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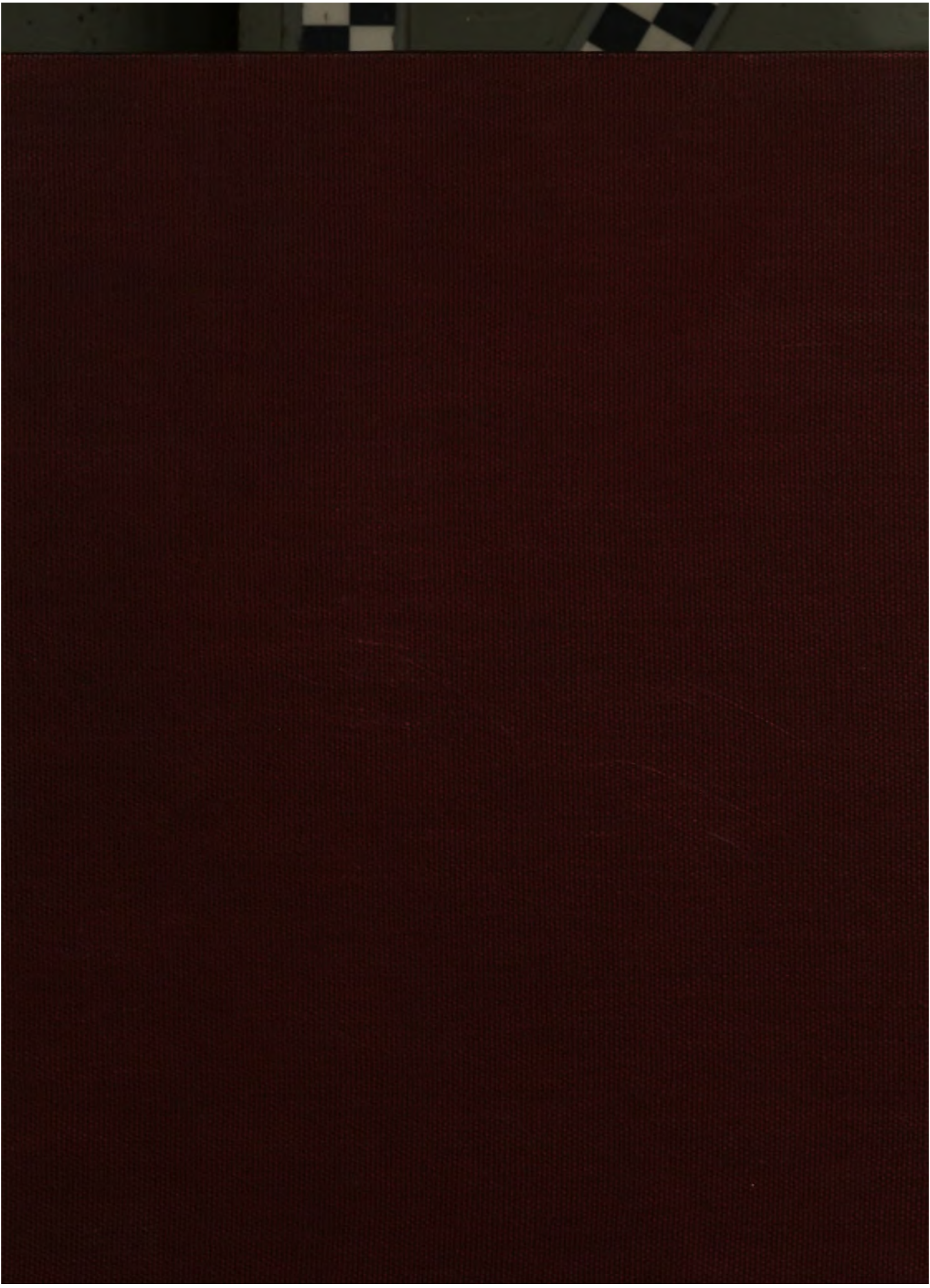
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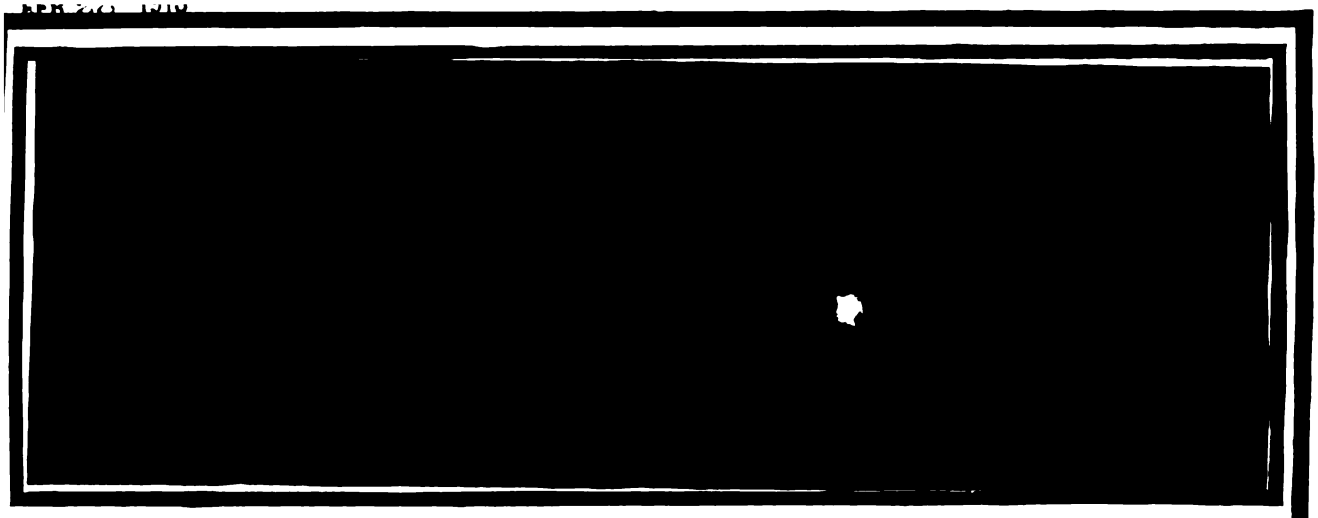
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TO DEALERS:

In every line the man who knows his business is the man who gets the business.
Do you know lubricating oils?
Are you guessing, or are you sure?

If you wish to improve your knowledge of scientific automobile lubrication you will learn points of distinct value by looking into Gargoyle Mobiloils.

Gargoyle Mobiloils end guess-work in motor car lubrication. They are produced by the world's leading authorities on scientific lubrication—The Vacuum Oil Company.

As no one lubricating oil will suit all cars, Gargoyle Mobiloils are produced in several grades.

Our recommendations were made after a careful study of every American make of car and most of the leading foreign makes.

Beyond any question, Gargoyle Mobiloils set a new standard in automobile lubricating oils. Their endurance is remarkable.

If you wish to handle the most efficient automobile lubricating oils procurable, in grades suited to every car you supply, you will find in Gargoyle Mobiloils what you are looking for.

In the meantime, if you should want further information on the subject, write us. We will send you a descriptive booklet and prices.

GARGOYLE

Mobiloil

A grade for each type of motor.

VACUUM OIL COMPANY, Rochester, U. S. A.

BRANCHES: DETROIT Ford Building · BOSTON 49 Federal St. · NEW YORK 29 Broadway · CHICAGO Fisher Building · PHILADELPHIA 4th and Chestnut Sts. · INDIANAPOLIS Indiana Pythian Bldg.

Distributing warehouses in the principal cities of the world.

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The Largest Automobile Supply House in America.

Our Name Is Your Guarantee

WHATEVER you buy from the house of Chas. E. Miller you may expect the fullest degree of satisfaction in every detail. Quality, quantity, material, workmanship, durability will be just right or we will make it right. Our name is your guarantee.

To buy from a house the size and standing of this one is the safest way to insure complete satisfaction in all your dealings. We handle goods of standard quality only and of course stand back of everything we sell.

No matter what you want in the line of automobile accessories or supplies, remember our slogan, "We Either CARRY IN STOCK, WILL GET IT—OR IT ISN'T MADE." One of the prize winners in Motor's recent advertising contest selected this as the slogan out of the many shown. His reason was as follows: "This saying is the clearest possible statement of the Miller business policy which I have found to be a fact through several years of satisfactory relations with them."

Our Annual Catalog is the largest, most complete, up-to-date and authoritative dictionary of the auto supply market of any book published. It has come to be recognized as one of the standard reference works of the industry.

The total distribution of one hundred thousand copies of this catalog practically covers the world, at least wherever automobiles are used. Nearly all foreign as well as domestic automobile manufacturers and dealers, the offices of American Consuls, Public Libraries, Universities, Y. M. C. A. Schools, Publishers, Automobile Clubs, Engineer's Offices, Purchasing Departments—in all these places you will find a copy of the Miller catalog on file.

Fifteen branches spread over the United States, located in the principal motoring centers, bring Miller service within the reach of practically every motorist in the United States. Prompt delivery, perfect quality, honest prices---these are the things that distinguish Miller service and explain the marvelous growth of this pioneer establishment since its inception in 1896.

Catalog Mailed to Anyone, Any Place, On Request.

CHAS. E. MILLER, Manufacturer, Jobber, Exporter and Importer

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The Dirty Crank

has made every motorist mad at some time or other, whether it was because "the darned thing wouldn't start," or because the handle was dirty and greasy.

Cut It Out!! **Eliminate the Crank**

by having your 1913 car equipped with an Electric Cranker. Electric Lights also from same system, all founded upon and furnished energy by an

CLBA

STORAGE BATTERY

Use Class A CLBA Battery with an Electric Lighting Generator
Use Class B CLBA Battery with an Electric Self-Starter

Write us for full information

Willard Storage Battery Co.
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New York Branch: 136 W. 52d St.
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UNIV. OF CALIFORNIA

NEW PRICE LIST IN EFFECT OCTOBER 1, 1911, Cancelling all former price lists

The 8-DAY HIGH GRADE "BOSTON" AUTO CLOCKS

☞ These superbly built 8-day, high-grade clocks have seven-jeweled escapements, Breguet hairsprings, cut steel pinions, compensation balances, dust and water proof cases, etc., and are dealt in and used by those demanding a first-class article.

QUALITY and PRICE — UNAPPROACHABLE

Ask Your Dealer for the "BOSTON" AUTO CLOCK

MODEL B



MODEL C



Adjustable to various angles by Ratchet and Nut at back. In general appearance it closely matches many makes of speedometers.

MODEL D



MODEL E



PRICE LIST—PER CLOCK

SIZE (Dial)	MODELS A, B, C.	MODEL D	MODEL E
3-inch	$18.00	$21.00	$24.00
3 1-2-inch . . .	20.00	24.00	27.00
4-inch	22.00	27.00	30.00

For (Patent Applied for) Outside Stem Winding and Stem Setting Device, ADD $3.00 to above prices.

Superior to other devices. A great convenience for winding clock and setting the hands without opening the clock case.

☞ All sizes stated are the approximate diameters of the dials

The 8-Day High Grade "BOSTON" AUTO CLOCK For AUTOMOBILES and MOTOR BOATS

On Sale By Leading Jobbers and Dealers.
If Not With Your Dealer Sent on Receipt of Price.

BOSTON CLOCK CO., 16 State St., Boston, Mass.

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Bosch Plugs

AS GOOD AS BOSCH MAGNETOS

THE ability of Bosch Plugs to serve you satisfactorily, irrespective of motor conditions, is assured. Their exclusive features have been adopted only after deep study and wide experience in ignition requirements proved them correct. They produce results where others fail—they keep in condition long after others are thrown away.

Automobile racing is by far the most severe test of spark plugs. During these contests they are constantly flooded with oil, exposed to extreme heat and severe vibration. Only plugs of the sturdiest construction can withstand the shocks, the smashing rebounds, the terrific strain of high compression, the intense blue flame of the burning gases which surrounds them for hours at a time. The plugs that can survive such abuse must be strong, tough, heat proof,—to the highest degree of perfection. They must be

As Good As Bosch Magnetos

Bosch Plugs have stood these strains, stood them so well, so wonderfully, that practically every race of importance run during 1911 and 1912 was won by cars employing Bosch Plugs, with the "also rans" using them too. The drivers who know—the manufacturers whose experience has taught them to provide the best they can procure for their racing cars, have universally adopted Bosch Plugs.

Actual Size



Don't be satisfied with "enough" power—use Bosch Plugs and enjoy the maximum. Let us send you our booklet "Locating the Spark Plug"; just write us a note for it.

BOSCH PLUGS FROM YOUR DEALER **$1.00 EACH** **OR ORDER DIRECT FROM THE**

Bosch Magneto Co., 204 W. 46th Street, New York

CHICAGO : : DETROIT : : SAN FRANCISCO : : TORONTO

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Dealers



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The big tire business of the future will be Dunlop business

The GENUINE DUNLOP (Straight Side) TIRE

is destined to become the universal tire

Car owners, dealers and manufacturers are everywhere turning to the Genuine Dunlop Straight Side Tire.

The 600% increase which has taken place in our Dunlop sales during the past year is an indication of the certainty of this trend.

The trade in general have come to realize what tire experts have long known—that the Dunlop is the ideal type of motor car tire.

It is the easiest tire in the world to put on or take off and it is absolutely guaranteed against rim-cutting during the life of the tire.

It possesses the superior strength and durability to be found only in four-factory co-operatively-built United States Tires. In fact it possesses every point of advantage to be found in any other tire, and in addition has exclusive advantages to be found in no other tire.

But bear in mind, the Genuine Dunlop Straight Side Tire is made only by the

UNITED STATES TIRE COMPANY

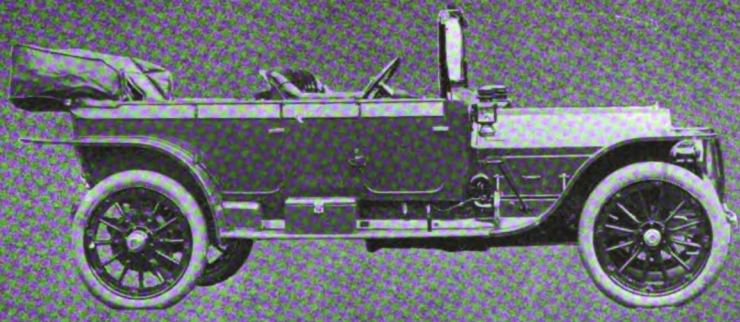
Makers of the famous Nobby and Chain Tread Tires (made in three styles), including the Dunlop.

NOTE: As always the guarantee of the United States Tire Company attaches to its tires when filled with air at the recommended pressure only

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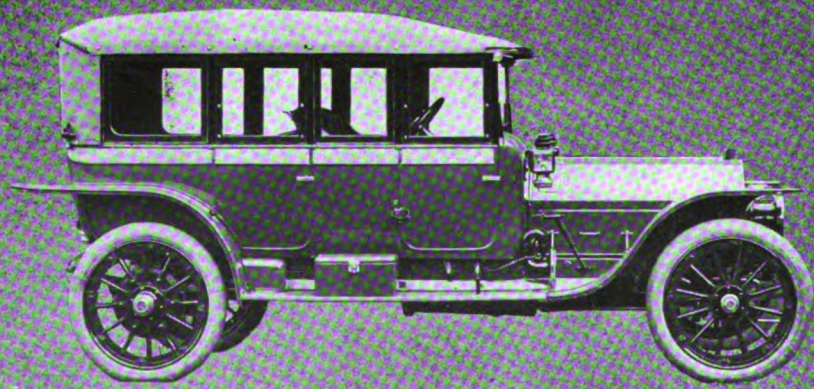
SPRINGFIELD METAL BODY CO.



Why not be comfortable all the year?

Our new light weight convertible bodies protect you from heat, cold, rain, snow and dust.
Send for catalogue.

SPRINGFIELD METAL BODY CO.,
SPRINGFIELD, MASS.



SPRINGFIELD, MASSACHUSETTS.

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What $200 Buys

By R. E. Olds, Designer

Here is a car on which I spend some $200 more than others think necessary.

It is spent to save repairs, to cut down upkeep, to insure a faultless car.

It pays for tires 34x4. Tires which cost $60 less are used on some cars of this weight.

It pays for 190 drop forgings, costing twice what castings cost.

It pays for 15 roller bearings ---11 of them Timken, costing five times as much as common ball bearings.

It pays for a $75 magneto--- for a doubly-heated carburetor--- for a centrifugal pump in place of a syphon.

It pays for big brakes, big springs---for axles and driving parts one-half stronger than necessary.

It pays for analyzed steel, for tested gears. For slow, careful building---for a thousand inspections.

It gives you a 17-coated body, genuine leather, the best curled hair.

And it saves the user from three to five times what I spend on these extremes.

Center Control

This car is controlled by a single small lever. The gear shifting is done by moving this lever only three inches in each of four directions.

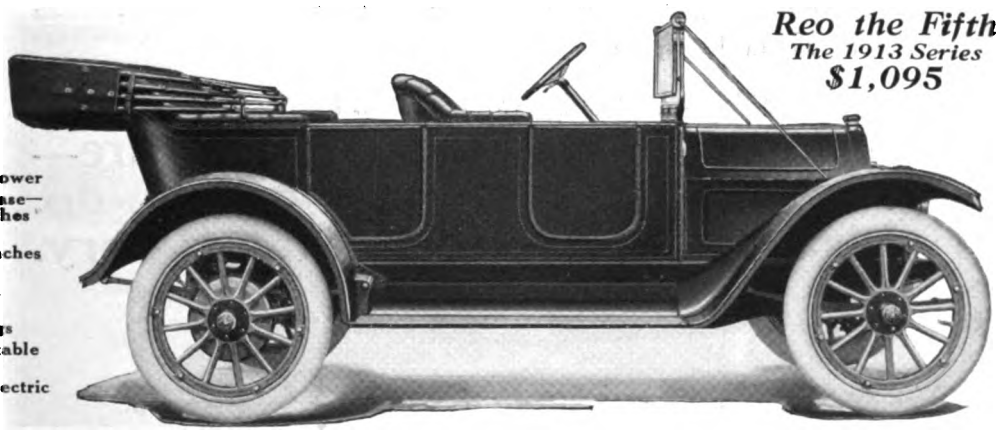
No side levers, no brake levers---nothing in the way. Both brakes are operated through the foot pedals.

Left side drive with right hand control, like all up-to-date cars. But the simplest control ever known in a car.

Dealers in a thousand towns. Write for our catalog and address of the nearest.

R. M. Owen & Co. General Sales Agents for **Reo Motor Car Co., Lansing, Mich.**

Canadian Factory, St. Catharines, Ont.



Top and windshield not included in price. We equip this car with mohair top, side curtains and slip cover, windshield, gas tank for headlights, speedometer, self-starter, extra rim and brackets—all for $100 extra (list price $170).

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Overland

OVER fifteen thousand Overlands have been delivered during the last five months. This is an increase of 300 per cent. over the same period last year. And last year we led every thousand dollar automobile producer in America.

This is more cars than all the automobile factories in Germany turn out in a whole year. Our 1913 sales are more than *double* those of any other manufacturer producing a similar car.

Our 1913 literature describes, explains and illustrates what we are---what we have and what we can do. It's all free. Please write the factory.

Address Department 52

The Willys-Overland Company
Toledo, Ohio

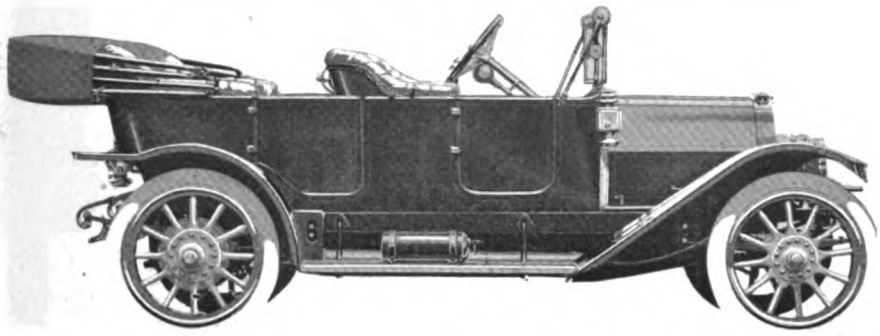
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Overland

$985—Completely Equipped

Model 69-T

Self-Starter
30 Horsepower
5-Passenger Touring Car
110-Inch Wheel Base
Timken Bearings
Center Control
Remy Magneto
Warner Speedometer
Mohair Top and Boot
Clear Vision, Rain Vision
Wind Shield
Prest-O-Lite Tank



$1475—Completely Equipped

Model 71-T

Complete Electric Lighting Outfit, Generator and Storage Battery
Self-Starter
45 Horsepower
Q. D. Demountable Rims
Timken Bearings
Center Control
Wheel Base 114 inches
Brewster Green Body, ivory striped, nickel plated and dead black trimming
Warner Speedometer
Mohair Top and Boot
Clear Vision, Rain Vision
Wind Shield
Prest-O-Lite Tank
Extra Rim



Touring Cars, Roadsters, Coupes and Torpedo Bodies

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COES

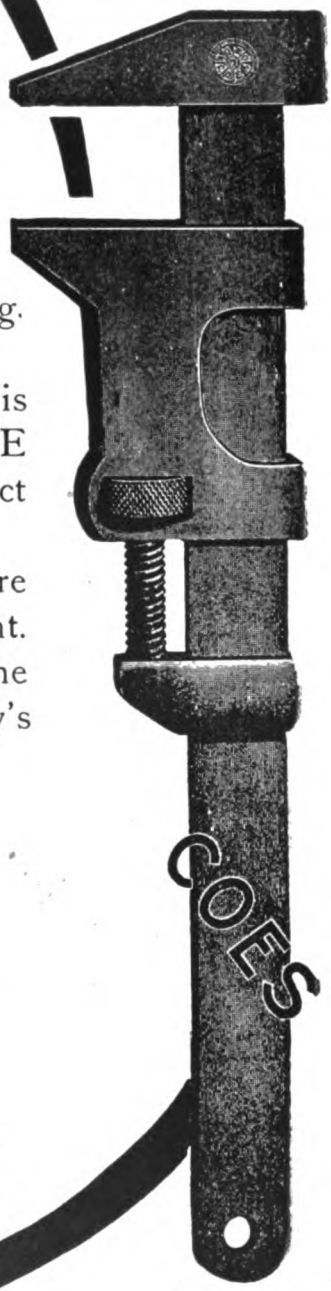
THE
Wrench Supreme

Strength without bulk or clumsiness.
Ease of handling without slipping or bruising.
Perfect balance and right grip

Everything the motorist desires in a wrench is to be found in the "COES" AUTOMOBILE MODEL, and you will never know perfect wrench service until you pin your faith to it.

It stands to reason that the 5 per cent. more you pay for a "COES" wrench goes for 60 per cent. more quality and service—put this wrench in the tool kit and shop. You will get your money's worth.

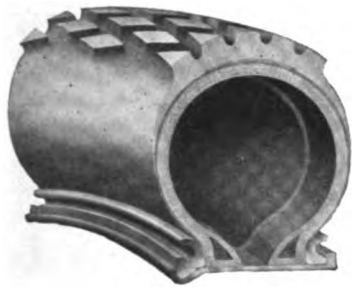
Send for Literature Now.



Coes Wrench Co.
WORCESTER, MASS.

J. C. McCARTY & CO.,
21 Murray St., New York City
JOHN H. GRAHAM & CO.,
113 Chambers St., New York City

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No-Rim-Cut Tires
10% Oversize
All Tiredom Records Broken

This Coming Season
Will You Still Over-Spend for Tires?

You who don't know No-Rim-Cut tires waste a pretty large share of your tire money.

Note this convincing evidence:

Men who do know bought last year 918,658 Goodyear tires. And they wanted 400,000 more.

They bought more than men bought in the previous twelve years put together.

The demand has broken all records of Tiredom, after countless mileage tests.

Now, isn't it time that you made a comparison?

Is it wise to face, for another season, blow-outs and rim-cuts and waste?

The evidence is that No-Rim-Cut tires save close to half of one's tire money. Stop and consider what that means to you.

If you question such savings, make mileage tests. And remember that hundreds of thousands have made them, with some two million Goodyear tires.

Look at This Tire

You can see that rim-cutting is made completely impossible.

There are no hooks on the base as with old-type tires. The removable rim flanges are set to curve outward.

The tire, when wholly or partly deflated, rests on a rounded edge.

The tire is held on by our patented feature—by six flat bands of 126 braided wires vulcanized into the tire base. That makes the tire base unstretchable. The tire can't be forced off, and yet it slips off like any quick-detachable when you remove a rim flange.

We control the only way known to make a satisfactory tire of this type.

See the Oversize

You can see that these tires are oversize, compared with clincher tires.

We claim but 10 per cent. But careful comparison of air capacity shows an actual average oversize of 16.7 per cent. We compared with six makes of clinchers.

Even 10 per cent. oversize, under average conditions, adds 25 per cent. to the tire mileage.

See the Non-Skid

Compare this Non-Skid with all other non-skids. You can see for yourself the tremendous advantages.

Note that we here add a complete extra tread, making a double-thick tread.

This extra tread is a very tough rubber. So the non-skid feature is immensely enduring.

The blocks are deep-cut and sharp-cut. Countless edges and angles grasp the road surface with a bull-dog grip.

Then these blocks widen out so they meet at the base. They don't center the strains on a part of the fabric. They distribute the strains as with smooth-tread tires. That means a long-lived tire.

Five minutes spent in a Goodyear shop will convince you that these things mean less tire cost.

What Mileage?

We can't prophesy the mileage, beyond our warrant, which you'll get from No-Rim-Cut tires.

That depends too largely on things we can't control. It depends on tire size as compared with car weight. It depends on roads and usage.

We can only say how the mileage compares with other tires under the same conditions. And that you can prove by comparison.

Statistics show that 23 per cent. of all clincher tires become rim-cut. Our patent tire never does.

Usage proves that 10 per cent. oversize, with equal tires, adds 25 per cent. to the tire mileage.

Reason will tell you that double-thick non-skids, with the strains distributed, will outlast the common non-skids.

Now we ask you to learn, by odometer test, what all this means to you.

Do It Now

Don't go on paying excessive tire upkeep, if this way really ends it.

Tires should be judged by the cost per mile. Else what is the use of working out these economies?

Here are tires that can't rim-cut. Here are oversize tires. Here are double-thick non-skids. Reason says they ought to save money. Legions say they do. And these tires, on sheer merit, now outsell all others.

You owe yourself a trial of such tires.

Write for the Goodyear Tire Book—14th-year edition. It tells all that we know, after 14 years, about cutting down tire expense.

GOODYEAR
AKRON, OHIO

No-Rim-Cut Tires

With or Without Non-Skid Treads

THE GOODYEAR TIRE & RUBBER COMPANY, AKRON, OHIO

Branches and Agencies in 103 Principal Cities
More Service Stations Than Any Other Tire (961)

We Make All Kinds of Rubber Tires, Tire Accessories and Repair Outfits
Main Canadian Office, Toronto, Ont.—Canadian Factory, Bowmanville, Ont.

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PREVENTION IS BETTER THAN CURE

It's far better, safer, cheaper to PREVENT accidents than to pay the costs AFTER the accident has happened.

TRADE MARK
Raybestos
REG. U.S. PAT. OFF.

"THE ORIGINAL AND BEST ASBESTOS BRAKE LINING"

Prevents accident because it is ***the*** brake lining that makes the brakes grip and hold INSTANTLY.
In an emergency---when danger threatens, when collision is imminent---your safety, the safety of other vehicles and pedestrians depends on---the brakes and brake lining. RAYBESTOS makes every brake sure and certain in an emergency. It is the greatest factor of safety that money can buy---line your brakes with RAYBESTOS and do it now!

Raybestos Has the Largest Co-Efficient of Friction



Acts Instantly with the Slightest Pressure

The name "RAYBESTOS" stamped in each foot of the lining. For sale by ***all*** good dealers. Beware of inferior substitutes.

THE ROYAL EQUIPMENT COMPANY

Railroad and Bostwick Aves., Bridgeport, Conn.

We also make Duplex and Raymond Brakes and Gyrex, the Mixer

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A Little Goes A Long Way



And Every Drop Counts

FOR PERFECT LUBRICATION

USE

HARRIS

TRADE MARK REG. U.S. PAT. OFF.

OILS

Care in manufacture, years of experience, and the best crude stock obtainable, are some of the causes of HARRIS OIL supremacy. From the beginning of the automobile industry we set a standard for high grade oils—and we are the only manufacturers who are able to keep up to that standard, because of our experience and facilities for production. We have eliminated soot-deposit ingredients to the greatest possible degree. Every drop is tested and proven before leaving the factory. Greater power, added mileage and a smoother running engine are the results of using the best oils—HARRIS OILS.

Be sure to see our exhibit at the Chicago Show.
Space 52 Coliseum Gallery.

A. W. HARRIS OIL COMPANY,

326 S. Water St., PROVIDENCE, R. I. 143 No. Wabash Ave., CHICAGO, ILL.

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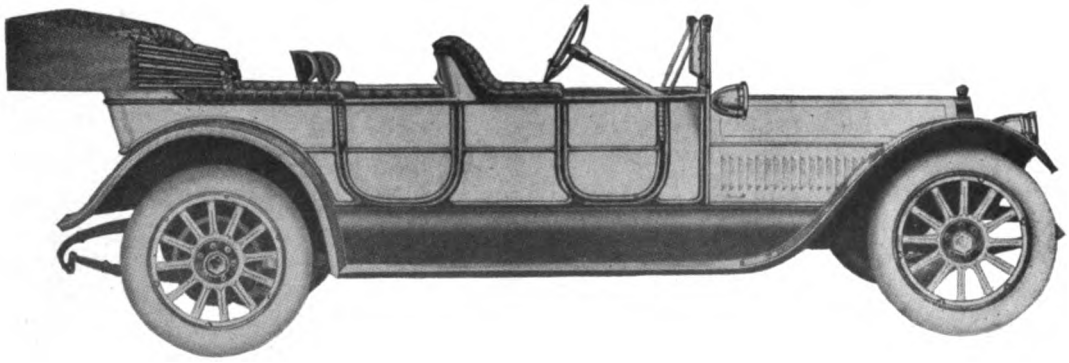
Our Exclusive Feature

We will (at small extra cost) furnish our Regular Models with the

AUSTIN

Two-Speed Axle

This axle provides two different gear ratios, both on direct drive, and in combination with a three-speed transmission gives six speeds forward and two reverse.



Model "77" has a Regular Direct Drive of 3 1-2 to 1, and a Special Direct Drive of 2 to 1.
Model "55" has a Regular Direct Drive of 4 1-2 to 1, and a Special Direct Drive of 3 to 1.

The Regular Direct Drive provides ample power and exceptional ease of control for hills, bad roads and crowded city traffic.

The Special Direct Drive for normal conditions, shows a gain of over 50% in mileage for the same fuel consumption and motor speed, eliminates the noise, wear and tear of running the motor at excessive speeds, adds materially to the life and durability of the car and pleasure of riding.

Model "77" Six Cylinders, 4 1-2 x 7 - - $6000.00
Model "66" Six Cylinders, 4 1-2 x 5 1-2 - $5000.00
Model "55" Six Cylinders, 4 x 5 - - - $4000.00

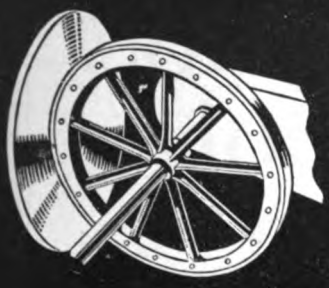
MORE NEW, IMPROVED and **DISTINCTIVE FEATURES** than any other car. Two-speed rear axle, high pressure air self-starting system, complete electric lighting system, left hand steer, center control, two-spark magneto, four-speed transmission, both brakes controlled by foot pedals, and our special nine passenger body.

Write for complete description and any information you may desire in regard to our two-speed axle.

Austin Automobile Company

GRAND RAPIDS, MICHIGAN

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The Gearless Transmission!

For ten years this simple, reliable car has been growing steadily in popularity. Today it is found giving perfect service in every section of the country. It offers advantages which are impossible in the gear car—and these advantages mean the very utmost in service and satisfaction for you.

A Cartercar Will Save 1-3—1-2 Your Tire Bills!

There are no jerks or jars in starting or stopping—and this means that much of the hardest wear on the tires is eliminated. Tires are the big item in the upkeep expense of the ordinary car.

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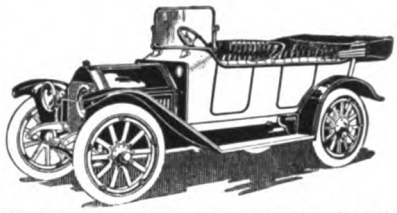
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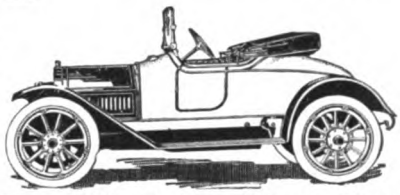
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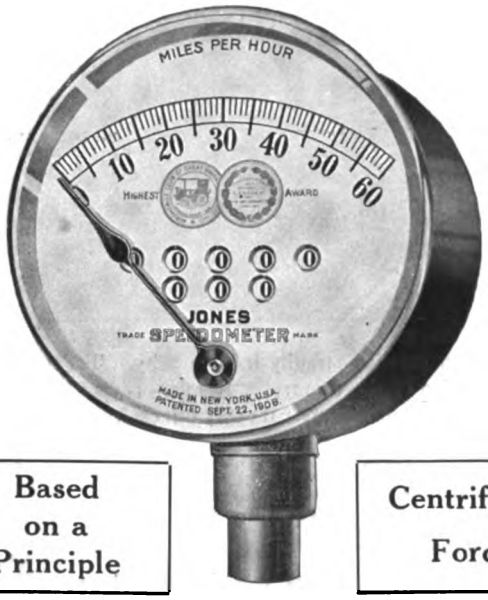
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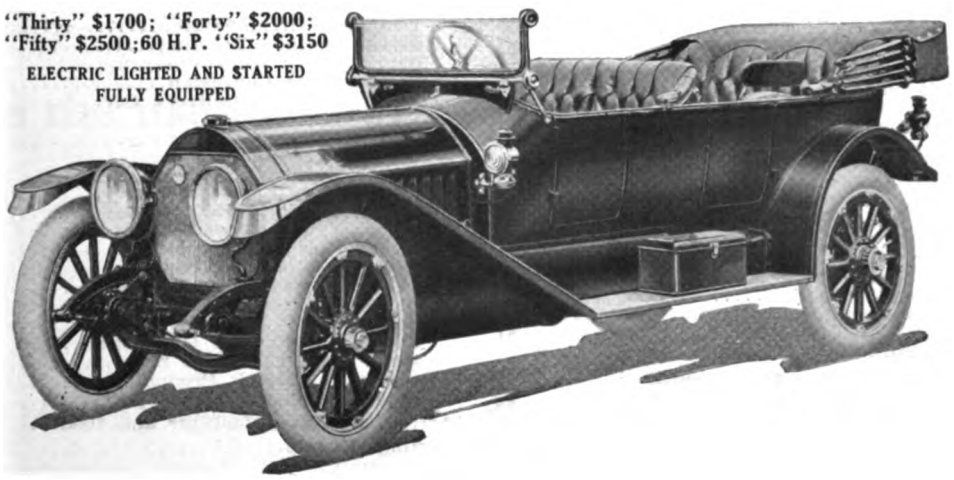
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Page

*Four Structures for Chicago Show....28
Manufacturers Discuss National Shows....28
Tire Producers Adopt New Guarantee....29
New Departure Exhibit....29
*Registrations Indicate Million Cars....30
Maxwell Motor Company....31
Will Handle Maxwell Account....31
*Providence Show Successful....32
*Ames Shock Absorber....32
*Refinements Mark New Schacht Chassis....33
Detroiter Cars Abroad....37
*Splendid Business at Local Shows
Detroit Dealers at Wayne Gardens....38
Many Sales in Lynn....39
Montreal Holds Another Show....40
Philadelphia's Truck Display....41
Fourth Annual Toledo Show....41
Pleasure Cars at Buffalo....41
Winnipeg's Second Annual....42
Large Display at Troy....42
Newark Plans Complete....43
Dealers Unite at Albany....43
Rochester's Biggest Show....43
New Makes at Pittsburg....44
Brooklyn Dealers Need Room....44
British Section at Toronto....44
*Mechanical Notes for Owners—
Folding Inner Tubes....45
Covering the Radiator....45
Proper Use of S Wrenches....46
Oil and Cold Weather....46
*Equipping the Private Garage, Part III....47
*New Dixon Catalogue....49
*Pathfinder Drivers Named....49
Savannah May Have Show....49
*New and Novel Accessories....50
Editorials—
The Price of Gasoline....54
Demand for Uniform Laws....54
Transcontinental Touring....55
Value of Racing....55
The Long Stroke Motor....55
*The Canyon Drives of Colorado, James A. Harris, Jr....56
Panama-Pacific Exposition....59
Quebec-Miami Highway....59
*The Garage and Repair Shop—
Mafan, a New German Magneto....60
New Bearing Metal....61
To Blacken Aluminum....61
Annealing Steel....61
Belt Glue Formula....61
*Garage and Repair Shop Equipment—
The Hydraulic System....62
Shaw Vise for Machine Work....62
American Compressors....63
Lubricating Oil Cabinets....63
Seamless Steel Tanks....63
Coes Wrenches....63

Page

*Motoring in Foreign Lands....64
*Features of Planhard Carburetor....67
*Correspondence with the Reader—
Function of Spiral Springs....68
Back Firing in Carburetor....68
Timing Splitdorf Magneto....68
Wiring Dual Ignition....70
Valve Timing....70
*In the Commercial Vehicle Field—
Electrics in Delivery Service....71
Good Record for Whites....71
Interesting Dumping Body Installation....72
Economical Haulage in Dairy Business....73
KisselKars in St. Paul....73
Moreland for Honduras....74
Will Replace Horses....74
Whites for Express Work....74
KisselKars for Fire Duty....75
Operates Large Fleet....75
Truck Reliability Run....75
Motoring Laws and Their Enforcement—
Governor Signs One Bill....76
Legislation in Jersey....76
Interesting French Decision....76
Seek Uniform Regulations....77
Would Transfer Authority....77
Amend Truck Bill....77
*In the Aviation Field....78
*News of the Industry—
Peerless' Expansion Plans....81
Ackerman Is President....81
Leaves Reo Truck Company....81
Leaves Automobile Industry....82
New Oil Concern....82
Buys Fisk Rubber Stock....82
Referee Will Hold Sale....83
Briscoe Freres Organized....83
New R-C-H Manager....83
Addition to Pilot Plant....83
Two New Firestone Men....84
Seeks Another Building....84
Reorganizing Knox Company....84
Names Cause Confusion....85
Announces New Delivery Car....85
To Increase Its Output....85
Extends Business Facilities....85
*Activities of Motorcyclists—
The Chicago Show....86
The New Machines....86
Those Who Displayed Accessories....87
Considering One Show Only....87
The New Emblem Line....88
The Indian Side Car....90
Humiston's New Records....92
New Merkel Agencies....92
Chicago Wants the Convention....93
Motorcycles at Toledo Show....93
Growth of Bosch Production....93
Yale as Economical Transport....93
*Activities of Manufacturer and Dealer....94
Coming Events....97

*Indicates article is illustrated.

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INDEX TO ADVERTISERS



American F. N. Company..... 93
Austin Automobile Co..... 14

Barrett Manufacturing Co.....104
Beach Co., T. C.....104
Borne, Scrymser Company.....106
Bosch Magneto Company..... 3
Boston Clock Co..... 2
Boyd, F. Shirley.....108
Bretz Company, The J. S.....103
Buckeye Manufacturing Co.....104

Cameron Mfg. Co.....107
Cartercar Company..... 15
Cataract Rubber Co.....102
Coes Wrench Company..... 10
Cole Motor Car Company.....106
Columbia Lubricant Co. of N. Y. 99
Croxton Motor Car Co., The....102
Cutter, Geo. A.....101
Cutting Motor Car Co.....102

Dean Electric Company.....103
Dixon Crucible Co., Jos..... 98
Dover Stamp. & Mfg. Co.....101

Eagle Oil & Supply Co.....107
Edwards Mfg. Co..... 99
Emblem Manufacturing Co..... 89
Empire Automobile Co.....101

Federation Amer. Motorcyclists. 89
Firestone Tire & Rubber Co....102
Fisk Rubber Company.....103
Frontier Specialty Company....108

Geiszler Bros. Storage Bat. Co..100
Goodnow Mfg. Co.....102
Goodyear Tire & Rubber Co..... 11
Gray Specialty Co.....106

Harris Oil Company, A. W..... 13
Haws, Geo. A..... 98
Hawthorne Mfg. Co.....102
Haynes Automobile Co.....102
Herreshoff Motor Co.....107
Hoffecker Company, The.....105
Holtzer-Cabot Electric Co.....105
Hupp Motor Car Co.....105

Ideal Motor Car Company.....101
Indian Refining Co..... 98
Invader Oil Co..... 21

Jackson Automobile Co.....105
Janney, Steinmetz & Co.....105
J. M. Shock Absorber Co.....102
Jones Speedometer Company.... 16

Kissel Motor Car Company..... 17
Knox Automobile Company..... 98
K-R-I-T Motor Car Co.....102

Leavens & Co., William.....102
Lenox Motor Car Company.....106
Liquid Tire Tonic Co..... 99

Marburg Bros.....101
McVey Mfg. Co.....102
Mea Magneto.....101
Mercer Automobile Company...103
Miami Cycle & Mfg. Co..... 91
Michigan Motor Car Co.....107
Miller, Chas. E.....Cover
Milwaukee Auto Specialty Co..104
Moller Brothers Controller & Economizer Co.....100
Mosler & Co., A. R.....105

National Motor Vehicle Co.....105
New Departure Mfg. Co.....100
Nordyke & Marmon Co..... 98
N. Y. Lubricating Oil Co..... 99
N. Y. & N. J. Lubricant Co..... 19

Owen & Co., R. M..... 7

Paige-Detroit Motor Car Co....105
Perfection Spring Co.....102
Pilot Car Sales Co.....104
Planhard Mfg. Co.....106

Randall-Faichney Co.....105
Remy Electric Company.....103
Reo Motor Car Company..... 7
R. I. V. Company.....108
Royal Equipment Co..... 12

Sager Company, J. H.....104
Selden Motor Vehicle Co.....100
Speedwell Motor Car Co.....103
Splitdorf Electrical Co.....106
Springfield Metal Body Co..... 6
Standard Co., The.....107
Standard Oil Company.....104
Standard Welding Co.....102
Standard Woven Fabric Co.....100
Studebaker Corporation.....106
Sumner, George, Inc..... 98
Swenson, B. A..... 93

Texas Company, The.....102

United States Tire Co.....4-5

Vacuum Oil Co.....Cover
Valvoline Oil Company..... 98

Waite Auto Supply Co..... 98
Wall, J. H.....101
Warner Instrument Co.....Cover
Warren Motor Car Company....105
Weed Chain Tire Grip Co..... 97
White Co..... 22
Willard Storage Battery Co..... 1
Willys-Overland Company.....8-9

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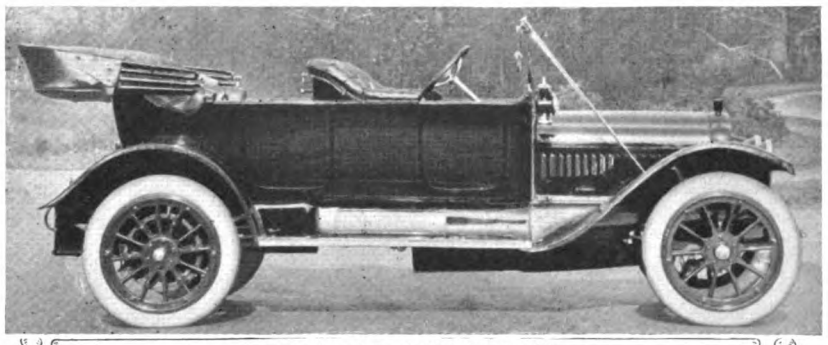
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THE AUTOMOBILE JOURNAL

VOL. XXXV, No. 1 FEBRUARY 10, 1913 Price, $1.00 the Year

FOUR STRUCTURES FOR CHICAGO SHOW.

Twenty-One New Makes Revealed in Western Metropolis, Adding Thirteen Sixes to the Season's Models---Electrics Departmentalized for First Time.

SOME 400 pleasure cars, reaching a total estimated value of $3,000,000, were displayed at the 13th annual automobile show in Chicago during the first week, Feb. 1-8. Four structures, including the Coliseum, Annex, First Regiment armory and the Wilson building, were utilized. General Manager Samuel A. Miles of the National Association of Automobile Manufacturers, under whose management all of the Chicago shows have been held, predicted that 400,000 people would visit the display during the week and that the total sales would aggregate $6,000,000. Complete figures are not yet available, and it is impossible to indicate whether this prediction was fulfilled.



Interior of the Coliseum During Progress of 13th National Chicago Show.

It would appear that the management left no stone unturned to make the exhibition a splendid success. Throughout the week special rates on the railroads leading into Chicago acted as an added inducement for the people of that section to visit the western metropolis. The doors were opened to the trade at 1 in the afternoon of Feb. 1, opportunity being afforded at that time for visiting deal-

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ers to inspect the new models in advance of the general public. Several special trains brought these men to the city, and they were met by a large delegation of men from the various factories represented in the display. It must not be understood that the efforts to interest dealers and in securing new agencies were confined to that one afternoon, but it does appear that the show took on a more retail aspect after the public opening at 6:30 that evening.

There was not the same reason for confining efforts to an attempt to interest dealers that has been true in former years. The so-called minor show circuit of the Middle West, or a substantial portion of it, has been raised to the dignity of a national circuit this year. Cities which have appeared much larger than that at New York. The figures bear out this statement. While the list of exhibitors totalled about the same in both instances, approximately 500, there were 102 who displayed pleasure cars as against 88 for New York. This would seem to indicate that there were but 14 new makes shown at Chicago, but some of those who were represented at the eastern display failed to secure suitable space at Chicago. The total of new makes was 21, of which 11 were electrics.

Speaking in a general way, practically the same characteristics were manifested at both shows. The list of six-cylinder gasoline models was increased by 13, this including the K-R-I-T six, which was displayed for the first time at



General View of the Main Floor of the Chicago Coliseum, as Seen from Near the Entrance, During the Recent Pleasure Vehicle Display.

been obliged to wait, heretofore, until after the Chicago display before holding their local exhibitions, already have had opportunity to inspect the season's models, many of which have been supplied by the sales departments of the concerns exhibiting at Chicago.

For some years past there has been a noticeable tendency toward elaborate decorations, particularly in the Coliseum. This year the general treatment was of a character much more simple, although the effect was quite as marked as ever. There was much better opportunity to view the machines as an assembly than was true in 1912, for instance, and this undoubtedly made for a more general comparison of the various models.

In the matter of numbers, the Chicago display any show. Wire wheels, electric starting and lighting, and the installation as regular equipment of many accessories and fittings formerly regarded as extras were quite as much in evidence as in the East. The new gasoline makes were: Austin, Colby, Crow Elk-Hart, Glide, Great Western, McFarlan, McIntyre, Midland, Pratt and Staver.

In some respects the display of the Austin Automobile Company, Grand Rapids, Mich., was the most radical feature of the show, because of the fact that the Austin is utilizing a two-speed rear axle this year. This axle provides two different gear ratios, both on the direct drive, and in combination with the three-speed transmission gives six speeds forward and two reverse.

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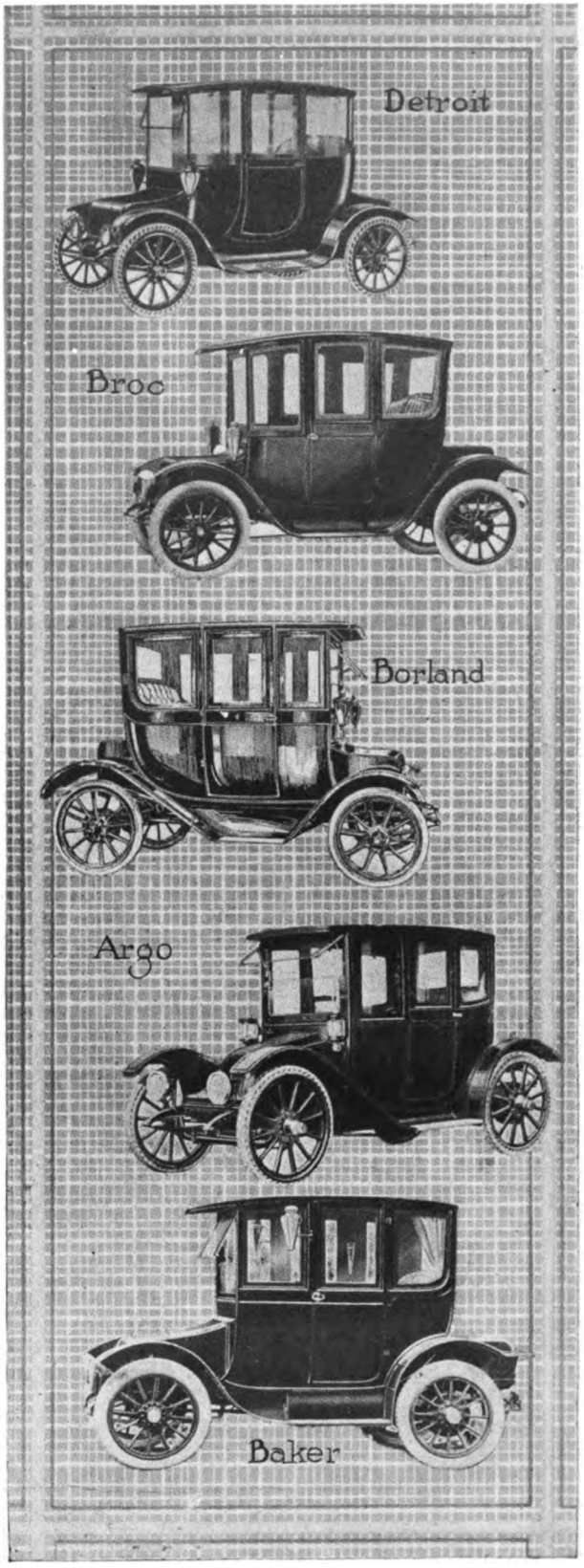
Special attention was given to the display of electric vehicles, these being allotted space together in the First Regiment armory, instead of being intermingled with the gasoline cars as in former years. This was a plan which proved decidedly satisfactory to the manufacturers and those interested in this type of vehicle. Chicago is in the centre of a large district where electrics have been used with decided success, and where the sales have been much larger than in some other sections. It is not surprising, therefore, that this part of the show should have awakened deep interest.

Eleven makes that were not seen in New York were shown at the Chicago display. This means a total of 16, for only five were exhibited at the Grand Central Palace last month. The 11 were: Argo, Baker, Borland, Broc, Century, Chicago, Detroit, Ohio, Rauch & Lang, Waverley and Woods. These are illustrated herewith, as are the 10 gasoline makes exhibited for the first time at a national show this year in that city. The specification details are presented in tabulated form on another page.

The display of accessories was most complete, although several exhibitors who were seen at New York were added to the list of those who held private shows, through inability to secure space or for some other reason. To offset this deflection, as always has been true of the Chicago show, numerous accessory houses located in the Middle West were represented. Some of these never have made effort to exhibit their product at shows in the East.

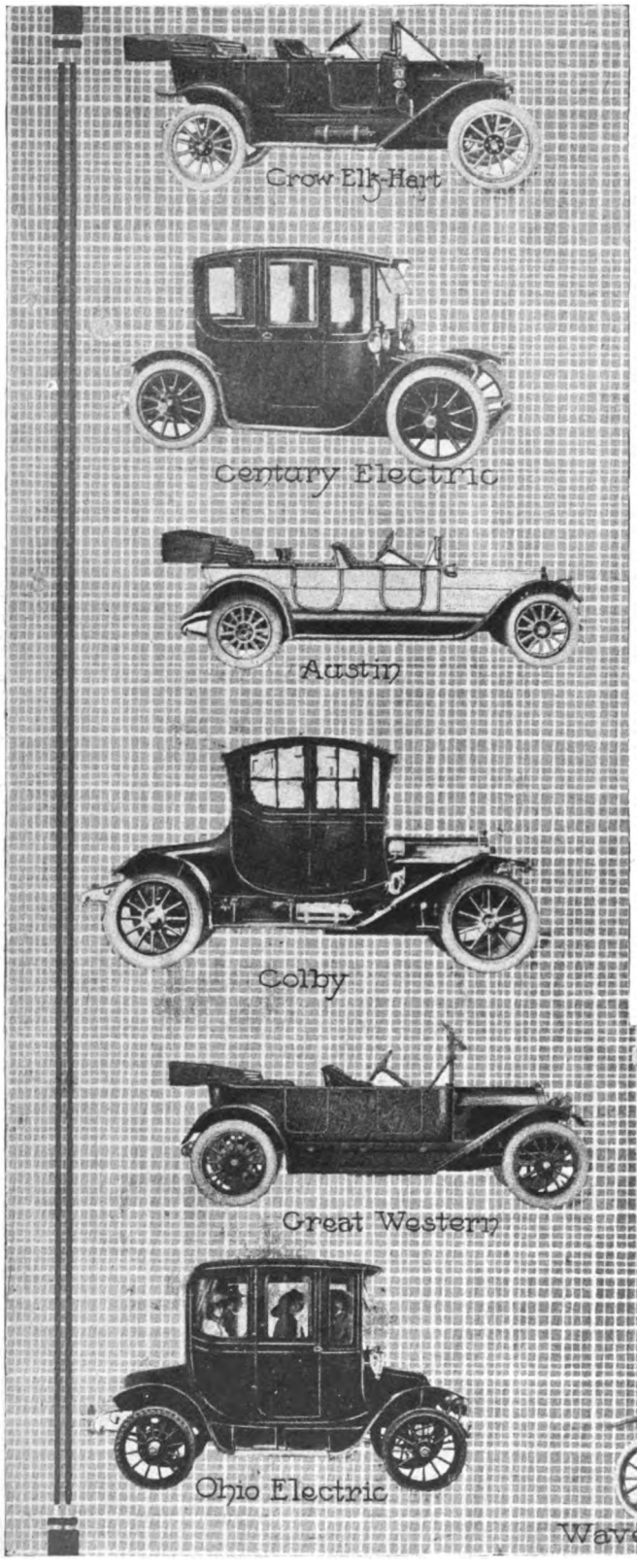
This separate show feature was undertaken by a few automobile manufacturers as well. The Ford Motor Company always holds a show of this character during the Chicago exhibition, and this year this concern was joined by the Marion Motor Car Company, Empire Automobile Company and Apperson Bros. Automobile Company. The last named was not represented at the New York exhibition, and the same thing may be said with reference to the Ford.

In addition, two entirely new cars were revealed at private shows, one of these being the Howard, made by the Central Motor Car Company, Connersville, Ind., and the other the Chandler, produced by the Chandler Motor Car Company, which is composed of former officials of the Lozier Motor Company, Detroit. Both are six-cylinder machines. It is understood that the Chandler company will locate in Cleveland, although this decision has not been made as yet. The Central company is occupying the former plant of the Lexington Motor Car Company.



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IMPORTANT DETAILS REVEALED IN 49 PLEASURE CAR MOD-



BRIEF SPECIFICATIONS

Make	Cyl.	Type	Cast	Bore	Stroke	Ratio
Austin	6	L head	pairs	4.000	5.00	1:1.25
Austin	6	T head	singly	4.500	5.50	1:1.22
Austin	6	T head	singly	4.500	7.00	1:1.55
Colby	4	L head	pairs	4.500	5.00	1:1.11
Colby	4	L head	block	4.125	5.25	1:1.27
Colby	6	L head	threes	4.125	5.25	1:1.27
Crow Elk-Hart	4	L head	block	4.000	5.00	1:1.25
Crow Elk-Hart	4	T head	block	4.125	5.00	1:1.21
Crow Elk-Hart	6	L head	pairs	3.750	5.00	1:1.33
Crow Elk-Hart	6	L head	pairs	4.125	5.25	1:1.27
Glide	4	L head	singly	4.750	5.00	1:1.05
Great Western	4	L head	singly	4.250	5.50	1:1.29
McFarlan	6	*	pairs	4.250	5.00	1:1.17
McFarlan	6	T head	threes	4.000	5.00	1:1.25
McFarlan	6	T head	block	4.000	6.00	1:1.50
McIntyre	6	T head	block	3.500	4.50	1:1.29
Midland	4	T head	pairs	4.500	5.00	1:1.11
Midland	6	T head	threes	4.000	5.00	1:1.25
Pratt	4	L head	block	4.000	4.50	1:1.13
Pratt	4	L head	pairs	4.500	4.75	1:1.03
Pratt	4	L head	pairs	4.500	5.75	1:1.30
Staver	4	T head	block	4.500	5.00	1:1.11
Staver	4	T head	block	4.500	6.00	1:1.33
Staver	6	T head	block	4.000	6.00	1:1.50

*Valve in the head.

BRIEF SPECIFICATIONS

Make	Motor	Location
Argo A	Westinghouse	rear axle
Argo B	Westinghouse	rear axle
Argo C	Westinghouse	rear axle
Baker	Gen. Electric	centre chassis
Baker	Gen. Electric	centre chassis
Baker	Gen. Electric	centre chassis
Borland	Gen. Electric	centre frame
Borland	Gen. Electric	centre frame
Broc	Westinghouse	centre chassis
Broc	Westinghouse	centre chassis
Century	Westinghouse	under seat
Chicago	Westinghouse	chassis frame
Detroit	Detroit	centre frame
Detroit	Detroit	centre frame
Ohio	Crocker-Wheeler	centre frame
Rauch & Lang	Hertner	under floor
Rauch & Lang	Hertner	under seat
Waverley	Waverley	rear axle
Woods	Woods	centre chassis
Woods	Woods	centre chassis

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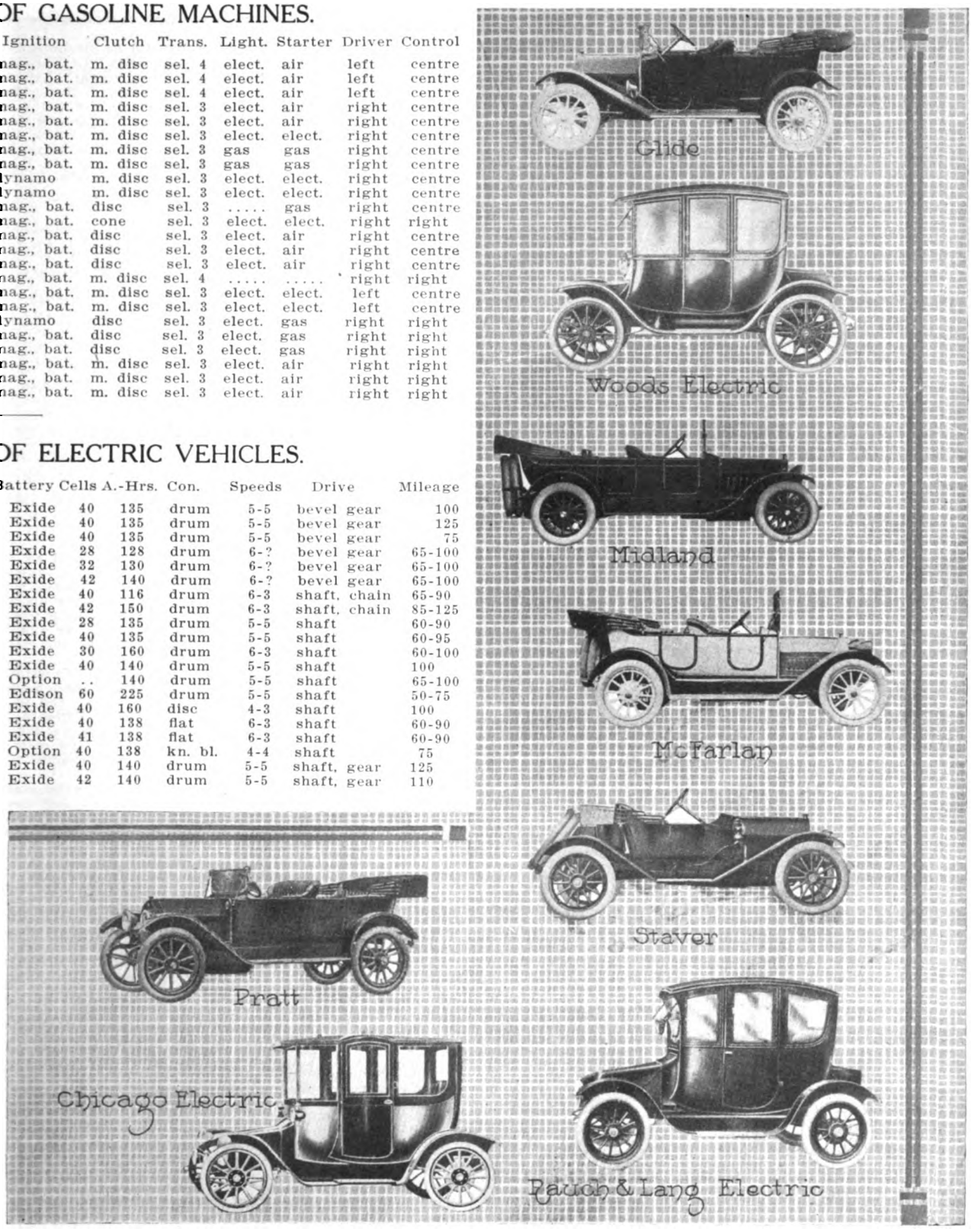
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Ignition	Clutch	Trans.	Light.	Starter	Driver	Control
mag., bat.	m. disc	sel. 4	elect.	air	left	centre
mag., bat.	m. disc	sel. 4	elect.	air	left	centre
mag., bat.	m. disc	sel. 4	elect.	air	left	centre
mag., bat.	m. disc	sel. 3	elect.	air	right	centre
mag., bat.	m. disc	sel. 3	elect.	air	right	centre
mag., bat.	m. disc	sel. 3	elect.	elect.	right	centre
mag., bat.	m. disc	sel. 3	gas	gas	right	centre
mag., bat.	m. disc	sel. 3	gas	gas	right	centre
dynamo	m. disc	sel. 3	elect.	elect.	right	centre
dynamo	m. disc	sel. 3	elect.	elect.	right	centre
mag., bat.	disc	sel. 3	.....	gas	right	centre
mag., bat.	cone	sel. 3	elect.	elect.	right	right
mag., bat.	disc	sel. 3	elect.	air	right	centre
mag., bat.	disc	sel. 3	elect.	air	right	centre
mag., bat.	disc	sel. 3	elect.	air	right	centre
mag., bat.	m. disc	sel. 4	.....	.....	right	right
mag., bat.	m. disc	sel. 3	elect.	elect.	left	centre
mag., bat.	m. disc	sel. 3	elect.	elect.	left	centre
dynamo	disc	sel. 3	elect.	gas	right	right
mag., bat.	disc	sel. 3	elect.	gas	right	right
mag., bat.	disc	sel. 3	elect.	gas	right	right
mag., bat.	m. disc	sel. 3	elect.	air	right	right
mag., bat.	m. disc	sel. 3	elect.	air	right	right
mag., bat.	m. disc	sel. 3	elect.	air	right	right

OF ELECTRIC VEHICLES.

Battery	Cells	A.-Hrs.	Con.	Speeds	Drive	Mileage
Exide	40	135	drum	5-5	bevel gear	100
Exide	40	135	drum	5-5	bevel gear	125
Exide	40	135	drum	5-5	bevel gear	75
Exide	28	128	drum	6-?	bevel gear	65-100
Exide	32	130	drum	6-?	bevel gear	65-100
Exide	42	140	drum	6-?	bevel gear	65-100
Exide	40	116	drum	6-3	shaft, chain	65-90
Exide	42	150	drum	6-3	shaft, chain	85-125
Exide	28	135	drum	5-5	shaft	60-90
Exide	40	135	drum	5-5	shaft	60-95
Exide	30	160	drum	6-3	shaft	60-100
Exide	40	140	drum	5-5	shaft	100
Option	..	140	drum	5-5	shaft	65-100
Edison	60	225	drum	5-5	shaft	50-75
Exide	40	160	disc	4-3	shaft	100
Exide	40	138	flat	6-3	shaft	60-90
Exide	41	138	flat	6-3	shaft	60-90
Option	40	138	kn. bl.	4-4	shaft	75
Exide	40	140	drum	5-5	shaft, gear	125
Exide	42	140	drum	5-5	shaft, gear	110



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MANUFACTURERS DISCUSS NATIONAL SHOWS.

ONE of the matters under general discussion among motor car manufacturers and others in the industry during the first week of the Chicago show was the proposition involving the abandonment of national shows in the future. The plan seems to have resolved itself into a question of making the New York and Chicago displays dealers' exhibition of much the same nature as the annual Boston show, with the exception that the manufacturers would assist the local men in somewhat the same manner they are aiding them in those cities placed on the national circuit this year.

It develops that Albert L. Pope, president of the Pope Manufacturing Company, Hartford, Conn., addressed a personal letter to the members of the National Association of Automobile Manufacturers Jan. 25, the closing date of the second section of the recent New York show, in which this proposition was suggested. Because of the fact that Col. George L. Pope, chairman of the Automobile Board of Trade show committee and one of the men who has had charge of the arrangements for the New York display for some years, also is a member of the same firm, his name has been confused with that of the writer of the letter, a copy of which follows:

I have been giving the matter of automobile shows in general a great deal of consideration lately and have thought it over from every standpoint and wondered in my own mind how long this industry of ours could stand such expense as automobile shows in general entail.

The past week I have been more impressed than ever at the Madison Square Garden show as to the matter of expense, for the automobile industry in general pays for it. Last year I understand gate receipts paid by the public at Madison Square Garden were only 40 per cent. of the total. It is too early at this writing to say what they will be this year, but in all probability they will be somewhat less. The trade in general paying for and giving away the tickets not only pays the rent and decorations, but a large part of the patronage as well.

The disorganization of your factory and sales department and business in general during the weeks of the show is a serious matter and I think one that will have to be reckoned with in the near future by the automobile industry. The money in addition that is left with the hotels in New York and other cities is another serious point.

Now the situation resolves itself right down to this: Can the automobile industry stand the expense of these shows with all its ramifications?

As soon as the automobile show is in progress of promotion it is merely a signal for all newspapers and publications of every kind to attempt to get from the automobile manufacturers advertising and this year it seems to me that it has been worse than ever.

Several prominent men in other lines of business have commented to me in the last week as to the expense of the automobile show and have not hesitated to make the statement that the business they were in could not stand any such expense. I think we are beginning to be seriously criticised by the public and I feel that it is a question that ought to be discussed thoroughly from all points of view and if for any reason it should be deemed wise by a majority to discontinue shows this is the time to take the matter up because in the very near future the association will be making leases and arrangements for shows in 1914.

If you feel as I do, that shows should be discontinued, or at least the matter thoroughly discussed by the manufacturers, will you kindly write a letter to the National Association of Automobile Manufacturers, 7 East 42nd street, New York, requesting them to call a meeting of their members for a discussion of this matter in the very near future, so that if it is determined that shows be discontinued during 1914 we may be in a position to notify all those who are now interested to discontinue their preparations so far as we are concerned as manufacturers.

It will be noted that no mention is made in this letter concerning the accessory houses—members of the Motor & Accessory Manufacturers and others who have assisted in holding the New York and Chicago shows. These men, particularly members of the association named, also have exhibited at the Boston show as manufacturers. They are able to appreciate the value of each type of exhibition, and the opinion of one of them is voiced by Chas. E. Miller of New York City, the pioneer accessory man in this country and one of the members of the committee which arranged for the first show in that city in 1900. Mr. Miller says:

"Show me" was the handwriting on the wall as revealed at the fortnightly national double show in New York. What I mean by this is that our national New York show is now such in name only, because all the products have been shown and in use for months previous to the opening of the displays. Hence, the exhibitions themselves are no longer maker's shows, but dealer's shows; who retail directly to the user.

If the New York exhibition were a local show like the big Boston display, the local dealers, branch houses and jobbers in supplies could control it. Then the show could be held in one building, the profits going directly to the dealers, for certainly the makers have no license to be in the show business for profit. All the makers would need to do would be to furnish the sample cars and do the big metropolitan advertising.

The motor business wagon show should be held out-of-doors, in the late summer or early fall, so that practical demonstrations of loading and unloading, for example, could be held. This would indicate the real value of the product to intending purchasers.

Still another phase of the situation has been brought to light, although it cannot be said that it is entirely new. This is a suggestion that there be one national show held in Detroit, say in July, when the new models are announced. Something of this nature was offered a year ago, but at that time it was discovered there was by no means any definite period of the year when new cars were being introduced. Since then there has been general discussion of the yearly model question, but as yet no agreement has been reached.

Several manufacturers have expressed themselves very forcibly concerning the show situation, and while the opinion thus far disclosed can-

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not be said to be unanimous, there apparently are a large number who agree with the suggestion as outlined by Mr. Pope. It is probable that much more will be heard relative to this matter in the near future. Feb. 5 the N. A. A. M. executive committee decided to hold a 1914 Chicago show.

TIRE PRODUCERS ADOPT NEW GUARANTEE.

DURING the progress of the recent New York show the Motor & Accessory Manufacturers adopted a new form of tire guarantee, the published wording of which is as follows:

We guarantee all pneumatic motor car tires, bearing our name and serial number, to be free from imperfections in material and workmanship. Tires returned for consideration under this guarantee will be accepted only when all transportation charges are prepaid. If, upon examination, it is our judgment that tires are defective, they will be repaired or replaced at our option.

When tires are replaced by us, charges will be made to owners at the time new tires are delivered, for such amounts as in our judgment will compensate for the service rendered by such replaced tires.

Tires worn out in usual or unusual service, abused knowingly or unknowingly, misused, used on rims not bearing these stamps (———) injured through accident or design, are not covered by this guarantee.

(Name of tire) pneumatic motor car tires are not guaranteed to give any definite miles of service, and any and all guarantees are expressly waived by any purchaser of these tires who uses therein any substitute for air; or who uses them under weights in excess of those for which the various tires are recommended, or who does not keep tires inflated to the pressure recommended by us.

Not all tire producers are members of the Motor & Accessory Manufacturers. Even among those who are members there does not appear to be an agreement with reference to the effect of the action taken at New York. The Automobile Journal has asked all the leading makers to state their opinion concerning the new guarantee and its effect upon the tire industry. Some of these have responded as follows:

You have evidently confused the action of the tire makers in connection with not guaranteeing their tires when any substitute for air is used therein. There is just exactly as good and valuable a guarantee on tires today as there was one week ago. There has been absolutely no change in connection with same.

If you will read the advertising being run by most of the leading tire makers, you will find the guarantee in question therein, and it speaks for itself. It is simply a protective measure of tire makers to do away with the abuses that they have suffered under a guarantee by the use of injurious fillers and attachment of tires to rims not properly inspected, proving them to be suitable for use in connection with tires.

Yours truly,
B. F. GOODRICH COMPANY,
By H. E. RAYMOND, Second Vice President.
Akron, O., Feb. 3.

We do not believe in mileage guarantees for the reason that the properties entering into the use of a tire which determine the mileage that it ultimately gives are not only indefinite, but absolutely beyond the control of tire manufacturers, which necessitates the placing of a mileage guarantee so low to protect against the abused tire, that it is of little value to the careful user.

If a given quality of tire would give a uniform service in miles, a mileage guarantee would be advisable, but let us assume that there are 1000 tires exactly alike placed in service at the same time, the mileage that they give even in the event there are no accidents will vary in accordance with the individual conditions to which they are subjected—several hundred per cent.—which fact is unavoidable and makes impossible a rational mileage guarantee.

A guarantee coupled with the close price competition sets a wrong standard for the direction of the manufacturer's efforts. It offers an incentive to build a tire down in quality that it may be sold at a competitive price until with proper use it will just cover the mileage guarantee, rather than the proper incentive, which is the highest economy and the highest quality which it is physically possible to incorporate in an automobile tire.

Very truly yours,
KNIGHT TIRE & RUBBER COMPANY,
By O. HIBNER, Sales Manager.
Canton, O., Feb. 5.

We understand that this matter was taken up at a recent meeting of the tire manufacturers' section of the Motor & Accessory Manufacturers. We understand that the members present decided to withdraw from the custom which has heretofore prevailed of making adjustments upon a 3500-mile basis. We, however, do not expect to alter our present policy, as we are quite satisfied to maintain the guarantee of 4000 miles for our Vacuum Cup tires and 3500 miles for the plain tread tires.

While we are members of the Motor & Accessory Manufacturers, we are not compelled to adopt the policy which the majority has agreed upon.

Yours truly,
PENNSYVANIA RUBBER COMPANY,
By H. W. DUPUY, President-Treasurer.
Jeannette, Penn., Feb. 3.

Owing to the late arrival of other letters it is impossible to reproduce them at this time. It is anticipated that the subject is one in which both manufacturers and users will be interested deeply, and the discussion will be continued in another issue.

NEW DEPARTURE EXHIBIT.

Ball Bearing Shaft Hangers Shown for First Time at Private Display in Chicago.

The New Departure Manufacturing Company, Bristol, Conn., maker of ball bearings, etc., was not represented at the Coliseum show in Chicago this year. Instead a private display was maintained at the Congress hotel.

A feature of this exhibit was the New Departure ball bearing shaft hangers, brought out by this company for the first time. In addition, a demonstration of the anti-friction quality of the New Departure bearings was given in an interesting manner by a moving exhibit of ball bearings in action, with the sides cut away in such manner as to show the almost infinitesimal point of contact between the balls and races.

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REGISTRATION INDICATES A MILLION CARS.

WHILE it is impossible to secure complete figures regarding the registration of automobiles and motorcycles in all of the 48 states of the Union, as some commonwealths have no registration law and the licensing of cars in others is by local ordinance or with county officials, statistics from 37 states and the District of Columbia show that there were listed 970,327 vehicles at the close of 1912. It will be admitted that in certain instances these figures will include some duplication of cars, but when the number of machines in use in the other 11 states is taken into consideration, this will be more than offset. The conclusion must be that there are now in use in the United States more than 1,000,000 motor vehicles.



Photo Copyrighted, Underwood & Underwood, New York.
Motor Traffic on Fifth Avenue, New York City.

The information contained in the accompanying tabulation was secured by The Automobile Journal from every state official of jurisdiction save two. In one instance the figures are the statement made by the manager of a leading commercial body in a state which does not require registration by law. The classification is as it appears on the books of the state officials, and it will be noted that in some instances this is with all types of vehicles in one list, while in others there has been distinct attempt to keep a separate listing.

It will be seen that there are no entries for the states of Arizona, Colorado, Florida, Idaho, Kansas, Louisiana, Nevada, Oklahoma, South Carolina, Texas or Wyoming. The District of Alaska and the Insular possessions also are omitted. Local ordinances exist in Colorado, Louisiana and Wyoming, but only in a few cities. In Texas registration is with the county clerks and in South Carolina with the clerks of the county courts. There are no registration laws in the other states named, save Florida and Oklahoma, from which no returns were received. The figures for Montana are those supplied by the manager of the Commercial Club of Helena, and are regarded as conservative.

While it is true that some machines have been

OFFICIAL REGISTRATION FIGURES.

State	Pleasure Cars	Service Wagons	Motor-cycles	Motor Vehicles Un-classified	Total Vehicle Registration
Alabama	3,010	130	220	....	3,360
Arkansas	....	....	....	2,000	2,000
California	....	....	....	88,867	88,867
Connecticut	....	....	2,525	17,875	20,400
Delaware	....	....	....	1,732	1,732
Georgia	....	....	....	18,100	18,100
Illinois	....	....	9,236	67,913	77,149
Indiana	....	....	....	65,000	65,000
Iowa	....	....	4,209	44,141	48,350
Kentucky	....	....	....	5,284	5,284
Maine	7,880	265	358	....	8,503
Massachusetts	46,096	4,036	5,034	....	55,166
Maryland	9,710	733	1,859	....	12,302
Michigan	....	....	3,620	39,569	43,189
Mississippi	....	25	....	2,855	2,880
Missouri	22,087	1,301	973	....	24,361
Montana	300	100	47	....	447
New Jersey	....	....	6,171	42,852	49,023
Nebraska	....	....	....	33,921	33,921
New York	95,319	9,649	....	....	104,968
North Dakota	....	....	470	9,470	9,940
Ohio	....	....	....	63,125	63,125
Oregon	8,284	695	1,183	....	10,162
Pennsylvania	....	....	7,314	59,334	66,648
Rhode Island	7,518	745	780	....	9,043
South Dakota	....	....	750	15,200	15,950
Tennessee	....	....	....	9,993	9,993
Washington	....	....	....	13,000	13,000
West Virginia	....	....	....	3,090	3,090
Wisconsin	....	....	4,060	24,578	28,638
Virginia	....	....	714	5,760	6,474
Vermont	....	....	204	4,381	4,585
North Carolina	....	....	....	6,200	6,200
New Hampshire	....	....	590	6,710	7,300
Minnesota	....	....	4,000	29,000	33,000
New Mexico	....	....	....	886	886
Dist. Columbia	....	....	2,393	12,346	14,739
Utah	....	....	....	2,552	2,552
Total	200,204	17,679	56,710	695,734	970,327

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registered in two states, these comprise a comparatively small percentage. Taking Massachusetts as an example, there were 881 licenses issued to non-residents in 1912, or about 1.51 per cent. It may be stated that this number is not included in the accompanying tabulation for that state, but if the same ratio were to hold throughout the country the total result would not be effected materially.

There is one other point which must be taken into consideration. In some states perpetual registration is still in vogue, while in others the life of a registration is three years instead of one. It would be impossible to arrive at an exact determination of the cars in use in these commonwealths without analysis of each state law. There seems little doubt, however, that when allowance is made for all duplications, the number in service in the 11 states not included in the tabulation will not be equalled. The conclusion that there are at present 1,000,000 motor vehicles in use in the United States must be regarded as conservative. Incidentally, the figures presented offer opportunity of possibilities for future business.

MAXWELL MOTOR COMPANY.

Declaration of Policy Made by Reorganized United States Motor Company.

The reorganization of the United States Motor Company appears to have been fully accomplished, and the name of the new concern has been decided definitely as the Maxwell Motor Company, Inc. As is more or less well known this concern has acquired the property of the Maxwell-Briscoe Motor Company at Tarrytown, N. Y.; Auburn, R. I., and Newcastle, Ind.; Brush Manufacturing Company, Detroit; Alden Sampson Manufacturing Company, Detroit; Dayton Motor Car Company, Dayton, O.; Briscoe Manufacturing Company, Detroit, and Columbia Motor Car Company, Hartford, Conn. These were constituents of the old United States Motor Company. It also has purchased the organization and business of the Flanders Motor Company, Detroit, formerly the Metzger Motor Car Company.

It is announced that the Maxwell Motor Company, Inc., will produce four models for the coming year, these to be known as: Maxwell Six, models 40 and 50, formerly the Everett and more recently the Flanders, and the Maxwell, models 25 and 35, four-cylinder machines. In addition, for the present at least, the regular Maxwell, models 22 and 40, and the Stoddard-Dayton, models 30, 38 and 48, will be continued. The present owners of the Stoddard-Dayton, Brush, Everett, Columbia, Sampson and Maxwell, will be cared for by the factory at Newcastle, Ind., which has been set aside for the purpose of manufacturing and supplying repair parts for these machines.

The country is to be divided into a number of districts, to be in charge of district sales managers as follows: Boston, Ralph Colburn; Chicago, P. J. Pollock; St. Louis, C. G. Jackson; Minneapolis, O. W. Klose; Kansas City, C. S. Wright; Dallas, Tex., J. W. Shelor; Omaha, J. M. Opper; Atlanta, branch house; New York, C. F. Redden; Philadelphia, E. G. Oliver; Charlotte, N. C., A. Burwell, Jr.; Pittsburg, E. M. Green; Indianapolis, F. B. Willis; Memphis, Charles Booth; Denver, D. S. Eddins; San Francisco, C. R. Newby; Los Angeles, C. E. Stebbins; Portland, Ore., L. H. Rose.

The officers of the new company are: President, Walter E. Flanders; vice president, W. F. McGuire; comptroller, W. B. Anthony; commercial manager, C. A. Forster; treasurer, Carl Tucker; board of directors, James C. Brady, Harry Bronner, Eugene Meyer, Jr., Henry Sanderson, William E. Potter, George H. Burr, W. Catchings, William J. Maloney, W. F. McGuire, Walter E. Flanders. The general offices are at the corner of Woodward avenue and Warren street, Detroit.

WILL HANDLE MAXWELL ACCOUNT.

E. LeRoy Pelletier, Well Known Advertising Man, Also Interested in Starter.

According to a dispatch from Detroit, E. LeRoy Pelletier, one of the best known advertising men in the industry, has become connected with the Campbell-Ewald Advertising Agency in that city. It is understood that he will act as advertising counsel for several large accounts carried by this concern, among which is that of the new Maxwell Motor Company, Inc.

Information from New York states that Mr. Pelletier also is interested with John Splitdorf of that city in the organization of a company for the production of a new electric starter. This concern should not be confused with the Splitdorf Electrical Company, Newark, N. J., well known maker of ignition and electric lighting equipment.

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PROVIDENCE SHOW SUCCESSFUL.

Second Annual Display Under A. S. Lee's Management Enjoys Satisfactory Business.

While it is impossible to give an estimate of the business done by the members of the Rhode Island Automobile Dealers' Association at the second annual show in the state armory, Providence, R. I., Jan. 25-Feb. 1, it is announced that the total number of sales far exceeded those of the previous year. This is particularly gratifying to the association and to the manager, A. S. Lee.



A. S. Lee, Providence Show Manager.

More than 20,000 persons attended the exhibit during the week, and this in spite of the fact that the price of admission was increased this year. It is the opinion of the management that this action resulted in the presence of a greater percentage of people who were actually interested in the new models and desired to make purchases.

An accompanying illustration presents Manager Lee, who is already engaged in considering plans for the 1914 show. An effort will be made to secure accommodations for all dealers who make application, but just how this is to be brought about is a problem which Mr. Lee is unable to solve at present. Much of the success of the two shows already held has been due to his energetic work, and there is little doubt that he will evolve a satisfactory plan for future displays.

AMES SHOCK ABSORBER.

A Device for Eliminating Vibration and Stresses Which Presents Interesting Features.

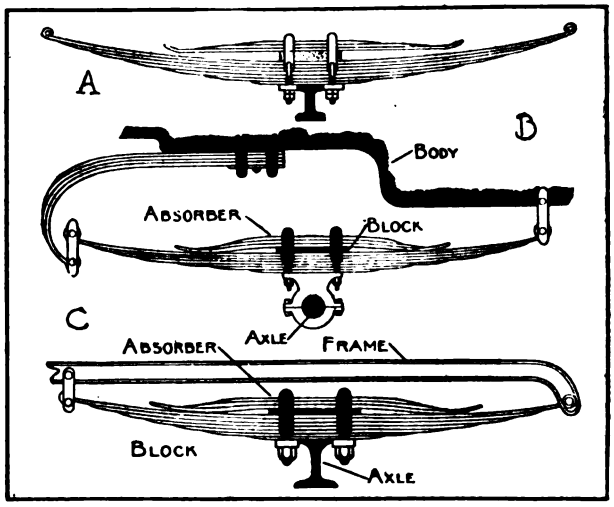
The springs of a car straighten when deflected by any unevenness in the road surface, and the resulting recoil projects the load of the machine upward and past its normal position, with a force proportional to the first shock. It is this movement which lifts one off the seat and which breaks the springs.

The Ames automatic shock absorber differs from those of conventional practise and comprises a steel spacing block and an inverted steel spring which is applied directly on top of the lower regular member. It has no effect upon the resiliency of the last named, nor is it affected by the first shock as the Ames is curved in the opposite direction. It is in contact with the spring in the latter's normal condition, but disengages when the spring is deflected as shown at A in the accompanying illustration. When the recoil takes place the shock absorber re-engages and so restricts the upward movement that all shocks and stresses are absorbed.

Another quality claimed for the Ames is that the master leaf is relieved of those stresses which make for breakage and that all vibration is absorbed by stopping them at the place at which they originate. The device is constructed both for pleasure and commercial vehicles and is made of heat treated, chrome vanadium spring steel.

The design makes for easy installation as the operation requires but the removal of the spring clips, fitting the block member, and replacing the clips. Longer clips are necessary, however, but these are supplied with the device by the licensees, Clarence N. Peacock & Co., 1784 Broadway, New York City.

The employment managers of many of the big Detroit automobile manufacturing concerns report difficulty in securing skilled mechanics to keep pace with the enormous increase in the production of their shops. The output of most of the factories has increased to such proportions that it is difficult to secure workmen to fill the neces-



The Ames Automatic Shock Absorber; A, Showing Position with Spring Deflected; B, Installation upon Rear Springs; C, on Front.

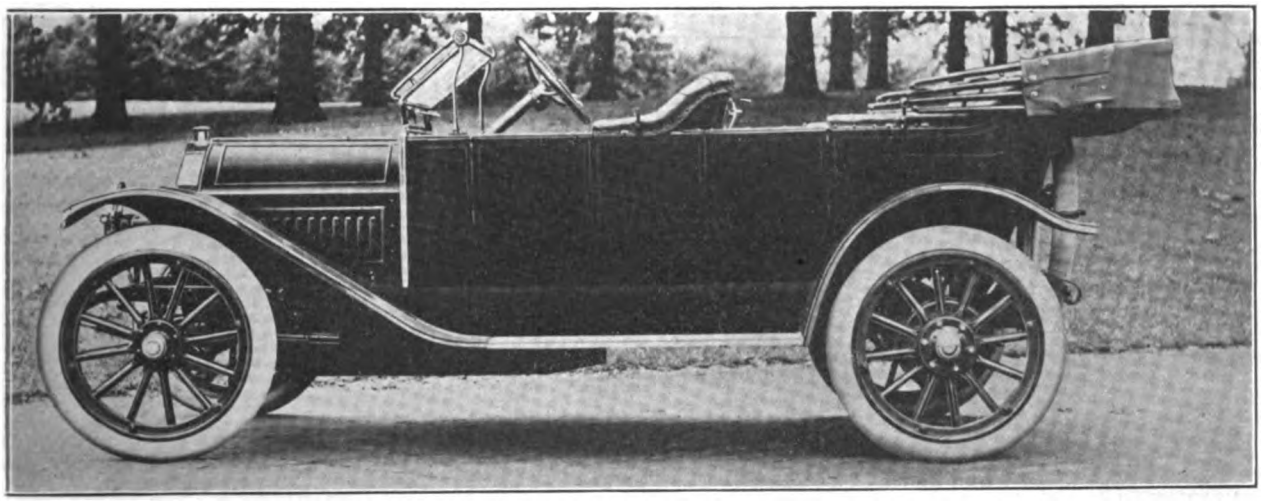
sary positions created by enlarged plants. However, overtime work is accomplishing much and the firms are meeting the demands for their machines with considerable success.

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REFINEMENTS MARK NEW SCHACHT CHASSIS.

ANNOUNCEMENT is made of a new model chassis by the Schacht Motor Car Company, Cincinnati, O., maker of pleasure and commercial vehicles, to which is fitted three types of bodies, a two-passenger roadster, a five and an eight-passenger touring car, these being known as models K. L., N. S. and P. P. respectively. The last named differs slightly from the other designs in that the wheelbase is longer, larger tires are fitted and those components caring for the stresses created by extra passengers are proportionately strengthened.

The determination to concentrate its efforts upon one chassis is the result of 12 years' experience in the automobile industry and the company maintains that by the manufacture of one model each part is made better and more uniform, and that it permits of a decreased cost in production and price to the purchaser. While no radical departure from the Schacht product is noted, minor mechanical improvements have been made and the design incorporates principles indorsed by sound engineering practise. The new car is fully equipped, including electric lighting and motor starter, and every means for comfort and convenience.



Schacht Five-Passenger Touring Car, Having Attractive Body Lines and Complete Equipment, Including Electric Lighting and Motor Starter.

Improved Power Plant.

The power plant has been improved with the idea of producing a very flexible motor, permitting of slow speed on the high gear with sufficient energy and having ample horsepower production to meet the approval of those who desire a serviceable and practical car, easily maintained at a minimum of expense. The motor is of the en bloc, L head type, having a 4.25-inch bore and 5.5-inch stroke which places it in the long stroke class. According to the S. A. E. formula it is rated at 28.9 horsepower, but a production of 45 is claimed by the company at 1625 revolutions a minute, which statement is substantiated by the piston displacement of 312 cubic inches.

The cylinder material is a special grade of gray iron and the water jackets are cast integral. That space above the cylinder heads usually subjected to the greatest heat of combustion is especially large, making for efficient cooling under all conditions of service. The walls of the cylinders are cast thicker than in conventional practise, a construction permitting of reboring with safety in the event of scoring, etc. The cylinders are offset from the crankshaft about .1875-inch, reducing side thrusts against the walls to a minimum. The unit is machined and ground accurately, the limit being very fine. The cylinders are finished in flat black.

Four Piston Rings Employed.

The pistons are a special gray iron and like the cylinder are ground to a perfect fit with a glass like finish. Four eccentric rings, .25-inch wide, are fitted to each above the wristpin, and extreme care is taken in securing a proper seat, a quality making for perfect compression and a well balanced motor. The web connecting rods are constructed of a special carbon, drop forged steel, 11.875 inches long, and the crankpin bearing

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is a split member secured by four nickel steel studs and retained by large castellated nuts and cotter pins. The rods are held in the pistons with case hardened tubular wristpins 1.0625 inches in diameter, and these oscillate in heavy phosphor bronze bearings, retained by set screws in piston bosses.

Three-Bearing Crankshaft.

The crankshaft is a drop forging of a special carbon steel, two inches in diameter in the centre, and rotates in three split bearings of Parsons' white brass. The dimensions of the bearings are as follows: Forward, 3.125 inches long, 1.75 inches diameter; centre, 2.5 long, two diameter; rear, 4.125 long, 2.125 diameter. The ample size of crankshaft and bearings makes for sturdiness and perfect alignment. The camshaft is forged with the cams integral, of special carbon steel, and rotates in three phosphor bronze bearings, one inch in diameter. The cams have a lift of .3125 inch.

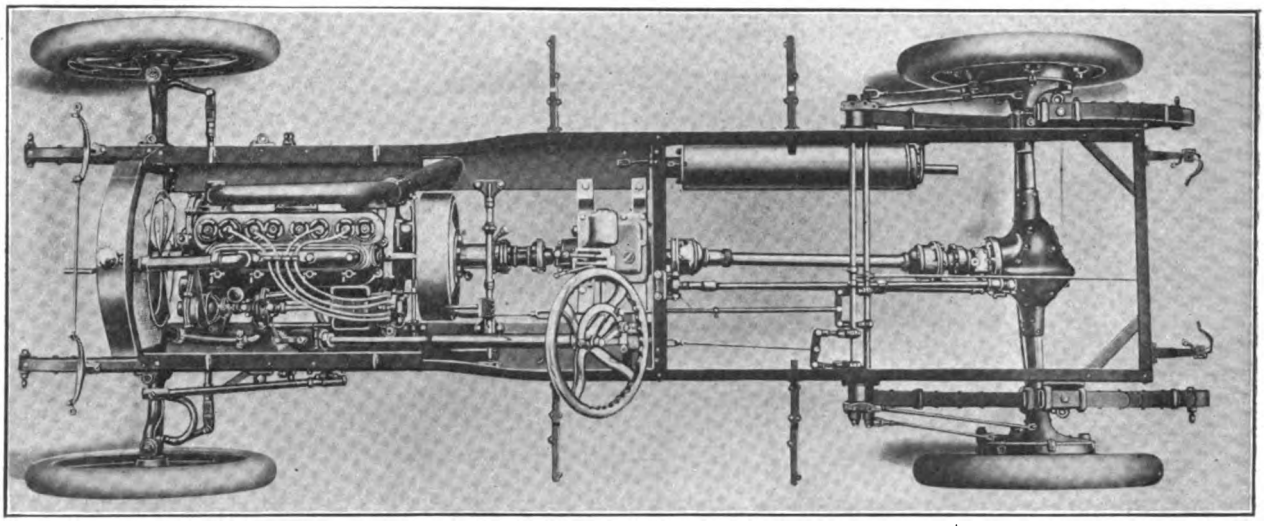
Large Sized Valves.

The valves are located on the right side of the motor and are housed by two pressed steel covers, excluding foreign elements, and the enclosing of the valve mechanism not only makes for durability but silent operation. The valves measure 1.857 inches in diameter, have case hardened heads electrically welded to high carbon nickel steel stems. The pushrods are .625 inch in diameter, having case hardened and ground steel rollers operating on hardened steel pins, and move through guides having 2.75-inch bearing surfaces. All valves are interchangeable and adjustable by means of an adjusting nut and lock washer arrangement on the heads of the pushrods. They are easily removed when grinding is necessary. Petcocks are provided.

The cylinders are bolted and lock washered to the upper crankcase, which is a two-piece construction of an alloy aluminum. The lower section may be dropped easily when adjustment of bearings, etc., is desired. Both the intake and exhaust manifolds are cast separately from the cylinders and the latter member has an upward swing, making for accessibility to the valve mechanism. The exhaust manifold is secured by six easily removed lock washered steel bolts, and back pressure is reduced to a minimum by its ample size and large muffler. The intake manifold is well designed and should make for easy starting in cold weather.

The carburetor is a model L, 1.25-inch hot air jacketed Schebler and the feed of fuel is by gravity, a 15-gallon tank being fitted under the seat in the touring bodies and a 25-gallon container on the rear of the roadster. Ignition is by a Westinghouse combined generator and magneto, driven through the pump shaft. One set of spark plugs, located over the intake valves, is employed. Dual ignition is provided by the Westinghouse system, the storage battery being employed as an independent source of supply, the interrupter, coil and distributor being utilized. An automatic spark advance is a feature, the time of spark being retarded mechanically, thereby preventing injury to the operator in cranking with the control lever advanced. Provision is made, however, for manual operation.

The designer of the Schacht motor has paid

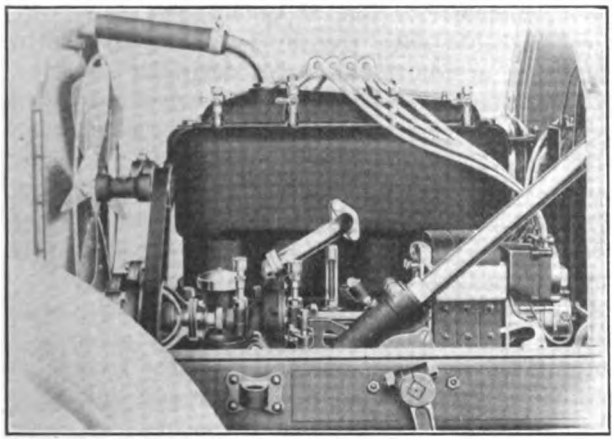


Plan View of Schacht Chassis to Which Are Fitted Three Types of Bodies, These Including Five and Eight-Passenger Touring Cars and Roadster.

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special attention to the matter of lubrication and the system utilized is self-contained inside the crankcase. A plunger pump is actuated by the



Showing Water Pump, Manifolds and Accessible Oil Filler and Indicating Gauge.

camshaft, forcing the oil to all bearings and timing gears. The surplus flows back to the sump, whence it is filtered and used over and over again.

A constant level of oil is maintained in the crankcase and the end of each connecting rod is provided with a scoop which dips into the lubricant, splashing it to all working parts. All oil is supplied through a large sized filler member, easily accessible, and a sight gauge next to the filler cap denotes the level of lubricant at all times. The oil reservoir has a capacity of 1.75 gallons.

Cooling.

A genuine cellular honeycomb radiator of 3.5 gallons capacity is employed and the cooled fluid is taken by a large centrifugal shaft driven pump and forced through a short intake pipe into the water jacket directly beneath the exhaust valves. After circulating around the cylinders the water passes out through a very short outlet pipe to the radiator. The top water manifold is of ample size and may be removed easily, making it a simple matter to clean the water spaces. Cooling is further aided by an 18-inch ball bearing fan having six blades, which is adjustable.

The clutch is of the cone type, Raybestos faced, and easy engagement is emphasized with the design. It is engaged by means of a heavy spiral spring contained in the rear end, and back thrusts are cared for by a large ball thrust bearing in front of the universal joint, coupled to the forward end of the main transmission shaft. Release of the clutch is brought about by a yoke operating on a shifting collar.

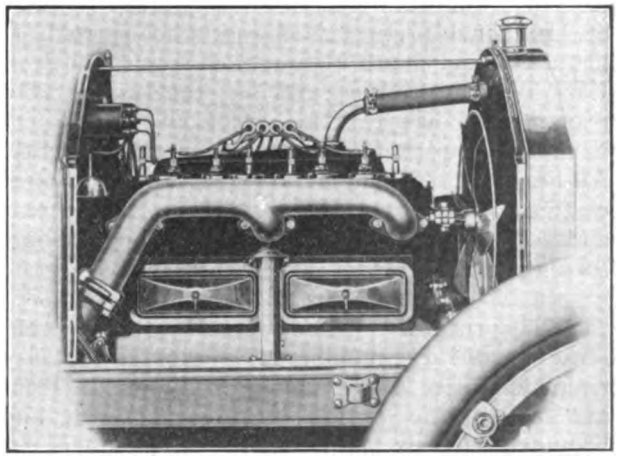
Selective Transmission.

The transmission is of the selective type, providing three speeds forward and reverse, and the ample sized gears are of chrome nickel steel. It is located amidships and the quadrant carrying the operating lever and emergency brake member is mounted thereon, eliminating lengthy shifting rods, etc. The shafts are of a high grade nickel steel and rotate in annular ball bearings. The housing is a special alloy aluminum and lightness and toughness is emphasized with the design and material employed. The gears rotate in soft grease and noiseless operation is claimed, as well as ease in the changing of speeds.

Drive is by a shaft of ample size and a high grade nickel steel is employed. The line is almost straight and drive is from a universal joint at the rear of the transmission to a similar member in front of the rear axle. The rear axle is of full floating type and the housing of pressed steel. The bevel pinion gear rotates in large ball bearings while high duty roller bearings are utilized for the differential.

Accessibility of Rear Axle.

Accessibility is a feature of the Schacht rear system and the removable cover plate of the differential housing permits of inspection or adjustment, while the 1.375-inch steel drive shafts may be taken out easily. They are secured to the wheels by a flange and six nickel steel bolts, lock washered. Double torsion rods are utilized, these running from the upper and lower sections of the differential housing to a ball and socket device having a heavy compensating spring attached to

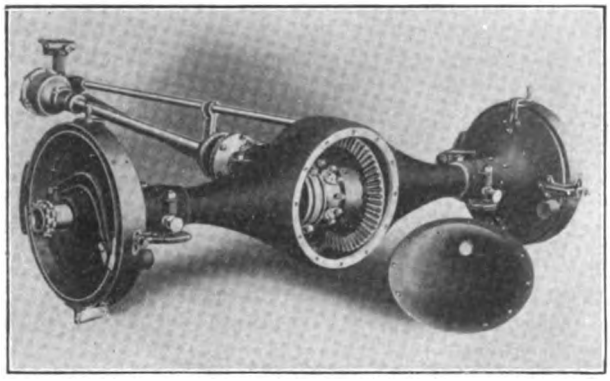


Exhaust Side of Schacht Motor, Presenting Compact Construction and High-Tension Wire Clip.

the cross member of the frame. This construction eliminates all stresses and strains from the transmission and driving shaft.

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The brakes are exceptionally large, being 14 inches in diameter and 2.5 wide. They are located on the rear wheels, the service members



The Rear Axle Is of the Full Floating Type and All Parts Are Readily Accessible for Inspection.

being of the external contracting type actuated by pedal, while the emergency are internal expanding, controlled by the conventional lever. They operate on a pressed steel drum held securely by heavy steel bolts to the spokes. Thermoid is utilized as a lining and over 350 inches of braking surface are provided. Both sets are equipped with equalizers, securing proper tension, and the contracting bands are prevented from rattling by spring adjusting nuts.

The front axle is of the I beam section type of drop forged carbon steel, 2.625 inches deep and 1.5 wide, with spring seats integral. The knuckles and steering linkage are ample in size, assuring a large factor of safety. Ball bearings hubs are fitted to the front wheels.

The frame of the Schacht is sturdy, is made of .15625-inch pressed steel and is hot riveted. It has a channel depth of four inches and width of 1.5. The sub-frame carrying the motor and transmission has a 3.5-inch drop and all corners have large gusset plates which make for rigidity. All brackets and hangers are drop forged or steel castings. The frame has a kick-up at the rear and is narrowed in front, making for a short turning radius.

Resilient Springs.

The springs are well designed and to the construction of these members is attributed the easy riding qualities of the machine. Those in front are semi-elliptic, 36 inches long, two wide and provided with six leaves. The rear members are three-quarter elliptic, 46 inches long, two wide and have seven leaves. All clips and shackles are drop forged with bolts double lock washered.

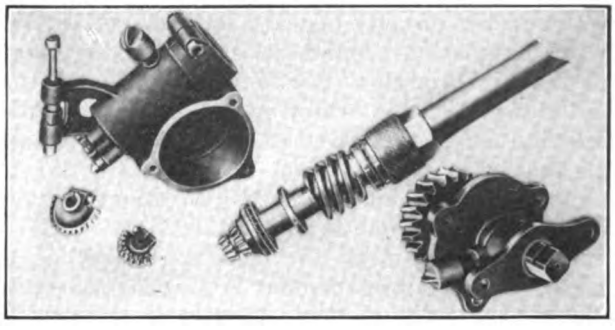
The wheels are of the artillery type, 12 spokes 1.5 inches diameter, and carefully selected second growth hickory is employed. They are fitted with demountable rims with one extra member, and 36 by four-inch tires are standard equipment on all models excepting the P. P., which has 35 by 4.5-inch tires. The 37 by 4.5-inch shoe is interchangeable with the 36 by four-inch and is furnished at additional cost if desired.

The steering gear is of the worm and gear type and the gear is irreversible. The connecting arm and tierod are ample in size. The steering column is set at 41.5 degrees, a comfortable angle, and is securely braced at the footboard and reinforced by special two-inch heavy nickel tubing, preventing vibration or rattling. The wheel is laminated and corrugated, 18 inches in diameter, and the gas and spark control levers are mounted on a sector on the top of the wheel. A feature of the steering mechanism and linkage is that all parts are adjustable for wear.

Left Hand Steer.

The driver is placed at the left with control levers in the centre at the right. The clutch pedal is at the left and brake at right and the usual accelerator and cut-out are standard equipment. The wheelbase of the roadster and five-passenger touring car is 120 inches and that of the larger machine, 128. Tread is standard, 56 inches.

All models are equipped with the Westinghouse electric lighting and motor starting system. The control of the starter is unique and conveniently located. It comprises a lever or handle mounted under the steering wheel at the rear of the column and a simple movement cuts in the current and rotates the flywheel of the engine until it operates under its own power. The starting motor is of the series wound type having four poles and is connected through a gearing to teeth cut on the periphery of the flywheel. The driving



The Steering Gear and Linkage Are Well Designed and Components Are Adjustable.

gear is automatically returned to normal by releasing the starting lever.

The battery is an LBA six-volt member of

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ample amperage capacity. One of the interesting features of the control of the lights and horn is the switch member. It is unusually neat and compact, comprising a small highly polished aluminum box or panel mounted on the steering column under the wheel. The arrangement not only makes for convenience, but for a clean appearing dash as well.

Attractive Bodies.

An attractive line of bodies is fitted to the chassis and they are noticeable for their straight line design from radiator to the rear. They are of special sheet metal, securely braced, and are sturdily constructed throughout. A quality of the design is that ample room is provided both in front and rear. The tufted Turkish upholstery is deep and comprises a high grade genuine buff leather with finest hair filling over resilient springs. The seats have exceptionally high backs and the cushions are 12 inches deep, making for comfortable riding qualities.

The doors are large, having the locks placed inside and are opened easily from the outside. Both front and rear fenders are well designed and harmonize with the graceful lines of the body. They are securely fastened to the frame and body and the splash apron extending from the running board to the frame is of the convex pattern and fully protects the occupants of the car from water and mud. The running boards are neatly covered with linoleum. The bodies and running gear are highly finished in standard deep blue black, but other colors are furnished at additional cost. The old fashioned lead and oil system is utilized and the company points out that the paint and varnish are very durable, 24 coats being employed.

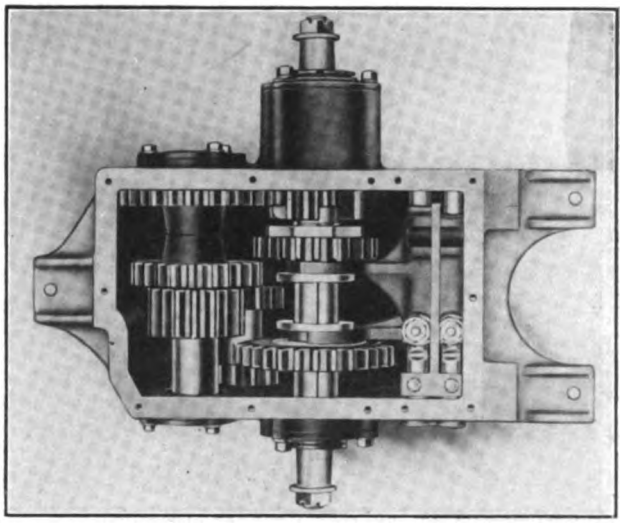
The equipment is very complete, including imported English silk mohair top with side curtains and slip cover, speedometer, folding zigzag windshield, patent adjustable aluminum ventilator in windshield base, electric horn, cocoa tonneau mat, foot rest, tire irons, robe rail, one extra demountable rim, pump, jack, tools, etc. A large tool box is placed at the rear of all models and a trunk in addition on the deck of the roadster. All metal parts are silver nickeled.

Throughout attention has been paid to small details making for convenience and comfort as well as economical upkeep. Accessibility to all parts requiring lubrication and attention is noticeable and by removing the floorboard the clutch, transmission and universal joints may be reached easily. Ample provision is made for the renewal of lubricants, the transmission and differential having large filler members, while all parts subject to friction are fitted with grease cups. The power plant is protected by a well designed and substantial pan which may be displaced easily and quickly by eight spring levers.

DETROITER CARS ABROAD.

Foreign Business Equalizes Production When American Demand Is Highest.

The Briggs-Detroiter Company, Detroit, producer of Detroiter cars, made a large foreign shipment of cars this year, some of which were shown at the Olympic show in London at the Paris salon, France, and in Turin, Italy. The Briggs-Detroiter Company is now in its second year and during that time every foreign field



The Transmission of the Schacht Is Sturdy, Having Large Gears and Shafts.

where automobiles are sold has been closed by contract.

The effect of this foreign business has been to equalize the output of the factory, since the foreign demand is heavy during the season when the American business is lightest. Within the last two years the company has sent large consignments to Sweden, Australia, New Zealand, South Africa, Japan and Dutch West Indies.

The Automobile Club of Cincinnati, O., is planning for a membership campaign, the aim being to have 2000 active names on its roll by Thanksgiving Day, at which time the club expects to hold open house in the splendidly equipped new home in the Gibson house.

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SPLENDID BUSINESS AT LOCAL SHOWS.

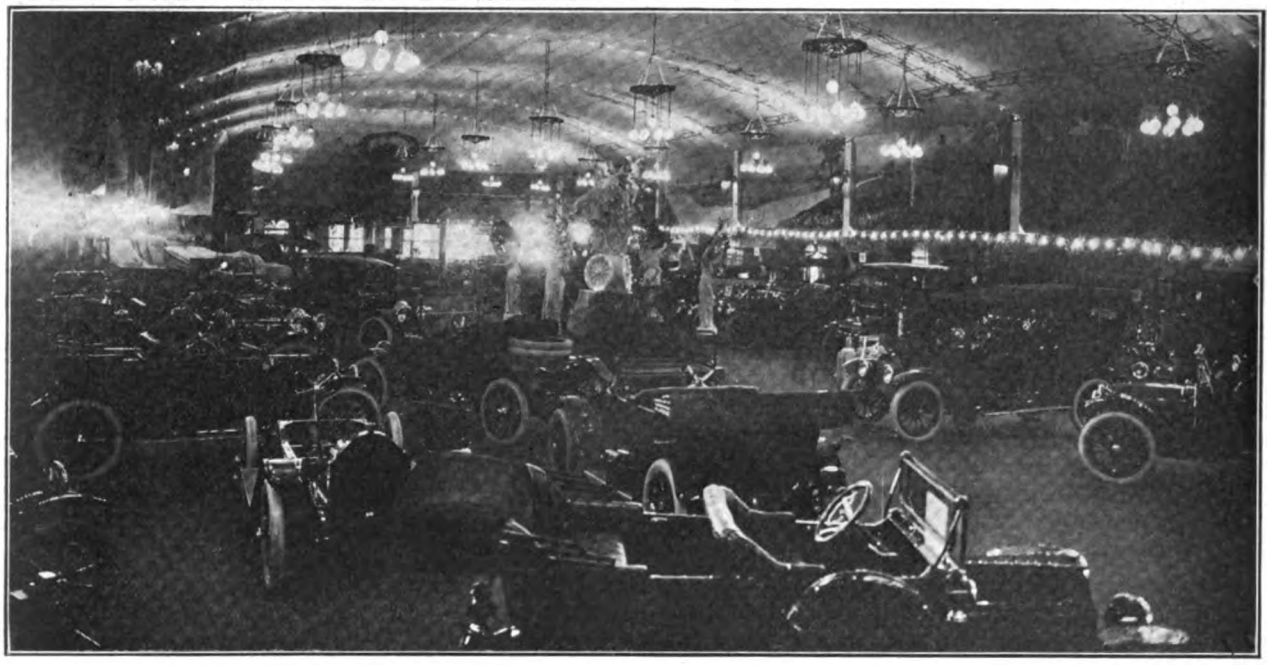
Demand for More Room Marks Displays in All the Leading Centres---Large Attendance and Many Sales the Rule---Detroit Dealers in Wayne Gardens.

DETROIT automobile dealers, who are responsible for the annual automobile show which opened at Wayne Gardens, Jan. 20, for one week, are to be congratulated on having overcome all obstacles encountered in giving an exhibition of such magnitude. Detroit, as the centre of the automobile industry, which employs tens of thousands of men, was justly proud of its show, national in scope and reflecting the prosperity of the city.

Thousands of people visited the Wayne Gardens during the opening night and the attendance throughout the week did not diminish from the mark set at that time. Summarized, there were 66 exhibits and 60 makes of cars, the total value of the display being about $1,000,000. It became apparent that the annual local show has grown to such proportions since the first one was held 12 years ago that next year the Wayne Annex, built especially for exhibitors, will have to be two stories high instead of one. Although ample space was afforded to exhibitors, a second floor could have been disposed of by the space committee this year had it been available.

From a business standpoint, the result was particularly gratifying. Many sales were recorded. In still another manner the show was unique, in that at least one new car was added to the list coming from Detroit. This was a Traveler-Detroit, made by the Traveler Motor Car Company and displayed in coupe, touring and roadster models.

The decorations were on a more elaborate scale than ever before and the show was given a most beautiful setting. The manager was Walter Wilmot and the officers of the Detroit Automobile Dealers' Association, which had charge of the event, are: President, W. F. V. Neumann; treasurer, C. C. Starkweather; secretary, Joseph A. Schulte; directors, Paul R. McKenney and Frank M. Seland. Following is the list of exhibitors:



Interior View of the Wayne Gardens, Detroit, Indicating Decorative Treatment and Lighting Effects During Recent Automobile Show.

Pleasure Cars—Abbott Motor Company, Abbott-Detroit; Annett Auto Garage, Auburn; Artemas Ward, King; Baker Electric Company, Baker electric; Barber Motor Sales Company, Detroiter; Bemb-Robinson Company, Hudson; Buick Motor Company, Buick; Cadillac Motor Car Company, Cadillac; Cartercar Company, Cartercar; Century Electric Sales Company, Century electric; Chevrolet-Little Company, Little, Chevrolet; Church-Field Company, Church-Field electric; Cunningham Auto Com-

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pany, Flanders, Maxwell; Detroit Electric Garage, Detroit electric; Detroit Hupmobile Sales Company, Hupmobile; Ford Motor Company, Ford; Foster Motor Sales Company, Cutting; Havers Motor Car Company, Havers; Grant Bros. Auto Company, Lozier; Grinnell Electric Car Company, Grinnell electric; J. P. Schneider, Stevens-Duryea, Locomobile; Keeton Motor Company, Keeton; Krit Motor Car Company, K-R-I-T; M. A. Young, Reo, Mitchell; Neumann-Lane Company, Chalmers, Pierce-Arrow, Rauch & Lang electric; Oakland Motor Car Company, Oakland; Olds Motor Car Company, Oldsmobile; Overland Motor Sales Company, Overland; Postal-Fair Motor Company, Peerless, Michigan; P. W. Schulte & Sons, Paterson; R-C-H Corporation, R-C-H, Hupp-Yeats electric; Regal Motor Sales Company, Regal; Seidler Sales Company, Jackson; Siegel-Zeckendorf Company, Cole; Standard Auto Company, Packard; Studebaker Corporation, Studebaker; Traveler Motor Car Company, Traveler-Detroit; Warren Motor Car Company, Warren; W. J. Marshall Auto Company, Paige; Winton Motor Car Company, Winton.

Commercial Vehicles—Cleveland-Galion Motor Truck Company, Cleveland-Galion; General Motors Truck Company, G. M. C. gasoline and electric; M. A. Young, Reo; Standard Auto Company, Packard; Thompson Auto Company, Federal, Standard, Alco.



Members of Lynn Automobile Dealers' Association in Charge of Recent Show: President Harry Doane in Centre, Secretary-Treasurer Percy I. Reynolds at Right, S. P. Tierney at Left.

Accessories—Chas. E. Miller, Boyer Miller Company, Buhl Sons Company, Detroit Auto Equipment Company, Edward G. Budd Manufacturing Company, Esco Auto-Lock Sales Company, Garrison Gasoline Engine Specialties Company, Indian Refining Company, Murphy Power Company, Punctureless Tire Company, Sears-Cross Company, Sewell Cushion Wheel Company, Armitage Leather Company, Automobile Equipment Company, Cleveland Hardware Company, National Refining Company, Paragon Refining Company, Vanguard Manufacturing Company, Wayne Oil Tank & Pump Company, Weston Electric Instrument Company, William Shakespeare, Jr., Company.

MANY SALES IN LYNN.

Results Such as to Justify Continuance of Policy Adopted Annually by Dealers.

The annual show of the Lynn Automobile Dealers' Association proved the most successful in the history of the organization, and the state armory in Lynn, Mass., was visited daily by a large number of people from Lynn, Swampscott, Nahant, Saugus and other nearby places during the week of Jan. 20-25. A special musical programme was given each day and the arrangements for the comfort of those who desired to inspect the new models were pronounced perfect.

Although Lynn is within easy access of Boston and the biggest exhibition of the entire year, the local dealers always have held their display in advance of that event. The idea has been to stimulate business and close sales as early in the season as possible, and reports from this year's show would seem to indicate that the business transacted was such as to warrant a continuance of this policy.

The following were the committees in charge of the show: General, W. H. Bennett, W. H. Beede, S. P. Tierney; publicity and advertising, W. H. Bennett, H. M. Doane, S. G. Warner; music, decorating and lighting, W. H. Beede, P. I. Reynolds, S. H. Barrett; programme, S. P. Tierney, F. Plumstead, C. R. Sibley, C. F. Green, F. I. Mitchell. The exhibitors and their products follow:

Pleasure Cars—S. G. Warner, Paige; M. Plumstead & Son, Maxwell, Stoddard-Dayton, Columbus electric; Fred Mitchell, Stevens-Duryea; Liberty Garage, Hudson, Studebaker; Essex Auto Company, Peerless, Flanders, American, Hupmobile; E. H. Beede, Ford; S. P. Tierney, Buick; Seymour Avenue Garage, Mitchell, Detroiter; Michigan Motor Company, Michigan; E. T. Reynolds, Pope-Hartford; P. I. Reynolds, Oakland.

Commercial Vehicles—Liberty Garage, White, Chase; Essex Auto Company, Peerless, Hercules.

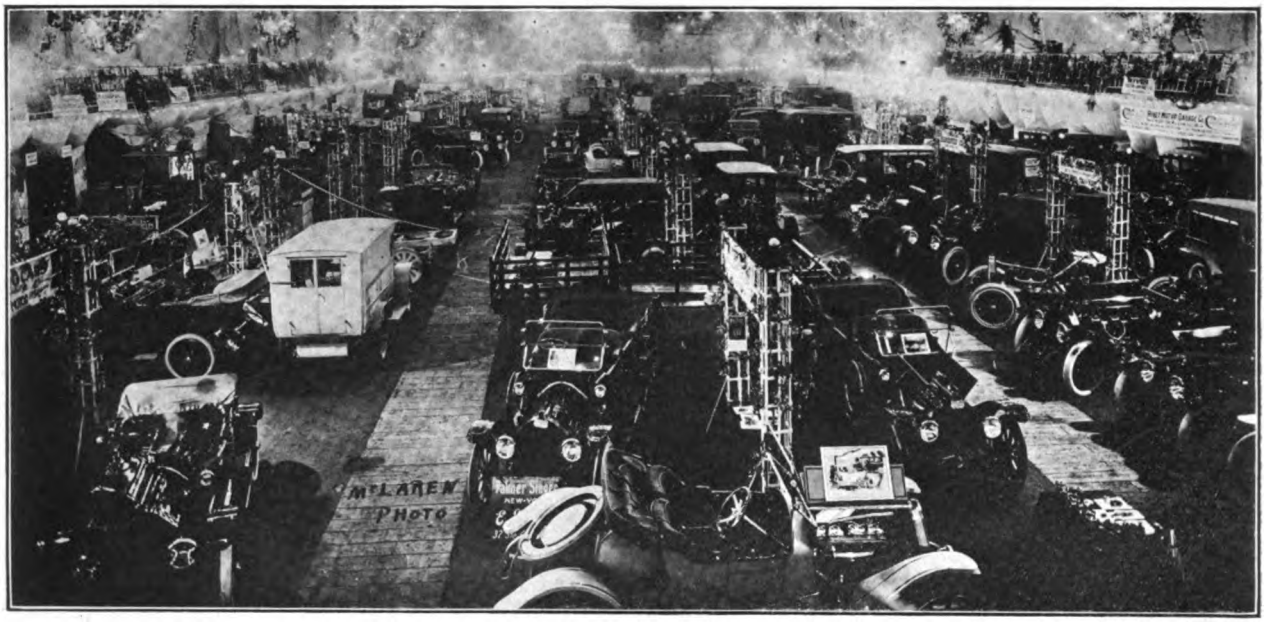
Accessories—Lynn Auto Company, tires and supplies; Lynn Sporting Goods Company, general accessories, motorcycles and bicycles; P. I. Reynolds, supplies.

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MONTREAL HOLDS ANOTHER SHOW.

Dealers Attract Second Large Crowd and Demonstrate Local Interest in Cars.

The fact that Montreal, Can., was able to support two large shows in one season, the second following the first by only one week, is abundant evidence of the growth of the automobile industry in that section. The first display was held by Canadian manufacturers and representatives of American producers, Jan. 11-18. The second was under the auspices of the local dealers, in the Drill hall, Jan. 25-Feb. 1. It is estimated that more than $75,000 in business was closed at the second display for the year in that city.



Main Floor of the Drill Hall, Montreal, Showing Wide Diversity of Pleasure and Commercial Vehicles Displayed by Dealers.

Seven years ago the first motor car exhibition was held in Montreal in the Arena, a much smaller building, and the number of exhibitors was so small that it became necessary to invite displays from makers of lines wholly foreign to the industry. When the automobile was first introduced in that territory, weather and road conditions were such as to discourage the most venturesome. Improvements in mechanical construction on the one hand and interest in better highways on the other have united in making the present day car a practical institution. The interest in it was manifested by the large attendance at both displays this year.

The dealers' show was under the able management of R. M. Jaffray, and the decorations were on a scale never before attempted in Montreal. Large baskets daintily draped with beautiful colored flowers hung from the ceiling, which was concealed by light blue bunting. The side walls also were hidden from view, and at each exhibition space was a small arch prettily decorated with green creepers and flowers.

There were 124 pleasure cars and 51 trucks on display, besides motorcycles and accessories, and a large monoplane, built by a local constructor, was to be seen in one of the side rooms. An accompanying illustration shows the main floor, where the following exhibits of cars and trucks were made:

Automobile Francaises, Berlit; Canadian Pneumatic Tool Company, Ltd., Little Giant truck; J. O. Collette, Little, Chevrolet; Stockwell Motor Company, Lozier, Paige, Peerless, Maxwell, Standard electric; Bellerive Garage & Auto Company, Mitchell; Canadian Fairbanks-Morse Company, Ltd., Mack truck; Gareau Motor Car Company, Marmon, National, Tudhope, KisselKar; Paul Lair, Michigan, Juno truck; William J. O'Leary & Co., Maritime; Arthur Pelletier, Menard; De Vaux Motor Company, Nyberg; Norwalk Motor Car Company of Canada, Norwalk; Pope-Hartford Motor Company of Hartford, Overland, Pope-Hartford, White truck; E. Major, Palmer-Singer; S. Gagnon, Rambler, Cutting, Empire; Republic Motor Car Company of Toronto, Republic; La Cie. Laiterie St. Daurent, Standard truck; Royal Automobile Company, Cole, Stevens-Duryea; Frigon & Baker, Winton; Rivet Motor Garage Company, Rg'd., Watson, Cartercar, Avery truck; Montreal Locomotive Works, Ltd., Alco truck; Albion Motor Car Company, Ltd., Albion; Victor Levesque, Abbott-Detroit; A. Beaudry, American; Baker Motor Vehicle Company of Canada, Baker electric; Brantford Motor Truck, Ltd., Brantford truck; J. B. Baillargeon Express, Commer truck; Rousseau Bros., Ltd., Cadillac; Drednot Motor Trucks Works, Ltd., Drednot truck; Canadian P. J. Mitchell Company, Ltd., Garrett; R. E. T. Pringle, G. E. V.; Motor Transport, Ltd., G. M. C.; Fred E. Ritchie,

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Henderson; International Harvester Company of America, International; P. A. D. Robert, Jackson; Arlington Bicycle Works, Indian motorcycles.

PHILDELPHIA'S TRUCK DISPLAY.

Second Week of Dealers' Exhibition Meets with Decided Favor from Business Men.

Following the close of the pleasure car show in the Automobile Club building at Philadelphia, under the auspices of the local dealers, the commercial vehicle display was opened Monday, Jan. 27, in the same building. The character of the exhibits had been entirely changed and instead of the highly polished touring cars which had delighted over 35,000 persons during the first week, were to be found a remarkable list of motor trucks of all kinds, ranging from small delivery wagons to vehicles of large carrying capacity. There were over 30 makes of trucks, gasoline and electric, on the first and second floors, in addition to the large representation of accessory dealers.

The attendance at the truck show also was of an entirely different character from that seen at the pleasure exhibition. A steady stream of business men and others interested in the mechanical transport inspected the various models, seriously bent on learning all they could about haulage costs and the suitability of the different makes for their individual requirements. Some 80 different types were shown by the following:

Devon Truck Company, Devon; Eldredge Company, Garford; H. C. H. Motors Company, Lauth-Juergens; General Motor Truck Company, G. M. C. gasoline and electric; International Motor Truck Company, Mack, Saurer, Hewitt; J. C. Bartlett, Mais, Walker electric, Detroit electric, Automatic electric factory truck; Packard Motor Car Company, Packard; Foss-Hughes Company, Pierce-Arrow; Eastman Motor Truck Company, Wilcox; Kelly-Springfield Motor Truck Company, Kelly-Springfield; White Company, White; Autocar Company, Autocar; C. A. Haines & Co., Baker electric; Chase Motor Truck Company, Chase; Commercial Truck Company, Commercial electric; General Vehicle Company, G. V. electric; International Harvester Company, International; Kissel Motor Company, KisselKar; Lansden-Webb Company, Lansden electric, Webb fire apparatus; Locomobile Company of America, Locomobile; Gomery-Schwartz Motor Company, Stewart; Cartercar Motor Car Company, Commerce; Gramm Motor Truck Company, Gramm; Longstreth Motor Car Company, Alco.

FOURTH ANNUAL TOLEDO SHOW.

Nearly Double the Number of Exhibitors Seen at Any Previous Display.

The Toledo Auto Shows Company has just closed what was pronounced to be the most successful automobile exhibition ever held in Toledo, O., in the Terminal building. It was the fourth annual event and nearly double the number of exhibitors displayed cars than was the case a year ago. In all there were 52 makes shown by 29 dealers.

The decorations were excellent, the rooms being transformed into a southern garden. The aisles were carpeted in green to resemble grass, while the booths were bounded by foliage, palms in profusion marking the aisles. Green and white and blue and white draperies covered the ceilings and the walls were concealed by paintings to heighten the garden effect. Following are the exhibitors of vehicles:

Pleasure Cars—Abbott Motor Sales Company, Abbott-Detroit; H. J. Adams, Reo; Atwood Automobile Company, Overland, Marmon, Standard electric; Auglaize Motor Car Company, Auglaize; Auto Exchange Company, Regal; Baumgardner & Kibby, Oakland, Columbus electric; Bunnell Auto Sales Company, Cole, Little; Clyde Auto Sales Company, Detroiter, Nyberg; Cornelius-Hohly Auto Company, Imperial; Dennis Motor Car Company, Rambler, Detroit electric; Ford Bros. Auto Sales Company, Michigan, K-R-I-T; Gamble Motor Car Company, Peerless, Garford, Ohio, Baker electric; Gauntlett Auto Sales Company, Buick; Grasser Motor Company, Hupmobile; M. E. Humbarger, Apperson; E. W. K. Burg, Stearns-Knight, R-C-H, Hupp-Yeats electric; Landman-Griffith-McIntyre Motor Company, Flanders, Stoddard-Dayton, Flanders electric; Litchie Automobile Company, Cadillac; Maumee Motor Car Company, Empire, King; Roberts-Toledo Auto Company, Ford; Standard Auto Company, Packard, Imperial, Rauch & Lang electric; H. E. Thorne, Mitchell, Paige; Toledo Motor Sales Company, Hudson; Union Supply Company, Pierce-Arrow, Chalmers; White Motor Car Company, White.

Commercial Vehicles—Banting Machine Company, Paterson, Krebs; Blovins Auto Sales Company, Sandusky; Dennis Motor Car Company, Alco; Gamble Motor Car Company, Peerless, Garford; Gauntlett Auto Sales Company, G. M. C.; Moore Motor Truck Company, Moore; Standard Auto Company, Packard; Union Supply Company, Pierce-Arrow; White Motor Car Company, White.

PLEASURE CARS AT BUFFALO.

Machines Valued at $2,500,000 Shown at Eleventh Annual Dealers' Display.

The 11th annual pleasure car show of the Buffalo Automobile Dealers' Association at the Broadway Auditorium, Buffalo, N. Y., was the largest display ever held in that city and it is estimated that the value of the product of the many manufacturers in the hall was about $2,500,000. A splendid decorative and illumination scheme was carried out, the central feature being the use of green and gold streamers extending from the middle of the ceiling to the eaves of the building and 30,000 square feet of green cloth covering the floor.

At the entrance to the hall was a long fence literally covered with flowers. In the centre was a fountain, representing a lion's head, while at the southern end of the structure was an Italian fountain 20 feet in diameter, illuminated by electric lights of variegated colors. The aisles were

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so arranged that no difficulty was experienced by the crowds in passing about the hall. Following is the complete list of exhibitors and their cars:

Co-operative Motor Car Company, Stevens-Duryea, Abbott-Detroit; Ralph E. Brown Motor Car Company, American, Winton, Rauch & Lang electric; Barrett Motor Car Company, Paige, Apperson; Buffalo Motor Vehicle Service Company, Baker electric; Buffalo Electric Vehicle Company, Buffalo electric; Buick Motor Company, Buick; Kane Motor Supply Company, Cadillac; Louis Engel, Jr., Cartercar; Mason B. Hatch, Chalmers; Joseph Rath, Chevrolet, Little; Cole Motor Company of Buffalo, Cole; Monroe Motor Car Company, Columbia; C. W. Trautman, Detroit electric; Delaware Avenue Garage, Marmon, Detroiter; Automobile Sales Company, Pullman, Fiat; Werick Bros. Motor Car Company, Haynes, Firestone-Columbus; Excelsior Sales Company, Flanders electric; Meyer Motor Car Company, Reo, Flanders; Ford Motor Company, Ford; George Ostendorf, Franklin; Grinnell Electric Car Company, Grinnell electric; Zimmer Motor Vehicle Company, National, Imperial, Henderson; Buffalo-Hudson Sales Company, Hudson; Henry Brunn, Peerless, Hupmobile; L. G. Schoepflin Company, R-C-H, Hupp-Yeats electric; F. A. Ballou, Jackson; Buffalo KisselKar Company, KisselKar, Simplex; Krit Motor Car Company, K-R-I-T; Buffalo Motor Sales Company, Lion; R. G. Danahy Company, Lozier; Mutual Motor Car Company, Victor, Marathon; Harry L'Hommedieu, Marion; Matheson Automobile Sales Company, Matheson; Monroe Motor Car Company, Maxwell; Frontier Motor Car Company, McFarlan; J. J. Gibson Company, Mitchell; Miller-Schulman Motor Car Company, Moon; Centaur Motor Company, Oakland; Oldsmobile Company of Buffalo, Oldsmobile; Overland-Buffalo Company, Overland; Packard Motor Car Company of New York, Packard; Singer-Brighton Motor Company, Palmer-Singer; Pierce-Arrow Sales Company, Pierce-Arrow; Lutz Automobile Company, White, Premier; Regal Motor Sales Company, Regal; Mason B. Hatch, Stearns-Knight; J. A. Cramer, Stoddard-Dayton; A. W. Haile Motor Company, Studebaker; Dixon Motor Car Company, Velie.

WINNIPEG'S SECOND ANNUAL.

Feature of This Year's Display Is Special Models from America and Europe.

The second automobile show, under the direction of the Winnipeg Motor Trades Association, opened at Winnipeg, Can., Feb. 10, and while not as large as some of those held in the United States, it is nevertheless a representative exhibit of Canadian and American products calculated to please the motor enthusiast. Some special models are being shown that have occupied prominent places in other displays, a few of them coming from Europe. Among the exhibitors are the following:

Canadian Fairbanks-Morse Company, Plews Automobile Company, Tudhope Motor Car Company, J. Maw & Co., Ltd., Lions Garage, Cadillac Motor Sales Company, Canadian Motor Company, Ltd., J. I. Case Company, Michael Ert, Winnipeg Garage, R-C-H Motor Sales Company, Russell Motor Car Company, Breen Motor Company, Western Canada Motor Car Company, McLaughlin Carriage Company, S. F. Bowser & Co., Ford Motor Company, A. C. McRae, Goodyear Tire & Rubber Company, John Mullen & Son, P. C. Hagarty, Triple Tread, Dunlop Tire & Rubber Company.

LARGE DISPLAY AT TROY.

Splendid Decorative Scheme and Wide Representation of Dealers in City and Vicinity.

The annual automobile show at Troy, N. Y., which opened at the state armory Jan. 27 and continued throughout the week was on a scale of grandeur and brilliancy never before attempted by the Troy Automobile Dealers' Association, which had the event in charge. It was the third exhibition to be held in that city.

The exhibition represented a large sum, one display alone reaching $30,000. The decorative scheme offered by the management was the most extensive ever seen in the big armory, every corner of which was treated. Yellow and gold bunting, masses of green foliage, thousands of electric lights and numerous oriental idols, billikens and picturesque statues were utilized. The show was opened by Mayor Cornelius J. Burns, who, after a brief address on the growth of the industry, touched the button which turned on the electric illumination. The exhibition this year was more representative of the industry than ever before and the following is a list of exhibits:

Pleasure Cars—Troy Motor Company, Cadillac, Fiat; Troy Automobile Exchange, Pierce-Arrow; Bolton-Myers Auto & Truck Company, Haynes; Congress Auto Company of Cohoes, Nyberg; Scott D. Nichols, Ford, Reo, Premier; Vincent & DeBaum, Metz; Ilium Garage, R-C-H; Betts Auto Company, Oldsmobile; Harvey J. Beeker, Paterson; John J. Blackhall, Jr., Crow Elkhart, Moline; Close Bros. of Schenectady, Knox; Dominent Motor Company of Albany, Packard; Fred V. Clute of Cohoes, Pope-Hartford, Overland; George Snyder, Stearns-Knight, Buffalo electric; Cohoes Automobile Company, Stoddard-Dayton, Little; East Side Motor Car Company, Paige; Payne Automobile Company, Studebaker; Troy Motor Carriage Company, K-R-I-T, Mitchell, Speedwell; C. H. Abbott, Stanley steamer; Aird Motor Company, Stutz, Apperson, Marmon; Wilbur Auto Sales Company, Cole, KisselKar; Monument Square Garage, Locomobile, National, Rambler, Hupmobile; J. J. Aker, Regal.

Commercial Vehicles—Troy Automobile Exchange, Pierce-Arrow, Lippard-Stewart; Foster Piano Company, Selden; Close Bros. of Schenectady, Knox trucks and fire apparatus; Dominent Motor Company, Packard; Fred V. Clute, Cohoes, Pope-Hartford; Troy Motor Carriage Company, Speedwell, Kelly-Springfield; Aird Motor Company, Chase; Park Garage Company, Albany, KisselKar; Monument Square Garage, Locomobile; Wilbur Auto Sales Company, KisselKar.

Miscellaneous—Vincent & DeBaum, punctureless inner tubes; Edgar H. Brunelle, Indian motorcycles, sporting goods; Albany Motorcycle Company, Harley-Davidson motorcycles, Arden bicycles; Standard Oil Company, lubricating oils and greases; Post & Lester Company, Albany, accessories; Economy Baler Company, Ann Arbor, Mich., represented by Peerless Trading Company, Albany, steel fireproof waste balers; William S. Martin, Englebert tires; H. T. Silberman, New York City, confectionery; Troy Automobile Club, information bureau; Mohawk Welding Company, engine welding demonstration; Myers Bros., New York City, ivory novelties; John S. Jones, automobile insurance; Troy Spring Works, spring repairing; Colorado Gold Stone Company, jewelry; William H. Frear & Co., automobile clothing and necessities.

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NEWARK PLANS COMPLETE.

Seventy Exhibitors Secure Space in First Regiment Armory for Annual Event.

The annual automobile show at Newark, N. J., will be held in the First Regiment armory the week of Feb. 15-22 and advance indications point to the probability that the commercial car section will be a strong rival to the main exhibit of pleasure vehicles. All the principal makes will be on display as will also several new types.

Space reservations were made freely and the closing date for these applications found a list of about 70 exhibitors of pleasure cars trucks and accessories. More than 200 cars, comprising 53 distinct makes, will be shown. The enthusiasm over the show, while evidenced largely among those who are actively engaged in the manufacture and sale of motor vehicles, is probably equalled by that of the automobile owners and the general public. The list of commit tees follows:

Space, George Paddock, C. Louis Fitzgerald, George Blakeslee, Walter H. Ellis, George H. Smith, R. A. Greene, Richard B. Mann; press, programme and advertising, H. A. Bonnell, Leonard B. Zusi, Jacob W. Mason; decorations, A. J. M. Edwards, Leonard B. Zusi, A. H. Humprieville; finance, R. A. Greene, Inglis M. Uppercu, Walter H. Ellis; entertainment, Joseph H. Wood, George Blakeslee, DeWitt C. Reynolds, D. B. Dunham, H. D. Ogden, F. A. Crosselmire, Richard T. Newton, Dr. James R. English, C. Louis Fitzgerald.

DEALERS UNITE AT ALBANY.

Schenectady, Cohoes and Troy to Be Represented as Well as the Local Men.

The Albany Automobile Dealers' Association, Albany, N. Y., is preparing for what is expected to be its most successful automobile show, to be held at the state armory Feb. 15-22. Dealers in Schenectady, Cohoes, Troy and neighboring places are uniting in this display and the detail plans have been worked so far in advance by Manager C. A. Simmons and the committee in charge that its success is assured.

A special feature will be made of the truck exhibit, which will be in the basement. The main floor will be devoted to an exhibition of pleasure cars. There was no show last year owing to inability to secure the armory, so that this year's event has met with general enthusiasm. The committee in charge includes J. B. Wood, W. J. Sutherland, C. F. Weber, J. S. Kingsbury, E. V. Stratton and W. R. Mason.

ROCHESTER'S BIGGEST SHOW.

Three Buildings Utilized to Advantage by Dealers at Fifth Annual Exhibition.

With 80,000 square feet of floor space given over to the exhibition of some 50 different makes of pleasure vehicles, to say nothing of commercial cars representing 20 manufacturers, and a large number of accessories, the fifth annual automobile show in Rochester, N. Y., opened at Exposition Park, Jan. 27 and continued one week. The exhibitors, members of the Rochester Automobile Dealers' Association, occupied buildings three, four and five.



First Regiment Armory, Newark, N. J., Where Annual Show Will Be Held Feb. 15-22.

For the first time in the history of the association, truck and pleasure vehicles were shown in the same space. The visitor entered building No. 3 and was forced to pass the accessory booths in order to reach the display of vehicles, a plan that was particularly beneficial to these exhibitors. While there were no special designs in the decoration of the three buildings, they nevertheless presented an attractive appearance, one being in green and gold, another in blue and white and the third in the national colors.

No effort was spared to make the show the greatest ever held in Rochester and the officers of the association and the executive committee

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were very well pleased with the result both in the matter of attendance and sales. Following are the officers and members of the executive committee: President, F. W. Peck; vice president, C. E. Hartson; treasurer, F. R. Leuscher; secretary, G. J. Bauer; executive committee, C. E. Hartson, H. P. Gould, A. V. Hart, A. M. Zimbrich, A. R. McKenney, C. E. Sager, H. G. Strong, Robert Thompson, Paul Le Hardy. A complete list of the exhibitors follows:

Almy Auto Company, Automobile Journal Publishing Company, George H. Barker, Babies' Health, Unlimited, Beers Bros., Thermostat Company, Benedict & Becker, Ball-Washburne Motor Company, D. E. Bemish, Clark Novelty Company, John Cunningham-Fordham Company, W. E. Davidson Electric Car Sales & Service Company, Empire State General Vehicle Company, A. Faber Company, E. W. Fisher, Franklin Automobile Company, Flynn Bros., A. H. Gable Company, Cibaud's Rochester Supply Company, Globe Manufacturing Company, C. E. Hartson, Frank P. Hunt, Indian Refining Company, Kemoshine Manufacturing Company, John Kimpson, Knipper-Kipp Company, W. H. Kline, J. A. Laurer, LeHardy & Lindsay, Edward J. Lucas, F. R. Leuscher, Inc., Kline Motor Car Company, Inc., Harry J. McKay, McKenney & Gilpin, Mabbett-Bettys Motor Car Company, Mandery Motor Car Company, New York Auto Tire & Supply Company, New York Telephone Company, Thomas J. Northway, Neff & Malone, Oliver Bros., Overland-Rochester Company, Pawlik & McGuiden, Peck & Arnold, F. Porschet, Rochester Ice Cream Company, Rochester Welding Works, Rochester Rubber Company, Edward Rabe, Rochester Railway & Light Company, Rochester Sporting Goods Company, W. H. Rowerdink & Son, Selleck Auto Equipment Company, Charles E. Sager, Shafer-Decker Company, F. C. Schutt, Sullivan Motor Car Company, Towner Bros., Wayne Oil Tank & Pump Company, E. Q. Williams, C. L. Whiting, Wagner-Dolph Company, Williams Heater Company, R. Walter White, J. Fred Webber, A. M. Zimbrich, Gillis-Baird Motor Company, Oldsmobile Company of Buffalo, Inc., Hazard Motor Manufacturing Company, Stein Auto Supply Company, John Leader & Son Company, James Cunningham, Son & Co., Atterbury Motor Car Company, Philadelphia Storage Battery Company, A. V. Hart, Arthur McNall, Abbott-Detroit Sales Company, Allen Street Oil Works, Rochester Telephone Company, D. L. McGuire & Bro., Union Oil Works, Vincent Orvis, Meyers Bros., Strong-Crittenden Company, Hollis-Rand Company, Michigan Motor Sales Company, A. Elliott, C. W. Henner, Louis Ernst & Sons, O-Tak-A Tire Remover Company, Robert Thompson, Genesee Motor Vehicle Company, Monroe County Oil Company, George L. Miner Company, Rochester Iron Works, Alling & Miles, Rochester Macanderuba Tire Filler Company, Shaw Bros., Selden Motor Vehicle Company, Leonard Glover, Thomas Watson, C. E. & H. B. Clark, Cutting Auto Sales Company, G. E. Lytle, C. M. Walker.

NEW MAKES AT PITTSBURG.

Many Producers Will Display Lines Never Seen in That City.

The Exposition hall automobile show to be held at Pittsburg, Penn., March 1-8, will eclipse all previous exhibitions, as the demands for space have been so heavy that the show management is considering the possibility of securing Machinery hall in addition. Many manufacturers are taking space with the idea of securing agencies for the Pittsburg district and are to show cars never seen before in that city.

The Automobile Dealers' Association has charge of the event and 40 dealers are working hard for its success. It is stated that about $40,000 will be used to finance the exhibit, which will include machinery, tools and accessories in addition to commercial and pleasure vehicles. The decorations will consist of mural paintings as the setting for the out-of-door appearance of the show, with flowers, palms, grass and trellis work in profusion.

BROOKLYN DEALERS NEED ROOM.

A Second Building May Be Necessary to Accommodate All to Seek Space.

So numerous and persistent have been the requests for space for the show which is to be held in the 23rd Regiment armory, Brooklyn, N. Y., Feb. 22-March 1, under the direction of the Brooklyn Motor Vehicle Dealers' Association, that the committee in charge is trying to devise some plan whereby additional floor space can be secured. The big armory will be taxed to its utmost to accommodate the exhibitors who have already made application.

Unlike shows held in most cities throughout the country, the cars in the armory will be located on one floor, making it unnecessary to climb stairs or use elevators to see them. The plan of decoration this year is upon a most elaborate scale and many conferences were held before the problem was solved.

BRITISH SECTION AT TORONTO.

Large Representation of Foreign Makes Expected for Comparison with American Product.

Although the Dealers' Association of Toronto, Can., received permission to use the armories for the automobile show this year, the space therein was entirely inadequate to accommodate the exhibitors, so the Government and Transportation buildings at the Exhibition were secured, making available about 100,000 square feet of floor space.

A feature of the show this year will be the British section, which will afford opportunity for comparison between cars of European manufacture and the American vehicles. It is said that machines made by all the British manufacturers will be shown and if this proves true it will be necessary to utilize the Horticultural building as well. E. M. Wilcox, who managed last year's show, is again in charge.

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FOLDING INNER TUBES.

Many motorists, especially the novice, do not give the inner tubes that care these members require. Not only are they exposed to contact with the pump, jack and other tools carried in the tonneau, but often to grease or oil. The inner tube is not constructed to withstand the same severe service as a tire and the life of the rubber is decreased through being exposed to the action of lubricants, moisture or heat. The automobilist who endeavors to maintain his machine economically, follows the instructions of the tire maker in respect to care of the inner tubes. The Willys-Overland Company, Toledo, O., prints some interesting data relative to this subject and that section dealing with the folding of these members is given herewith.

To fold a tube in the most satisfactory manner, the valve stem should be removed so as to allow the escape of the air as shown at Fig. 1 A. The tube is next rolled up as tightly as possible, beginning with the end farthest from the valve, as indicated at B. This will enable the displacement of the air through the valve, but it will be noted that some will accumulate at the end because of the bend. By moving the valve and rolling the tube at the same time, all air may be removed and the tube rolled as shown at E.

The tube should be compressed to prevent air entering while the valve and cap are being replaced. Do not screw in the stem too snugly as it will make the work of inflating the tire more difficult. The valve should be adjusted and tested after pumping. The tube is now ready to be prepared for placing in the tube bag. Open up the tube as shown at C, keeping the valve in the centre, and fold each end inward as indicated at D, making a final fold as at F. The result will be a flat package. The folds may be secured by rubber bands and these may be made from an old inner tube.

If the tube be punctured it will be difficult to fold as the air will enter through the opening. The best plan is to roll it as outlined at E. This will enable one to distinguish at a glance whether the needed tube is in perfect condition or not. A small handful of soapstone or talc in the bag is recommended. By observing these precautions the tubes are always ready for immediate use.

COVERING THE RADIATOR.

If one is to make a cover for the radiator to protect the water against the chilling winds when operating, it is best to ascertain the height of the

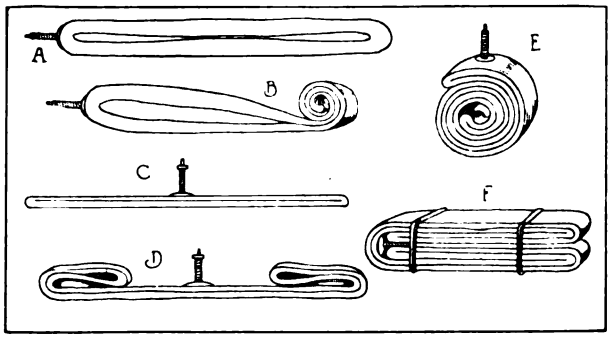


Fig. 1—Illustrating the Process of Folding Inner Tubes and How They Should Be Prepared for Storing.

cold fluid before covering that portion of the cooler. It should be remembered that hot water rises to the top of the radiator and that the cold settles to the bottom, this being demonstrated by the thermo-syphon system of circulation.

The writer has noted some drivers operating on extreme cold days with the top of the cooler covered and the lower fins unprotected. This is poor practise as the position of the cover should be reversed and the front of the radiator covered about half way to the top, depending upon the design of the motor and cooling facilities of the circulating system.

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PROPER USE OF S WRENCHES.

The average motorist who makes his own repairs or adjustments will in time accumulate a set of S wrenches of various sizes and openings. They are indispensable in the garage and when used properly the nut or bolt is not damaged. The novice should learn how to handle these tools and at Fig. 2 are shown several suggestions for tightening or loosening nuts or bolts not easily accessible.

Sketches A to F illustrate methods of securing greater leverage when tightening a nut and when it is impossible to accomplish the work with a single tool. Those at C and E present the utilization of a piece of piping which is placed over the wrench to augment the leverage.

It is well to remember that when a hammer is employed with an S wrench for starting a frozen nut or bolt, the jaws should be fitted so that the impact of the hammer will tend to drive

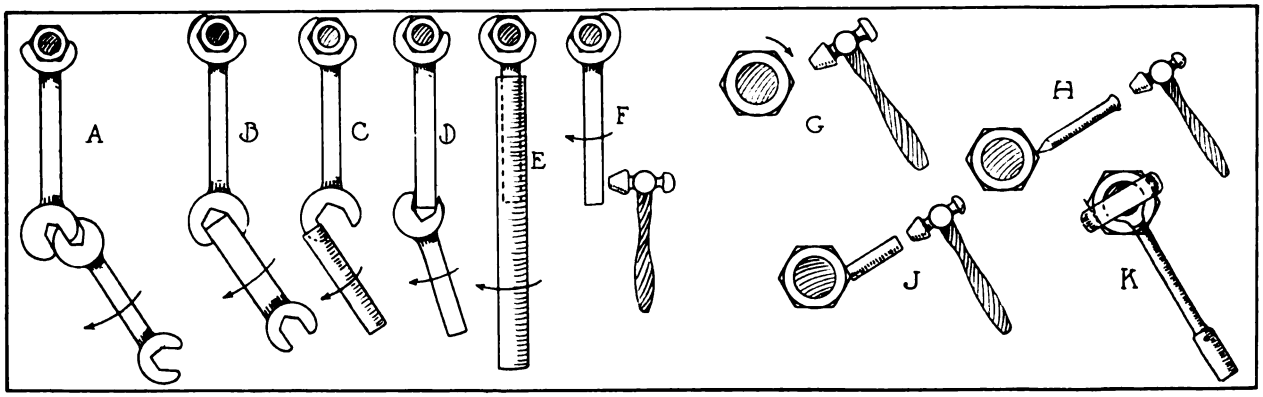


Fig. 2—Illustrating the Proper Use of S Wrenches: A to F, Showing Methods of Obtaining Greater Leverage; G, H, J, Suggestions for Starting Frozen Nuts.

them onto the nut and not off. If placed incorrectly the blow will cause slipping if not damage.

Sometimes the nut is so located that a wrench cannot be utilized because of lack of space. At G, H and J are shown methods of doing the work, and it will require but little practise to master the operations. A rigid piece of metal should be employed, an iron or brass bar for example, and never the cold chisel, which will ruin the nut. The blows with the hammer should be sharp and clean, and the force applied for a brief part of a second is sufficient to start or lock the nut or bolt. Slow and constant hammering should be avoided.

The box wrench, or as it is sometimes called, the clawfoot, is of service when some foreign substance has become lodged between the threads of the nut and bolt, and when tapping with a hammer is necessary to loosen the parts. The wrench is fitted over the nut and receives the impact of the hammer, thus saving the nut from damage.

In removing a small nut or union member from light tubing, and when it appears frozen, care should be exercised not to exert undue strain due to the leverage of the wrench. The best method is to fit the wrench and give the handle a light, quick tap, which will start the stubborn part without danger of twisting the tubing. The same method may be employed successfully in removing the hup cap from a wheel. Some of these members are thin and if considerable leverage is exerted through a long handled wrench, the metal may become bent out of shape. On the other hand a more solid cap will resist the leverage and may strain the spindle if considerable pressure is applied through employing piping over the handle of the wrench.

A common fault with the amateur repairman is to employ an S wrench that is too large; or in other words, the nut is smaller than the opening of the jaws of the tool. This results in damage to the nut by rounding off the corners.

OIL AND COLD WEATHER.

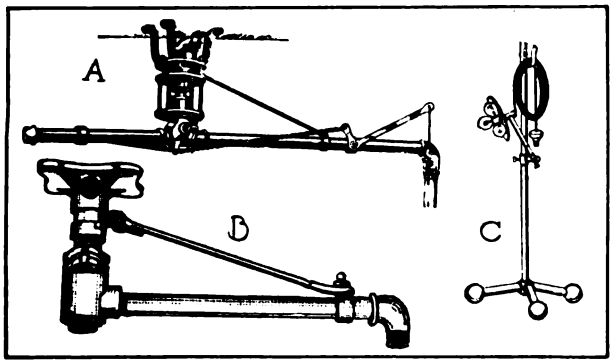
One cannot be too careful of the lubrication system in cold weather. While it is an excellent idea to utilize a light grade of lubricant for winter operation some employ a heavy or medium oil the entire year. If the motor has stood for any great length of time and the oil has become congealed, it is poor practise to race the motor after starting just to warm it up. The engine should be run slowly until the lubricant has had an opportunity to become fluid, and it is a good plan to observe this rule at all times when the motor clutch is disengaged. The various oil companies supply a chart showing the particular grade best adapted for winter use and to each type of motor.

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EQUIPPING THE PRIVATE GARAGE.

Part III.

The fuel problem is one in which all motorists are interested, especially those having a ga-



Washers of the Overhead Type: A, Irving with Automatic Cut-Off; B, Ever Ready; C, Portable Electric Light Stand.

rage on the premises or convenient to their place of residence. While some install a storage tank and purchase gasoline in large quantities, depending upon the size of the system, others prefer to buy the fuel in smaller amounts, especially when there is a service station in their neighborhood. Buying in large quantities makes for economy and convenience, however, and the question of fuel is one that is best settled by the owner. Some make it a practise to build a small shed some distance from the garage and house and by employing five or 10-gallon cans are able to secure wholesale rates from the tank wagon. Before making arrangements for the storing of gasoline it is advisable that the insurance people be consulted.

Washing the Machine.

The majority of owners having small garages wash and polish their cars and by so doing save a considerable sum each year. Others prefer to have the work done outside, but when convenient the installation of a washer will materially reduce the cost of yearly maintenance. This readily will be seen when the prices charged for washing and polishing are considered. Assuming that the rate is $1, which is conservative, and that the car is washed once a week, this means an outlay of at least $52 the year.

Practical washers may be secured at a reasonable figure, ranging from $10 upward, depending upon the design. In an accompanying illustration will be noted two designs for attachment to the ceiling of the garage, that at B being moderately priced and having a hose arm 4.5 feet long. The depth from the ceiling is but eight inches and the total weight is only 14 pounds.

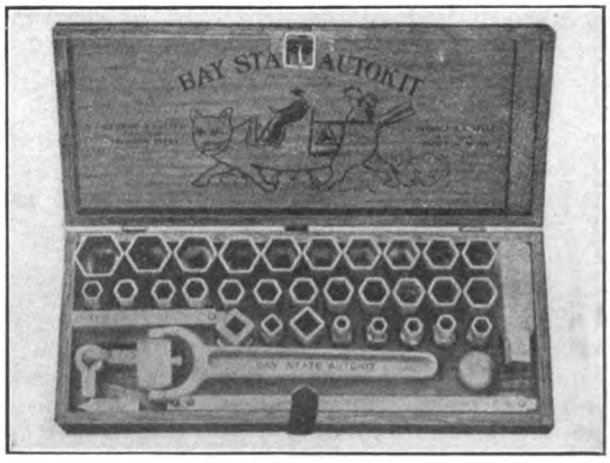
That depicted at A is of higher grade and is provided with an automatic shut-off, incorporated in the top of the washer and equipped with a valve attached to a rod running down the centre of the washer to a cam at the bottom of same. When the water is turned on there is no pressure on the washer, as the valve shuts off the supply directly at the elbow entrance. The function of the valve member is to open and close the line of supply and this is superior to the old method of walking around the car to the faucet to shut off the fluid. It also prevents waste, making for economy.

Some types of washers are fitted with an electric light attachment, but this may be dispensed with by the use of the lighting stand shown at C. The latter will be of service in the overhaul as it is adjustable to any desired angle. One may be made if desired, by utilizing an old music rack and fitting to it a reflector, or by employing a drop light having a reflecting shield of the type outlined in a previous installment.

It is not absolutely necessary to purchase an overhead washer, although these are convenient in that the hose may be swung around the machine, as the ordinary hose may be utilized. The subject of washing the car will be taken up in logical sequence.

Purchasing the Tool Equipment.

In the selection of the tool equipment the motorist should exercise considerable care. Of



Bay State Autokit, Having a Large Number of Sockets, Ratchet Wrench, Etc.

course the number to be purchased will depend upon the work to be performed, but as there is a growing tendency on the part of the owner to at-

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tend to the upkeep of his car, successful work will require proper tools. While the list presented may appear rather formidable and the cost prohibitive if the entire equipment be included in one purchase, by buying the tools one at a time and exercising good judgment considerable economy may be effected.



Allen Friction Wrench Set.

The majority of car makers provide a good equipment, but it will need supplementing if an overhaul of the machine is to be undertaken. It is better to purchase a limited number of high grade tools than a large number of cheap members and attractive prices do not always mean economy in the end.

In selecting the vise, which is one of the most essential tools, it is advisable to purchase one that will permit of handling large work. While a small member may be suitable for light material it will not withstand severe service and may mean the purchase of a new and larger one. One having at least four-inch jaws is recommended and the larger the opening the better. The difference in cost is very small and the larger is well worth the increased price.

Some are the swivelling type and have a locking arrangement, but the ordinary member will serve. It should be securely anchored to the bench by bolts or cap screws and free from all play. A suggestion for fitting the handle with rubber rings is worth consideration as by placing the material near the ends the metal is saved from damage when the vise is being worked.

Box or Socket Wrenches.

The writer strongly recommends the purchase of a set of box or socket wrenches. There are a number of different sets upon the market and when the amount of work these handy tools will accomplish is considered, to say nothing of time and jammed fingers saved, they are cheap in comparison with ordinary tools. They make for economy in that when properly used, nuts and bolts are removed or tightened without damage, and this is especially true when they are located in places not easily accessible with the S or other wrench. It should be borne in mind that the use of a cold chisel and hammer for starting a frozen or refractory nut means that it will have to be replaced by the same method, and frequently a new part will be required.

The average set contains a large number of steel sockets of both hexagonal and square shapes, ranging from .3125 to 1.28125 inches by thirty-seconds, and with such an equipment the removal of the smallest as well as largest nut or bolt is accomplished easily and without damage. The kit usually includes a long and short extension for use with a universal joint, which makes possible the handling of bolts where the space is limited. With a little practise one can tighten nuts in places which appear to be almost inaccessible.

Some of the wrenches have swivelling, reversible ratchet handles, making possible the removal of nuts, etc., by a ratcheting motion, and where there is not room to swing an ordinary wrench. Types of this kind are shown in the Mossberg and Bay State outfits presented in accompanying illustrations. The Allen wrench differs from these in that it operates upon the friction principle. As previously pointed out there are a number of different designs, those illustrated being presented to show the components of the set. They are moderately priced and make possible the accomplishment of work requiring a large number of ordinary wrenches.

(To Be Continued.)

Miss Victoria Clerke, a progressive young woman, has successfully established an automobile agency, the northern boundary of which reaches into the Arctic Circle. Her territory, centred at Humboldt, Saskatchewan, Canada, includes that province and the vast areas of Alberta and Mackenzie. Miss Clerke is the representative of the Imperial Automobile Company, Jackson, Mich., maker of Imperial cars.



The Mossberg Wrench Is of the Ratchet Type and the Outfit Is Very Complete.

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NEW DIXON CATALOGUE.

Valuable Work Concerning Lubrication Available for the Motorist and the Trade.

The largest and most complete catalogue ever issued by the Joseph Dixon Crucible Company, Jersey City, N. J., is being mailed to the manufacturer, jobber, purchasing agent and others interested in graphite, crucibles, lubricants and other products of this company. Altogether over 100 pages are devoted to illustrating and describing the Dixon product.



The new booklet has a neat cover design, which is presented in the accompanying illustration, and its contents will prove of value to the motorist in that the subject of lubrication is fully treated in an interesting manner. Copies will be mailed free upon request.

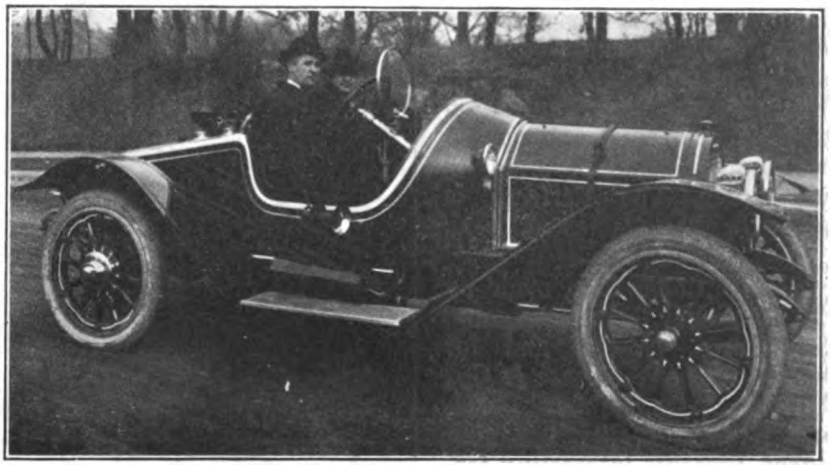
PATHFINDER DRIVERS NAMED.

Robert Speigel and Dr. Charles G. Percival Will Act as Cross Country Pilots.

When the Indiana automobile manufacturers hold their third annual tour, which this year will be from Indianapolis to the Pacific Coast, one or more Pathfinder cars, made by the Motor Car Manufacturing Company, Indianapolis, will be entered. These machines will be driven by two well known veteran cross country pilots.

One of these is Robert Speigel, who achieved considerable fame in the Los Angeles to Phoenix road race, and the other, Dr. Charles G. Percival of New York City, the pathfinder and traveller, who has just written an account under the title of "The Trail of the Bull Dog," of his famous two years' journey of 50,000 miles, extending from Mexico to the borders of the Arctic circle. With two such drivers there is hope that the Pathfinder will complete the coming tour with a perfect score.

The tourists will leave Indianapolis July 1, but the exact details of the itinerary have not been decided upon as yet. Both of the Pathfinder drivers are thoroughly familiar with all the roads leading into these cities. An accompanying illustration shows them in a Pathfinder cruiser model, the picture having been taken in New York City during the progress of the recent show.



Robert Speigel and Dr. Charles G. Percival in Pathfinder Cruiser Model in New York City.

SAVANNAH MAY HAVE SHOW.

Suggestion That Display Be Held in Connection with National Racing Classics.

Harvey Granger, president of the Savannah Automobile Club, under whose direction the Vanderbilt Cup and Grand Prize races will be conducted at Savannah, Ga., next fall, states that the club will lend its moral support to a mammoth automobile show which has been suggested in connection with the races. The club cannot, however, assume charge of such a show, because of the fact that it will have all it can handle in caring for the race arrangements.

The proposal is to have a show under canvas, at which admittance will be free, thus giving the manufacturers exhibiting the utmost advantage of the affair. Plenty of room would also be available for road demonstration of both pleasure and commercial vehicles.

In the French quarter of New Orleans, La., laid out nearly 200 years ago, there has been great difficulty in handling the traffic, owing to the narrowness of the streets. In the last report of the chief of police he states that owing to the increased use of motor vehicles it is now possible to reduce the traffic squad materially in the old part of the city. When horses were used altogether the lives of pedestrians were often threatened by the animals becoming unruly in the congestions at street intersections.

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NEW AND NOVEL ACCESSORIES THAT APPEAL TO MOTORISTS

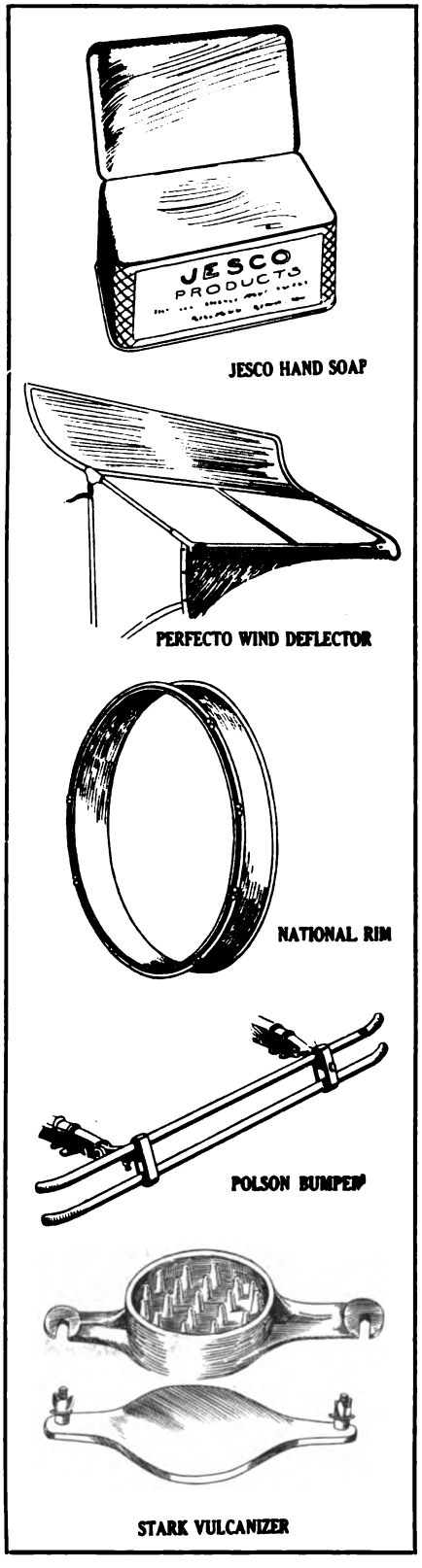
Jesco Hand Soap is manufactured by J. Eavenson & Sons, Inc., Camden, N. J., and comes in tin boxes, 36 to a case. One of the qualities emphasized with the preparation is that it will remove dirt or grease without injury to tender hands. It is held by the maker that the soap is free from grit or other abrasives and that it imparts a clean smoothness to the skin.

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The Perfecto Wind Deflector is the product of the Perfecto Wind Deflector Company, 67 Church street, Boston. It is designed to deflect the wind in such manner that back draughts are avoided. Being constructed of fibreloid it is claimed that injury through a collision is reduced to a minimum. One of its qualities is that it may be taken apart in a few minutes and an entire new panel inserted at a small cost. The shield may be adjusted to any desired height or thrown forward to accommodate one entering the car, and it is held that it can be attached to any form of dash. A device on the filler board permits of the shield being raised in warm weather to provide ventilation and side curtains make possible the exclusion of draughts in winter. The Perfecto is made in various sizes.

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The National Rim, made by the National Rim Company, Tarrytown, N. Y., and for which Walter A. Frese & Co., United States Rubber Building, New York City, is selling agent, presents interesting features of construction in that a tire may be removed and a new one fitted quickly and that the shoe is held securely in the event of a blow-out when travelling at high speed. The rim proper is of pressed steel, having punched slots on its outer periphery, and through these apertures project movable lugs. When the tire is inflated the side pressure locks the outside and removable ring against the lugs and the latter against the rim. When the tire is deflated the lugs remain in position until disengaged, which operation is accomplished easily by the thumb. This is done by pressing downward on the lug, which is spring retained and fitted with a pivot device, making it possble to hold out the lug until the ring and tire are removed and replaced. After fitting the tire and ring the lugs are moved into engagement with the slots and locked automatically. It is obvious that the ring cannot leave the rim because of the retaining lugs and that the construction makes changing tires a simple operation. Among the qualities emphasized with the National rim are: Non-rusting, easy operation, no parts to become loose or lost and perfect safety in use.



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Stark's Improved Vulcanizer is manufactured by the Electric City Specialty Company, Buffalo, N. Y., and comprises two metal castings and two thumb screws. To vulcanize, an inner tube is placed between the parts with a patch and a prepared rubber placed over the puncture. A measured quantity of gasoline is poured into the pronged receptacle and lighted. The latter is so designed that the heat generated is regulated automatically and the patch is cured properly. The Stark vulcanizer is moderately priced and is guaranteed.

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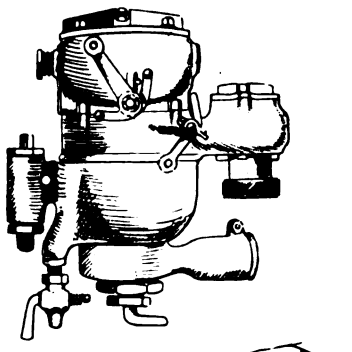
The Polson Universal Bumper, produced by the Polson Manufacturing Company, Buffalo, N. Y., has been improved and one of its features is that it is adaptable to any car with a pressed steel frame. It comprises a double protecting bar secured to the frame in a substantial manner by special clamps. The fittings are supplied in enamel and the bar in brass. Enamel or nickel finish is optional.

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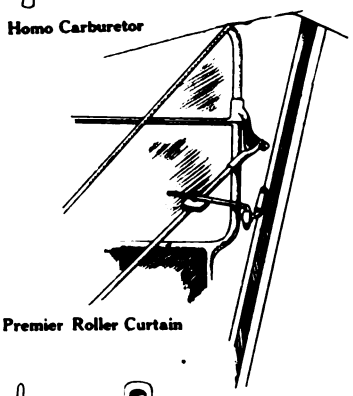
The Homo Carburetor, manufactured by the Homo Company of America, 3202 Oxford street, Philadelphia, presents interesting features in that the maker lays great emphasis upon its vaporizing thoroughly low grades of motor fuel. This is secured by the fuel passing through the Homo, located in the heart of the heat jacketed section of the carburetor, which device prevents liquid gasoline reaching the cylinders. It is held that the construction of the carburetor provides for a homogeneous mixture of air and fuel in correct proportions. Economy of fuel and high efficiency are also claimed for the Homo.

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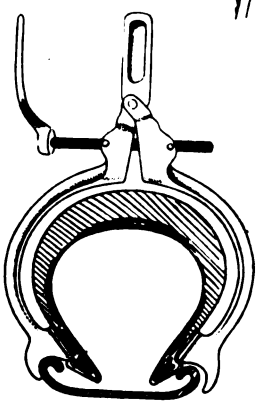
Premier Roller Curtains are manufactured by the Storm Front Company, Troy, O., and are of the quick detachable, roller type. They are made for both front and middle side and are neat and serviceable. They permit of enclosing the car quickly, with but little effort upon the part of the driver, and the top may be folded as easily as normally. That shown in the illustration is a front fixture attached to a fore door with glass windshield. The principle of operation is similar to that of a curtain shade, but more substantial and quickly operated.



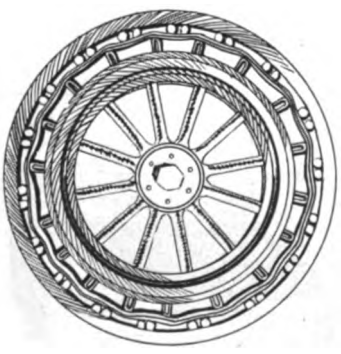
Homo Carburetor



Premier Roller Curtain



Giant Tire Tool



Favary Tire

The Giant Tire Tool, made by the M. & G. Tire Tool Company, 134 Washington street, Providence, R. I., is a practical device which will appeal to motorists as with it tires frozen to the rim are easily removed. It comprises a pair of pivotally mounted jaws having flat extensions which engage the wall of the tire next to the bead or rim. Considerable pressure is secured through turning a handle which carries a threaded bolt extending through the jaw members, compressing these members and forcing the shoe away from the rim. The ends of the jaws are so constructed that they do not slip upward in the operation or injure the walls of the tire. The movement of the jaws in compression is limited, being sufficient to break contact of the bead with the rim. The tool will fit any sized shoe, is constructed of high grade material and is moderately priced.

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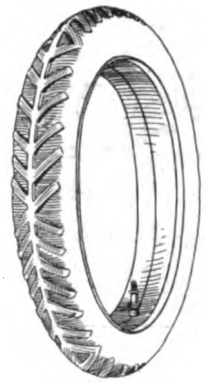
The Favary Tire, manufactured by the Favary Tire Company, Inc., 111 Broadway, New York City, is constructed upon the mechanical principle whereby resiliency is obtained by the flex action of a combination embodying pliable bands under tension. There are two of these, composed of extra strong belting or fabric, especially woven and water proofed. Series of aluminum blocks are secured to and interposed between the bands by tubular steel rivets. The large heads of the rivets rest upon the bands and their tubular section is opened on the aluminum blocks. Friction between the blocks and fabric is eliminated by solidly riveting these members. A quality of the construction is that the tread is made detachable, the oper-

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ation involving the removal of the bottom blocks, which is accomplished easily. Another feature of the tire is that the locking mechanism is positive in its action. The principle involved in operation is as follows: Immediately under an applied load the bands dip downward, while adjacent thereto there is an upward movement due to the increased tension of the bands. It is held that the tension is quickly and easily adjusted to conform to the character of the roads and that resiliency is the chief feature of the tire. Its construction is such that skidding or side slipping is reduced to a minimum. Greater tractive qualities are claimed as well as efficiency. The Favary tire is adapted for both pleasure and commercial vehicles.

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The Columb Anti-Skid Tire is manufactured by the Russian-French India Rubber, Guttapercha & Telegraphs Works, Prowodnik, Riga, Russia, for which the Russian Tyre Sales Company, 981 Eighth avenue, New York City, is agent. The tread surface is provided with a wide rubber rim, running through the centre of the outside of the cover and being reinforced by a number of ribs proceeding from the central member like a fish bone. These cross ribs are arranged at an angle, a construction which the maker holds affords an increased resistance against slipping or skidding. These groups of ribs run in alternate directions. Among advantages of the construction claimed are: Greater efficiency, non-skidding, better traction and less heating, due to the surfaces being kept cool by air passing through the channels of the ribs. The India rubber compound employed is also held to be unusually durable.



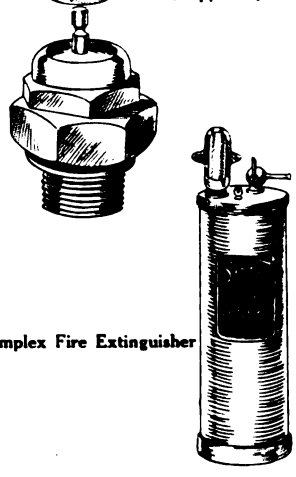
Prowodnik



Western Gas Filter



Snappon Spark Plug



Simplex Fire Extinguisher



Eureka Valve Grinding Compound

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The Western Gas Filter is the product of the Western Brass Manufacturing Works, Marshall boulevard and 21st street, Chicago, and is a device for incorporating in the line between the carbide generator and the lamps. It is held to remove effectually any foreign substance, such as particles of carbide, water or acetone, from the gas, and it is designed for service with gas tanks as well. It is made in polished brass, 1.5 by six inches, and is moderately priced.

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Snappon Spark Plugs are marketed by the Bingham Manufacturing Company, 227 Prospect avenue, N. W., Cleveland, O. As the name indicates they are provided with a terminal which is secured to the high-tension cable, and which snaps firmly into position. The construction facilitates the work of removing the spark plug from the cylinder. The retaining mechanism comprises spring actuated steel balls which grip firmly the positive electrode provided with a suitable recess.

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The Simplex Fire Extinguisher is manufactured by David Kahnweiler's Sons, 260 Front street, New York City, and comprises a cylindrical brass receptacle without interior mechanism, and a carbonet in a winged cap inserted at the top, with nozzle and stop cock. The vessel is filled with a combination of gases in a liquid state termed Simplex, which is held to contain no moisture and to be a non-conductor of electricity. It is also claimed that the preparation leaves no deposit and will not injure fabric, etc. The extinguisher

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is operated easily, the turning of the winged cap piercing the carbonet and liberating the pressure, which is held to be sufficient to force the liquid a distance of about 30 feet. The blaze is enveloped by a gaseous blanket, extinguishing it by shutting off the supply of necessary oxygen.

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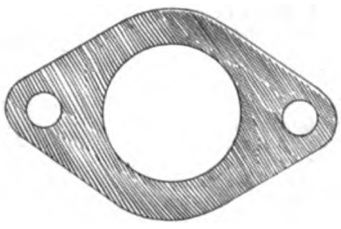
Eureka Valve Grinding Compound is produced by the Auto Equipment Company, East Orange, N. J., and comes in a neat box. It is adapted for the grinding of valves and it is claimed that the use of oil or gasoline is unnecessary. If the compound becomes too heavy it is moistened with a few drops of water.

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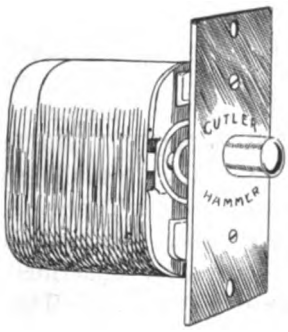
The Elyria-Dean Speedometer, manufactured by the Dean Electric Company, Elyria, O., differs from other centrifugal speedometers in that four steel balls operate radially in grooves, so as to raise a cup shaped member and move the indicating hand over a long uniformly divided scale. This is accomplished without compensating springs or other modifying means being interposed. The dial is finished in black, a reflection proof color, and the markings or letters, figures, etc., are in white, a construction making for easy reading and at a considerable distance. The odometer is a Geneva movement and the trip member may be set to any tenth mile. The total and trip portions are actuated by separate mechanisms, serving as a double check on the mileage. Both the speedometer hand and the odometer movement operate in a right direction regardless of that of the shaft revolution, or whether the drive is on the right or left wheel.



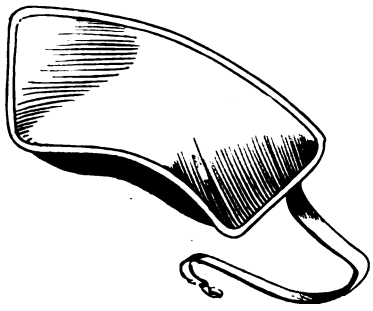
Elyria-Dean Speedometer



Vellumoid



Cutler-Hammer Door Switch



Leasure Sanitary Shield

Vellumoid is a patented gasket material marketed by Charles D. Brown & Co., 49 Federal street, Boston. It is very tough, but pliable, and is impervious to the action of gasoline, kerosene, oils, water, etc. It is particularly adapted to motor cars for gaskets, either in hot or cold places, but is not suited to hot steam under pressure. Vellumoid comes in sheets, or rolls, and is constructed in differing thicknesses to meet individual requirements.

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The Leasure Sanitary Shield is manufactured by the Sanitary Sales Company, Bradford, Penn., and is a combination eye and nose shield. It is sanitary in that it prevents the inhalation of dust or other foreign elements and also protects the eyes. The shield is made either plain, amber, blue or green, trimmed in colored leather or ribbon, and a neat leather case is provided for carrying it when not in service.

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The Cutler-Hammer Door Switch is an electrical unit designed to close the circuit automatically and light the foot lamp when the door of the vehicle is opened. Closing the door extinguishes the bulb. The Cutler-Hammer Manufacturing Company, Milwaukee, Wis., is the maker and a feature of the device is its compactness. It is narrow, with rounded ends which fit the holes made by an ordinary bit, and it is held that it is a simple matter to install the switch. The insulating material is water and fireproof and the body and push bar are sturdily constructed. A strike plate, for mounting on the door against which the operating bar of the switch comes in contact, also is furnished.

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THE PRICE OF GASOLINE.

The price of gasoline has advanced from 50 to 80 per cent. since about the first of the year, this depending upon the section of the country, for it is maintained that certain dealers were able to purchase motor fuel at a better figure than others since last summer because of contracts which have not and will not be renewed. The situation is one of decided importance to the automobile industry, particularly as there does not appear to be any immediate suggestion that gasoline will be produced in such quantity as to warrant a reduction in cost.

This advance was not wholly unforeseen. Engineers have been busily engaged in experimentation for some years in an effort to find a suitable substitute. At one time attention was turned toward denatured alcohol, but whatever may have been the result abroad, it does not appear that relief is to be gained from this source here, particularly when kerosene is available in the present quantity.

There was some reason for surprise that no kerosene carburetors made their appearance during the recent show at New York City. It is more or less well known that engineers have been at work along this line for the past year, at least, and commercial vehicles utilizing kerosene or distillate as fuel have been giving satisfactory service in the West and on the Pacific Coast for a longer period.

The step from the grade of gasoline which has been supplied in recent years to kerosene is not as great as the average motorist may have been led to suspect. The chief problem involved is that of supplying the necessary heat to produce vaporization. That this problem will be worked out satisfactorily and within a comparatively short time is the expectation of those most intimately acquainted with the industry.

DEMAND FOR UNIFORM LAWS.

There is a hopeful sign in the editorial columns of the daily press with respect to the matter of uniform motoring legislation. That these papers reflect public opinion cannot be denied. At one time it seemed to be the chief aim of the legislators to enact laws which were bound to confuse the visiting motorist. With the more general adoption of the automobile, and perhaps the acquisiton of cars by the legislators themselves, more consideration has been given to the subject.

The legislative board of the American Automobile Association, of which Charles Thaddeus Terry of Buffalo, N. Y., is chairman, has done much to secure the repeal of certain laws and the enactment of others which tend toward uniformity. This board is engaged upon a campaign of education which is sure to bear fruit. A recent issue of Leslie's Weekly published an article by Mr. Terry, in which he made a strong plea for uniform and simple enactments governing the automobile and its use. In commenting upon this article the Chicago Inter Ocean says:

> There really seems no good reason why an automobile owner must be a perambulating encyclopedia of law to protect himself from becoming a criminal through ignorance. Yet that is the condition in which he finds himself at the present time. Every commonwealth and almost every community has a different set of statutes or ordinances governing the use of automobiles. * * * As Mr. Terry shows, it should not be difficult to make a set of laws which would have general currency throughout the country.

The Inter Ocean suggests that delegates from the various states meet and arrange a simple code which the several legislatures can enact, to

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their own benefit and the vast accommodation of the increasing number of motorists. This plan has never been tried, except in a very limited way. Organized motorists would do well to advocate such action, and it is worthy of note in this connection that the automobile clubs of California have united for just this purpose with reference to existing laws in the various counties of that commonwealth.

TRANSCONTINENTAL TOURING.

The interest in good roads which has been awakened among the public spirited citizens of the West undoubtedly had its inception in the desire to urge motorists to visit that section in greater numbers. Those who have toured that portion of the country are enthusiastic over the possibilities. There seems little reason for going abroad, when there is so much to be seen at home, but until very recently there has been little incentive to make the attempt.

Good roads organizations are now busily engaged in developing the situation. The Indiana Automobile Manufacturers' Association is planning a tour to the Pacific Coast in July. Already there is much interest in the Panama-Pacific exposition of 1915, with a suggestion that the national tour, or the Glidden as it has come to be known, be held with that event as its objective point.

It would seem that the growth in transcontinental touring were sufficient argument to indicate the desirability of studying highway construction and maintenance. The commercial application of the motor vehicle follows the use of the pleasure car. The combination of good roads and motor haulage makes for the solution of economic problems, leaving out of consideration the money expended annually by tourists.

VALUE OF RACING.

About a year ago several manufacturers announced their intention of withdrawing from racing, because they were convinced that such contests had ceased to have value from a manufacturing standpoint. Those who remained in the field contended that there was still much to be learned in this manner. The year has passed and the first of the annual shows has been held.

At the New York display the visitor could not help but be impressed with the number of wire wheels on exhibition. Engineers representing makers who continued in the racing field contend that results obtained with wire wheels in such contests were sufficient to indicate that they were desirable equipment. It may be admitted that there was abundant evidence of their practicability to be found in their use on cars abroad, but it undoubtedly will be contended that racing has played its full part in placing them upon machines in this country.

It is unnecessary to go into the relative merits of wire and wood wheels in this connection. At the beginning of the 1913 racing season it seems to be indicated that the number of withdrawals will be few and there is a well defined rumor that some of those who retired a year ago will re-enter the field.

THE LONG STROKE MOTOR.

A careful consideration of the 1913 motors as presented at the New York show reveals a strong tendency toward the long stroke, particularly with the new designs. This is a practise which follows that in vogue abroad, particularly in Great Britain, where the long stroke was utilized, assumedly for the purpose of escaping increased taxation, the license fees being based upon the horsepower rating. The formula in use in Great Britain is the same as that adopted by the Society of Automobile Engineers in this country, and the bore is the chief consideration in determining the rating.

Last year more than half of the motors produced in America, or some 59 per cent., had a bore to stroke ratio between 1:1 and 1:1.20. Some 27 per cent. had a bore to stroke ratio of over 1:1.20. The figures at the recent show in New York City, which may possibly be taken as highly representative of the entire industry, indicate that about 43 per cent. now have a bore to stroke ratio between 1:1 and 1:1.20, while 56 per cent., most of these being new designs, have a higher ratio. The situation is interesting as suggesting the trend of engineers along this line.

Aside from suggesting the wonderful growth of the industry, the figures, elsewhere in this issue, indicating there are now 1,000,000 automobiles in America, afford opportunity to judge future possibilities.

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THE CANYON DRIVES OF COLORADO.

(By James A. Harris, Jr.)

PROBABLY no state in the union offers a better combination of magnificent mountain scenery, unusual roads and good hotel accommodations than Colorado. Here are found the highest peaks of the Rockies, the deepest canyons, and the prettiest valleys, all of which can be seen more effectively by motoring than in any other manner.

The historic Santa Fe trail, running westward from Kansas, takes the tourist to Pueblo, in the southeastern part of the state, an ideal starting point for the mountains. Forty miles to the north is Colorado Springs, the road skirting the edge of the foothills. A few miles from the springs is Pike's Peak, Manitou, with its hot springs and caverns, and the Garden of the Gods, rich in fantastic rock formations.



First View of Collegiate Range, Continental Divide, Coming into Bueno Vista from Trout Creek Canyon.

The road leads straight north to Denver, with the entrance to the mountains only 15 miles away—at the mouth of Bear Creek Canyon. Right at the entrance is situated Red Rock park, named from enormous monoliths, rich red in color, which project upward from the lower slopes of Mount Morrison.

The ride up Bear Creek is extremely picturesque, the road following close to the winding stream. Climbing gradually, a low divide is crossed and the headwaters of the South Platte are reached, from which point a steeper grade begins up over Kenosha Pass, into South park. This is a large, level plain, shut in by lofty ranges on all sides and with an elevation of over 9000 feet. Here the mountains appear in all their grandeur, peak after peak outlined against the sky, each covered with snow.

The Park range, at the western edge of South park, is crossed over Trout Creek pass, and from here the road winds down the valley of Trout Creek, past the fortress like Castle Rocks, into the broad valley of the upper Arkansas. The ride up the valley into Buena Vista is magnificent. The Collegiate peaks of the Saguache range part of the Continental Divide, rise abruptly across the valley. Mount Princeton is directly abreast, with Mount Harvard and Mount Yale slightly to the north, all over 14,000 feet high and all white with snow.

Continuing up the gradually narrowing valley of the upper Arkansas, the road leads to Twin lakes, picturesque little mountain lakes nestling at the foot of Twin peaks, with Mount Elbert and Mount Massive, the two highest peaks of the Rockies, on either side. From Twin lakes there is a long, steady climb to the famous mining town of Leadville, the highest city in the United States, having an altitude of over 10,000 feet. The view from Leadville surpasses all description. There is literally a sea of snow capped mountains on every side, peak after peak rising in the utmost confusion with Mount Elbert and Mount Massive towering above all.

Tennessee pass, where the Continental Divide is crossed, is just north of Leadville, and only slightly higher in elevation. The trip over the pass is easily made and commences the descent down the western slope, by way of Eagle river canyon. The road here runs along the side of the canyon, sometimes to a height of 1500 feet above the river, through Red Cliff, and along the upper edge of the mining camps of Gilman and Minturn, which are literally glued to the cliff like side of Battle mountain. The view up the canyon from the edge of the mountain is magnificent. Far beneath one can see the river and the road

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Leaving Salida, in the Arkansas Valley, with Sangre de Cristo Range in the Background.

just traversed, looking like tiny, winding threads.

After leaving Battle mountain the canyon changes to a valley, and a few miles further the road reaches the valley of the Grand river, which flows westward into Utah to join the Colorado. The descent down the valley is very gradual, and extremely picturesque, with high, deep red cliffs and battlements at either side. The trip down this valley continues for 30 or 40 miles and then the sides of the valley suddenly close in and the tourist finds himself in the canyon of the Grand, with the road cut out of the solid rock and the walls rising straight up to a height of over 1000 feet.

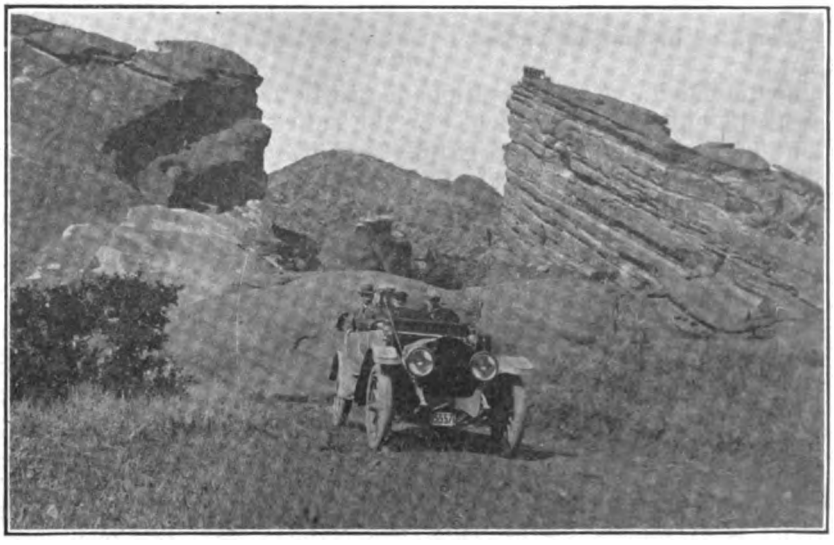
This ride through the canyon of the Grand is one of the prettiest canyon trips in the state, and once taken will never be forgotten. The road is extremely winding, now dropping down to the level of the river and now climbing a hundred or so feet above, the inside wall so close that it can be touched from the car. This canyon continues for 15 miles and at the lower end is situated the town of Glenwood Springs, and the well known summer hotel, the Colorado, with its wonderful hot springs and vapor caves. Glenwood Springs is also a favorite starting point for hunting parties, the wild mountain country to the north abounding with deer, bear and mountain lion.

After leaving Glenwood Springs the character of the country rapidly changes. The sharp peaks and granite rock formations vanish, and the high, flat topped mesas with prominent rim rock along the upper edge come into view. Stratified rock, of brilliant reds and yellows and browns, takes the place of the volcanic formations of the divide ranges.

About 50 miles down the river another canyon is entered, this time with wider and higher walls, intersected at frequent intervals by diverging canyons. Here the rock formation, both in appearance and coloring, closely resembles that of the Grand canyon of Arizona, only, of course, on a much smaller scale. This canyon extends westward for 25 miles to Grand Junction, near the Utah border line, and one of the fruit growing centres of the country.

Grand Junction is located at the edge of the vast desert which stretches away for over 100 miles into Utah. Here the mountains have been practically left behind, so a turn is made to the southwest and the return trip begins, over the Rainbow route, following up the valley of the Gunnison river, which joins the Grand at the junction.

Passing through the town of Delta, the road goes up over the Black Mesa, the top of which is more than 10,000 feet in altitude, and then follows the edge of the Black canyon of the Gun-



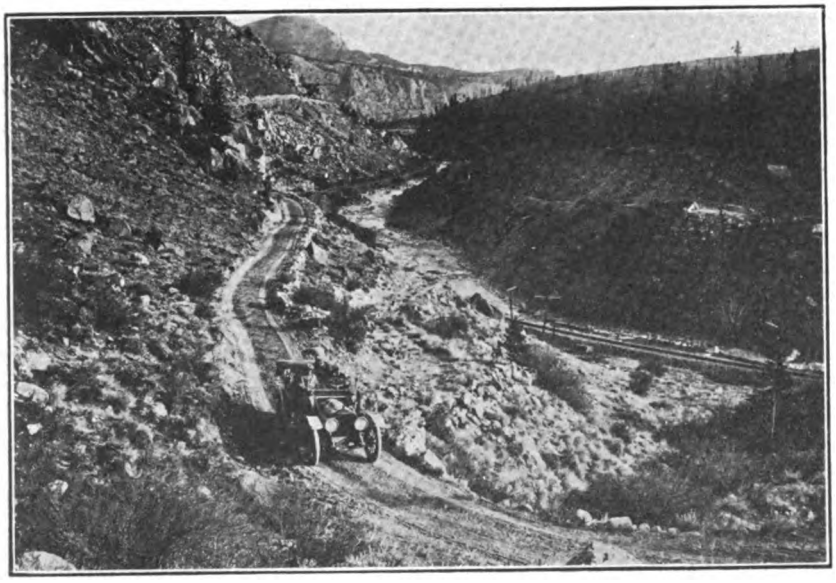
Some Idea of the Curious Natural Formations in Red Rock Park, Near Denver.

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nison, with the river over 2000 feet below, straight down. From Delta a side trip well worth taking is south to Montrose and from there to Ouray, along the beautiful canyon of the Uncompaghre river.

The way leads along the top of the Black canyon for quite a distance, passing the Curecanti Needle, a spire of solid rock towering up from the edge of the river nearly to the top of the canyon wall. After leaving the canyon the route continues up the Gunnison valley, famous for its unexcelled trout fishing, to the town of Gunnison.

After leaving Gunnison the road enters the lower ranges of the divide, and the long climb to Monarch pass, crossing the Sangre de Cristo range, is begun. Monarch pass crosses the Continental Divide at an elevation of nearly 12,000 feet, the highest point reached on the entire trip. The hard climb to the top is fully repaid by the incomparable view which is obtained on all sides from the pass. From this high vantage point it is possible to see for miles and miles over the tops of countless peaks and ranges, with Mount Ouray boldly outlined against the southwestern horizon. The pass is covered with snow nearly the entire year and the air is extremely bracing, but not uncomfortably cold.



Going Up the Narrow Valley of the Upper Arkansas River, Near Leadville.

The descent down the eastern slopes of the Sangre de Cristo range is rapid, and Salida is soon reached, located on the headwaters of the Arkansas river. Following down the river the route is extremely pretty, with the Sangre de Cristo rising like an impenetrable wall behind.

The next stop is at Canon City, and here it is advisable to spend a day or so, taking several side trips which are too wonderful to overlook. Thirty miles to the north of Canon City lies the famous mining camp of Cripple Creek, the road to which leads up through the Phantom canyon of Four Mile creek. This canyon trip is one of the prettiest along the entire route, and is well worth taking. The scenery is different than that of the other canyon farther west, and an added charm is the little stream, which goes tumbling down in almost a continuous cascade.

Another interesting side trip from Canon City is the climb up through Priest canyon to the top of the Royal Gorge, about 10 miles from town. There are several observation points at the top, where it is possible to look over the edge, straight down to the river, 2500 feet below; and so narrow are the walls that in some places the railroad at the bottom is suspended above the water. The third trip of importance is the Sky Line drive, running for three miles along the very top of a steep ridge, from where one can see for miles over the country on both sides, with Canon City almost beneath.

Leaving Canon City, there is a choice of two roads. One leads to Colorado Springs and the other to Pueblo, each about 50 miles distant. This completes the triangular route through Colorado, of over 1000 miles, every mile of which is filled with the finest scenery to be seen anywhere in the world.

The illustrations accompanying this description of the canyons of Colorado were taken on a recent tour over these routes in a White six-cylinder car, made by the White Company, Cleveland, O.

Having for its object the improvement of the present and the construction of better roads in Nevada, the State Automobile Association has filed articles of incorporation with the county clerk at Tonopah, Nev. The incorporators are: Charles G. Patrick, C. R. Redmond, J. L. McCarthy, Victor Brandt, S. R. Moore, Gale Hoag and J. E. Stevens. The association will also foster the passage of the transcontinental highway through Nevada.

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PANAMA-PACIFIC EXPOSITION.

Automobile Manufacturers and Allied Industries to Have Their Own Building.

Permission has been granted by the Panama-Pacific International Exposition to the National Association of Automobile Manufacturers to erect a motor transportation building on the 1915 exposition site. This structure is to house the most attractive automobile show ever held in the world, which is to last throughout the entire period of the international world's fair at San Francisco, Cal. Announcement of this is made by Director of Exhibits Asher Carter Baker, who states that the automobile manufacturers and allied industries, fully satisfied that the physical area of the Transportation Exhibits building did not permit space to be alloted of sufficient dimensions to accommodate their displays, asked permission to erect their own building.

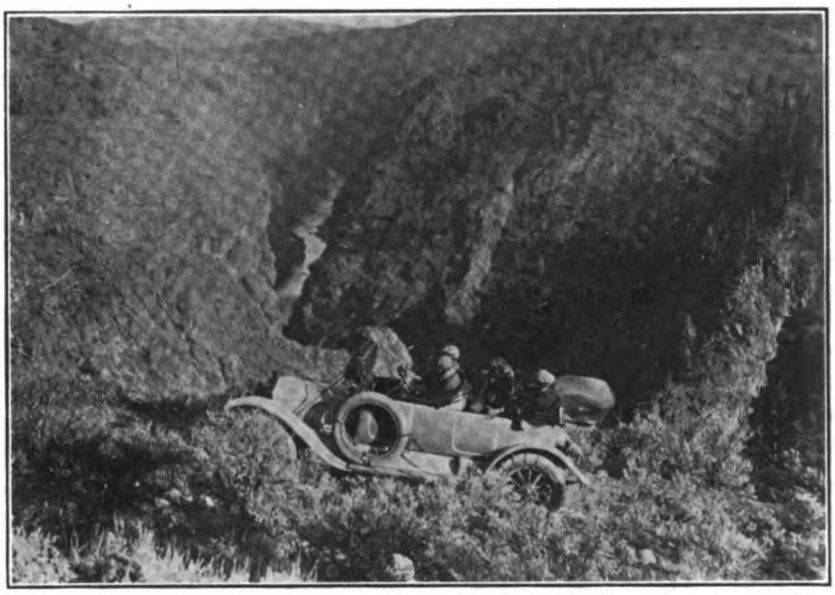
This building was designed by G. Albert Lansburg of San Francisco and has been approved by the architectural commission. The design is one of the most modern notes in the composition of the exposition and harmonizes admirably with the general classic lines established by the commission. In the building the processes of manufacture and assembling will be shown and the importance and extent of this great industry will be placed before the world. The interior decorations promise to be the most attractive of any in the fair and will embrace one general scheme. The structure will be approximately 275 feet front by 800 feet deep and will cover over five acres.

QUEBEC-MIAMI HIGHWAY.

Work of Constructing Long Distance Touring Route Now Progressing Favorably.

Much progress has been made recently on the work of constructing the international route from Quebec, Can., to Miami, Fla., known as the Quebec-Miami highway, according to reports received by Howard D. Hadley of Plattsburg, N. Y., president of the association in charge of the project. More than half of the 2500 miles is now finished. About 400 miles more are under construction, while plans are being made this winter to begin work on the remaining 700 miles, so that the entire road may be finished by the fall of 1914. The stretch from Washington, D. C., to Montreal, Can., is finished, with the exception of five short strips now under construction. The total distance is 649 miles.

It is anticipated that the Quebec-Miami route will carry a heavier traffic than any other trunk highway in North America for three reasons: It leads through a region of historic interest; it traverses sections of great scenic beauty; it will form the main north and south artery through the most densely populated section of this continent. The 10 states, together with the District of Columbia and the Province of Quebec, through which the road leads, have a total population of 31,936,982, nearly one-third of the population of continental United States and Canada.



Looking Down into the Black Canyon of the Gunnison River, 2000 Feet Deep.

The name of Manhattan Automobile Club has been decided upon for the organization of which E. E. Schwarzkopf is organizer. It was arranged at first to call it the Automobile Club of New York, but this was found to interfere with a club already organized with a similar name.

W. J. McDowell of the General Vehicle Company, Long Island City, N. Y., reports the sale of a five-ton truck with Edison batteries to the Manhattan Brewing Company of Chicago.

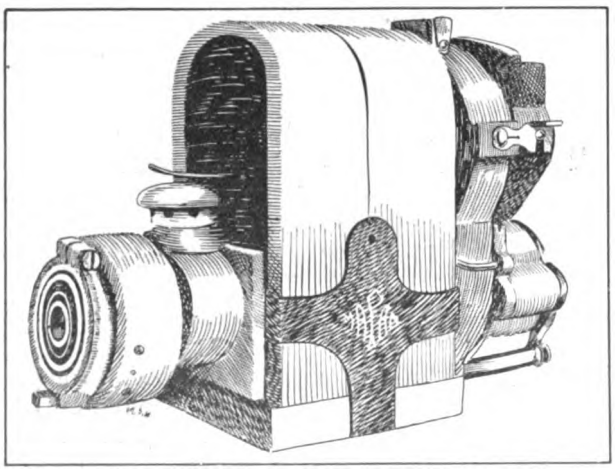
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MAFAN, A NEW GERMAN MAGNETO.

A new magneto which is of interest because of several novel features is the Mafan, manufactured by Hartmann & Braun, Ltd., Frankfort-on-Main, Germany. While it does not differ from the general outlines of accepted magneto design, it will be noted by the accompanying illustrations that many serviceable features have been incorporated.

Additional stability is noted in the pole pieces,



Mafan Magneto, a New German Product, Having Permanent Magnets Retained by Plate Clamps.

these being secured by a covering piece riveted to the base plate. On the finished instrument the pole ends are covered by plates, making for a water proof armature case. It is also claimed that the construction permits of greater accuracy in machining and grinding, allowing a smaller air space and making for greater efficiency.

The safety spark gap is made of steatite and is constructed integral with the high-tension carbon brush, and any excess of current generated by the machine is taken care of. The permanent magnets are not retained by screws or rivets, but are clamped into position by means of two sturdy and ingeniously constructed plate clamps. The contact breaker is of the parallel type, dispensing with the use of a spring trembler. The slide holding the contact surfaces reciprocates in a straight line in a well insulated and mounted frame. It is easily detachable, and by turning a bushing can be changed from operating in a clockwise to an anti-clockwise direction or vice versa. It is claimed that at speeds of 6000 revolutions a minute the interruptions are very regular. The spark is tested under pressure at seven atmospheres.

Provision is made for easy timing. Mounted on the high-tension spindle is the usual gear wheel, and near the outer edge of this member are drilled two holes, which may be brought into register with apertures drilled in a frame cross member. In timing a four-cylinder motor two of the holes are brought into register and a pin inserted. The second set of openings is utilized for obtaining the correct armature position for the third cylinder.

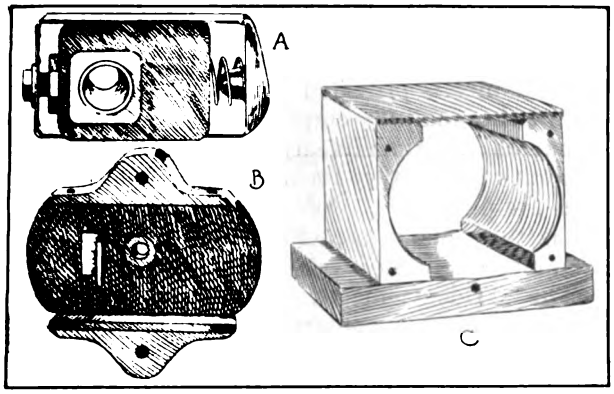
The spring cap oil cup, utilized on locomotives, is employed. Pushing back this cap shuts off the ports to the feed pipes, and when a charge of lubricant is inserted, releasing the cap member opens the ports, and the oil is conducted by means of pipes to the ball bearings and other running parts of the magneto.

An interesting feature of the instrument is the provision made for controlling automatically the advance and retard of the time of spark. Two flexible chains are enclosed in a case and have springs between the different links and the inside diameter of the housing. By this means the armature speed is retarded and is suddenly accel-

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erated prior to the ignition period when starting the engine.

It is held that a hot spark is secured at all



Detail Construction of Mafan Magneto: A, Showing Parallel Type of Reversible Contact Breaker; B, Fibre on Contact Breaker Is Oil Treated; C, Design of Pole Pieces Makes for Stability.

speeds and it is also claimed that the limit of angular adjustment may be increased from the usual 30 or 40 degrees to 75. The automatic ignition adjustment is so constructed that it can be fitted to any ordinary standard magneto employing coned shafts.

NEW BEARING METAL.

A new bearing metal is being marketed abroad, called phosforum, and it is particularly adapted for plain bearings. One of the difficulties encountered in the selection of a suitable metal for this purpose has always been in regard to the homogeneity of the cast material, in which segregation occurs. The new metal is cast in stick and bushing form and it is said to eliminate entirely the troubles experienced through occasional variations in metalling and casting temperatures.

TO BLACKEN ALUMINUM.

Aluminum may be blackened. The surface of the material to be colored is polished with very fine emery powder or finest emery cloth, after which a thin layer of olive oil is poured over and the part heated slowly over an alcohol flame. To obtain uniformity of the coating the part is treated to a second coat of oil and heated. Under the action of the heat the metal turns first brown, then black, according to the degree of heat. When the desired color has been obtained the metal is polished, after cooling, with a woolen rag or soft leather.

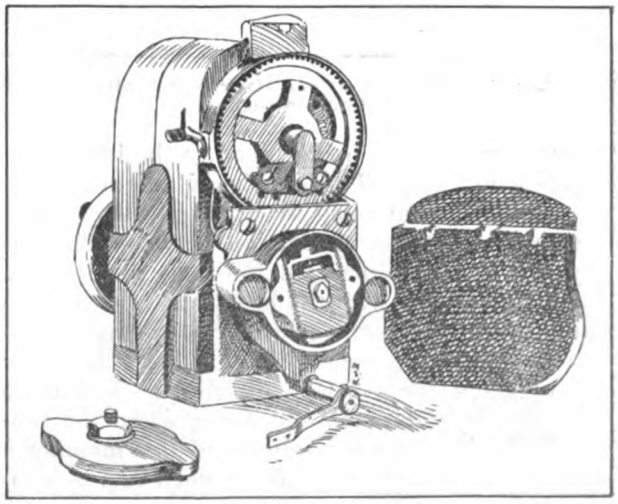
A second method is to prepare the following solution: White arsenic, one ounce; sulphate of iron, one ounce; hydrochloric acid, 12 ounces; water, 12 ounces. When the arsenic and iron are dissolved by the acid, add the water. The aluminum to be blackened should be thoroughly cleansed and washed before immersing in the bath. When the color is sufficient, remove and dry off with fine sawdust and lacquer.

ANNEALING STEEL.

The following formula for annealing steel is given by the D. T. Williams Valve Company, Cincinnati, O.: For small pieces of steel, take a piece of gas pipe two or three inches in diameter and put the pieces in it, first heating one end of the pipe and drawing it together, leaving the other end open to look into. When the pieces are a cherry red, cover the fire with sawdust, and leave the steel over night. A charcoal fire should be employed.

BELT GLUE FORMULA.

A glue for belts may be prepared as follows: Soak 50 parts of gelatin in water, pour off the excess fluid and heat on the water bath. Stir well and add first by weight, five parts glycerine, 10 parts turpentine, five parts linseed oil varnish and thin with water as required. The ends of the belt to be glued are cut off obliquely, the leather warmed and the hot glue applied. The united



Contact Breaker, Distributing Box and Other Parts of Mafan Magneto Are Very Accessible.

parts should be subjected to a strong pressure and allowed to stand at least 24 hours before the belt is used.

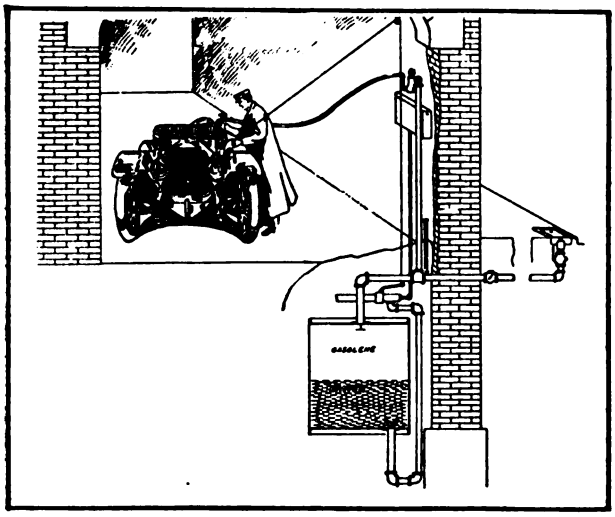
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GARAGE AND REPAIR SHOP EQUIPMENT.

THE HYDRAULIC SYSTEM.

Among the factors of a gasoline storage system to be considered are: Freedom from evaporation, safety and economy of operation. A system presenting interesting features is the Hydraulic, manufactured by the Hydraulic Oil Storage Company, 90 West street, New York City. The principle involved is not new and as the name implies, water plays an important part. It is the difference between the weight of gasoline and water and the fact that these fluids will not mix, that govern the operation of the system.

It comprises the storage tank to which is led



Showing the Operation of the Hydraulic System and Its Components.

the water, the fluid being piped to the lower part of the container. The supply or amount fed to the vessel is controlled by a water valve, which member closes the connection between the supply and the gasoline tank. When the lever of the water control valve is lifted, water enters the tank, lifting and forcing the fuel out through the draw-off pipe, thence to the gasoline tank of the car or other receptacle to be filled. A drain is provided for removing the water when the tank is to be refilled with gasoline and this member is automatic in its action, closing when fuel is being drawn from the large tank. The system is operated easily. To draw fuel the lever of the water control valve is lifted as shown in an accompanying illustration.

Clean gasoline is secured through all dirt and foreign elements dropping to the bottom of the tank, whence they are removed when the water is drained as the vessel is being refilled with fuel. The system permits of the use of all the fuel and the container is provided with a gauge member. One of the qualities emphasized by the design is that as the tank is always completely filled evaporation and the formation of combustible gases are prevented. Another feature of the system is that pumps are eliminated and that considerable time is saved as well as fuel.

The Trident meter, utilized in connection with the system, is constructed in two forms, that illustrated being designed for garages, service stations, etc., and is particularly adaptable where a large number of cars is to be filled daily. The dial is placed vertically on the meter for convenience in reading and is large enough to be seen for a considerable distance. The main register is known as the straight reading and records continuously up to 100,000 gallons, after which amount is drawn the figures automatically return to zero.

An auxiliary or set-back register is provided, recording in parts of a gallon up to 10. It is so arranged that it can be set back to zero any time by simply turning the hand. For example: If five gallons are desired, when the large hand reaches five, that amount has been drawn. The large pointer can then be turned back to zero. The continuous register denotes the total amount regardless of the number of times this dial hand is utilized. The flow of the fuel after the desired amount is secured is automatically shut off. No gasoline can be drawn without its being recorded and the company holds that this feature enables a check to be kept upon the daily, weekly and monthly sales. Complete descriptive matter will be mailed upon request.

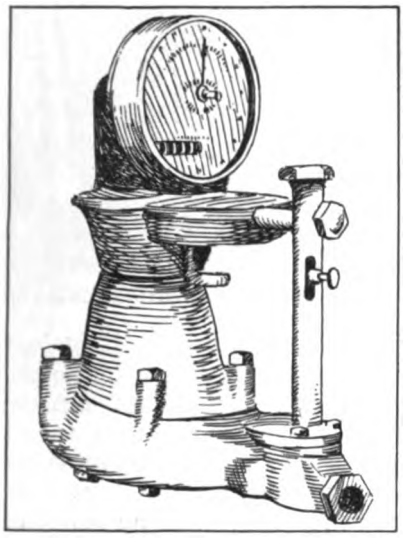
SHAW VISE FOR MACHINE WORK.

A vise that differs from conventional construction is the Shaw, brought out by an English concern and especially adapted to automobile work. It is a flat vise having a top and bottom grip, comprising a plate having a bolt let into it as shown in an accompanying illustration. A dog plate and a nut are fitted over the bolt member. This device is intended to be held in the jaws of an ordinary bench vise, either of the leg or parallel type, and small finished articles, such as bushings, terminals, small screws, nuts, etc., can be held and worked with ease.

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AMERICAN COMPRESSORS.

The American Steam Pump Company, Battle Creek, Mich., maker of pump machinery, is manufacturing a line of motor and belt driven air compressors for garage and service stations. The design known as size 1 is compact and the entire outfit includes electric motor, compressor, air tank and automatic controller. The last named is mounted upon a slab 14 by 16 inches, with gauge, switch and fuse blocks, and is perfectly automatic in its action, stopping and starting the compressor at adjusted pressure limits, which may be changed readily as desired. The motors are constructed for alternating or direct current, single phase or polyphase and the best of material and workmanship is incorporated.



Trident Auto-Stop Meter Utilized with Hydraulic System.

The compressors have cross heads with adjustable bronze shoes working in bored guides, bronze connecting rods and cranks of forged steel. All bearings are adjustable for wear. The company also manufactures two-stage belted compressors. Special discounts are offered to the trade and a catalogue will be mailed upon request.

LUBRICATING OIL CABINETS.

In handling lubricating oil it is important that the fluid be kept free from dirt or dust as the foreign elements act as an abrasive, cutting bearings. The Milwaukee Tank Works, Milwaukee, Wis., is manufacturing a lubricating oil cabinet which is constructed of heavy steel and to withstand severe service. It is provided with a pump of the self-measuring type and pints are handled as accurately as larger quantities. A quality claimed for it is that it will not drip. A lock and keys are fitted if desired. A measuring gauge indicates the quantity of oil on hand. The cabinets are made in barrel sizes, varying from one to five. The smallest member is 17 inches thick, 29 wide and 30 high, and weighs 185 pounds. All cabinets are guaranteed. Catalogue and price list will be forwarded upon application.

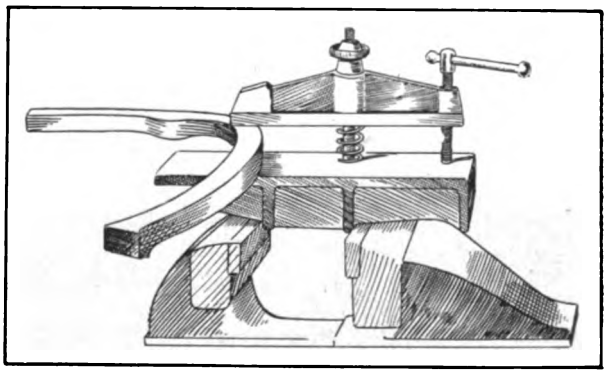
SEAMLESS STEEL TANKS.

With the very general adoption of compressed air in the garage and repair shop the use of a tank for storing the air is essential, especially when the compressor outfit does not include one of these members. Janney, Steinmetz & Co., Philadelphia, manufactures a wide variety of seamless tanks for various air installations, as well as for other uses. Catalogue and descriptive matter will be mailed free of charge upon request.

COES WRENCHES.

Strength without bulk or clumsiness is a desirable quality of wrenches for the repair shop and the tool must be capable of being handled easily and without bruising or slipping. The all-metal wrench has found favor among workmen owing to its ability to withstand severe usage. The Coes Wrench Company, Worcester, Mass., well known maker of this line, is issuing instructive literature concerning these tools which will be forwarded upon request.

Shipments of automobile tires from the United States during November, 1912, to the value of $275,360, marked a gain of $98,150, or 35 per cent. over $177,210, the value of the tires shipped abroad during the same month of 1911. For the first 11 months of 1911 the value was $2,257,727, and for the same period of 1912, $3,034,699, a gain of 34 per cent., or slightly less than the increase for November, 1912.



The Shaw Flat Vise, Especially Adapted for Machined Work.

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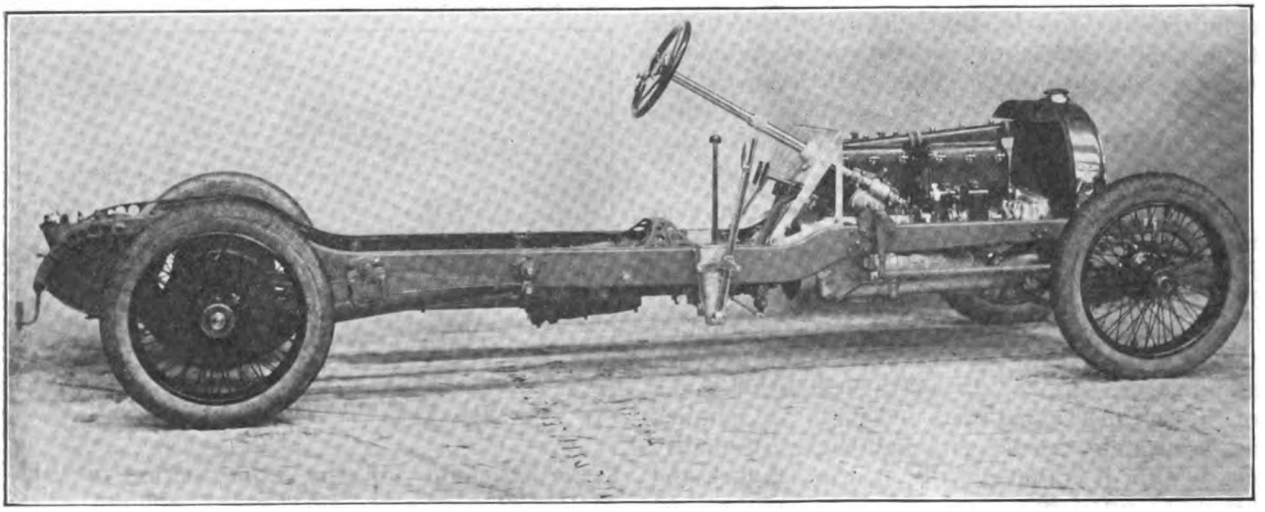


A British car which presents unusual features is the new 30 horsepower, six-cylinder Sheffield-Simplex, made by the Sheffield-Simplex Motor Works, Ltd., Tinsley, Sheffield, England. It is a development from the 25 horsepower model produced heretofore, but is characterized by a number of innovations, notably the worm driven rear axle and the four-speed transmission. A study of the accompanying illustrations will indicate that the design differs materially in some respects from what has come to be regarded as conventional American practise.

The motor has a bore of 3.5 inches and stroke of five, giving a rating of 29.4 horsepower under the R. A. C. formula, which is the same as that of the S. A. E. in this country. The six cylinders are cast in blocks of three with a plain bearing between each cylinder. They are of the L head type, the valves being on the left, and being enclosed in quickly detachable covers. The valves are operated through rollers mounted on rocker arms, the latter projecting from the sides of the engine and being held to the cams by light leaf springs. Both the camshaft and the magneto are driven by silent chain.

Lubrication is by pump circulation to all parts of the motor through a hollow crankshaft of specially strong construction. Cooling is by water, the thermo-syphon system being utilized. The radiator is of distinctive design, being spherical in shape and slightly convex. This is mounted on trunnions bolted to the chassis frame members at the front. All water pipes are of large diameter and the outlet manifold is an aluminum casting, part of which is formed with the base chamber. Cooling is still further aided by a fan located in the flywheel.

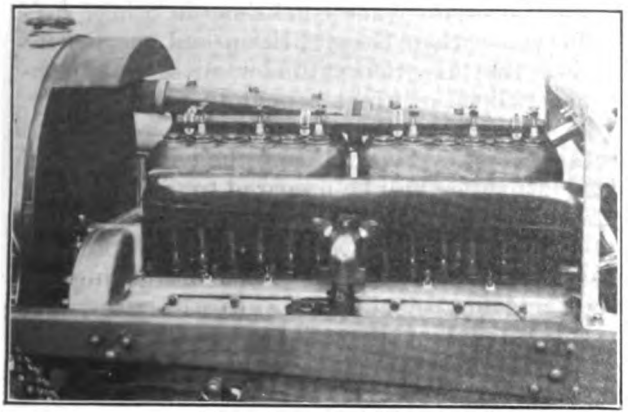
The carburetor is a Zenith. The exhaust pipe gradually increases in size toward the rear, and has leads cast in it for jacketing the inlet pipe, which has two large leads only, the rest being cast in the main cylinder casting. An air pump is fitted to supply pressure to the fuel tank, which is located at the extreme rear of the chassis.



Side View of the Sheffield-Simplex Six-Cylinder, 30 Horsepower Chassis for 1913, Presenting New Features of Design with This Company.

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The magneto is a Bosch water proof, high-tension, self-starting instrument, placed at the right of the engine, and beside it is the dynamo



Valve Side of Six-Cylinder Sheffield-Simplex Motor, with Detachable Covers Removed.

for the electric lighting system. The wiring is unusual, in that the high-tension members are molded into one and enclosed in a solid ebonite casing. The leads to the plugs consist of small brass levers which may be detached while the engine is running by means of ebonite handles.

The clutch is of the multiple disc type, lubricated with dry graphite. The four-speed gearbox is located in the centre, instead of further to the rear as in previous models. This is incorporated with the torque tube and moves with it, and is supported at the forward end by a large spherical joint. At the rear of the gearbox the propeller shaft is enclosed in a tubular steel member, which is bolted directly to the aluminum worm and differential casing. The main universal joint on this shaft is enclosed in an oil tight spherical bearing and works in a bath of lubricant, its centre being concentric with that of the combined torque and radius rod. A side view of the chassis herewith shows the construction and the location of the gear shift and brake levers.

Two independent sets of brakes are fitted, actuated by hand and foot, respectively, and both are of the internal expanding type acting directly on large drums on the rear wheels. A noticeable feature of these drums is the utilization of radiating fins for the purpose of maintaining them in a properly cooled condition. The brake control rods are divided in the centre and supported to prevent excessive whip. Special means of adjustment are provided for taking up wear without affecting the original position of the levers or pedals.

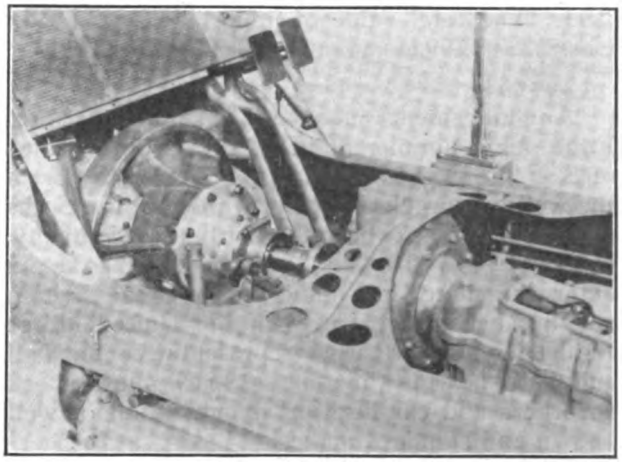
The worm driven rear axle is with a worm of the Lanchester type, stiffly mounted under the wheel with a ball thrust bearing running in oil, and all extremely accessible. Springs are semi-elliptic in front and Lanchester type, inverted semi-elliptic in rear. The frame is with a double drop, giving a very low entrance to the car without reducing the road clearance. Either detachable wire or steel wheels are fitted upon option, with one extra wheel.

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Several American automobiles are in use at Riga, the Russian Baltic region, these being brought in by way of St. Petersburg and Moscow, and they appear to be giving satisfaction, according to reports. The German Benz is popular, being constructed especially for the bad roads of that section. A recent local competitor in this field is the Baltic Car Works at Riga, which uses German motors in its product. The Prowodnik Rubber Works, also of Riga, employing more than 8000 men, not only supplies local demand for pneumatic tires, but exports them to the United States, Germany and other countries. The Russian Baltic region is in need of motor trucks of large capacity, utilizing naphtha or operating on the anthracite gas-generating principle. Gasoline costs about $1.92 for 36 pounds. The poorest grade sells at 25 cents a gallon.

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Conditions for the French reliability tour, the Tour de France, which will be held March 1-15, covering 3000 miles, point to a better test than was the case last year. The selling price of contesting cars must be under $1600 and the daily



Illustrating Gearbox Location and Large Universal Joint Employed on Sheffield-Simplex.

run will average 160 miles. Cars cannot be accompanied by supply cars as in previous runs, supplies being obtained from the regular dealers

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in towns along the route. The run will be of the sealed bonnet type and the sealing provisions this year are a new feature. There will be two sets of seals, one being known as permanent, the other as daily. The permanent seals will be applied at the start to the axles and steering gear and cannot be removed without penalty. The daily seals will be broken every morning to allow for filling the tanks and making adjustments. These seals will be applied to the hood, radiator filler cap, underpan and footboards covering the clutch and transmission. Penalties for breaking seals are: Two points for radiator seal; three for the underpan or floor boards and four for the bonnet.

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Although American competition in the automobile trade in the United Kingdom was keener in the first 10 months of 1912 than in any corresponding period of previous years, the British motor car business increased materially, both in the business at home and in exports. The imports of foreign cars into the British empire also increased considerably. From figures compiled by Consul Albert Halstead at Birmingham, England, the number of complete automobiles exported from the United Kingdom during the first 10 months of 1912 was 4083, valued at $7,611,021, an increase over the same period in 1911 of 574 in number and $757,592 in value. The total value of the exports of motor cars, including complete cars, chassis and parts, for the 10 months was $14,151,782, an increase of $1,802,250 over the same period in 1911. The increase in the export of motorcycles continues, 10,491 being sent out in 1912, valued at $2,047,813, a gain of more than 100 per cent. for the corresponding 10 months of 1911. The total value of imported cars in 1912 was $13,393,499, as against $10,300,025 in 1911.

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Announcement has been made that S. F. Edge, for a number of years the leading genius of S. F. Edge, Ltd., London, England, maker of the well known Napier cars, who several months ago severed his connection with that company, ostensibly to retire, has been persuaded to again enter the motor car industry in Great Britain and has become chairman of the United Motor Industries, Ltd., British representative for ball and roller bearings, magnetos, spark plugs, shock absorbers and car lighting dynamos, all of well known and standard makes.

E. de Rodakowski, who has been chairman, has resigned that position to become managing director of the concern. Mr. Edge's untiring energy and sound and helpful advice have brought success to the Napier business and his co-operation with the United Motor Industries, Ltd., will surely mean a further expansion of the business of that company. It is understod that during the next year or two he intends to investigate motoring and motor trade conditions in other parts of the world than Great Britain and the benefit of his actual experiences under all sorts of conditions will be of great benefit to the company, as he will be in a unique position to test motor accessories of every kind from the user's point of view. Mr. Edge will be prepared to test all really good devices that may be brought to his notice, but he has announced that the United Motor Industries, Ltd., must have goods of the highest grade and of real advantage to the user, not merely articles of attractive appearance for the purpose of creating sales.

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The 1913 French Grand Prix will be held July 12 over a 19-mile course near Amiens, 80 miles north of Paris and between Paris and Dieppe, which will make it convenient for English visitors, it being possible to reach Amiens in 3.5 hours from London. The municipality, it is said, is paying $10,000 for the privilege of having the classic run in its vicinity. Such a subvention is needed because of the large expense attendant on promoting a Grand Prix race. It cost $60,000 last year, it is stated, and the promoters faced a large deficit after the contest had been run, and Georges Boillot in a Peugeot car had been declared the winner.

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The few roads in existence in Venezuela until recently were used principally by heavy carts and were not well adapted to automobiles. The government, however, is now laying much stress on the improvement of existing ways and construction of new ones. The idea that the motor truck can be used to bring agricultural products to market is gaining favor and in a few years it is probable that there will be considerable mileage over which motor vehicles can be used to advantage.

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It is expected that the new ruling by the United States credit department relating to automobilists crossing the Mexican and Canadian borders, the effect of which is that there shall be no duty charged on the cars, the only requirement being that the machines shall be inspected, will result in a great increase in the number of tourists visiting these countries. The new ruling fixes six months as the time limit on the free return of cars into the United States.

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FEATURES OF PLANHARD CARBURETOR.

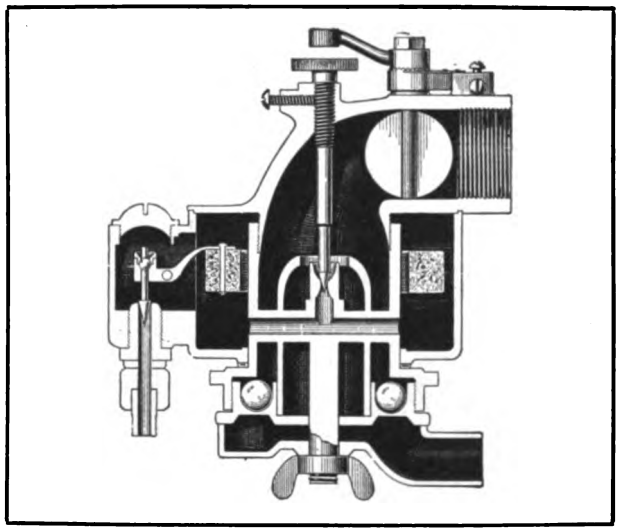
A CARBURETOR that presents interesting features in that the construction involves but few parts, and that there are no springs, levers or cams, is the improved Planhard made by the Planhard Manufacturing Company, 1784 Broadway, New York City, and Kokomo, Ind. It is of the concentric type, the float chamber surrounding the mixing chamber, and is designed in such manner that all joints are in a horizontal plane. A quality is that the vaporizer may be assembled by screwing the central member into the top member.

The problem of proper vaporization of gasoline and thoroughly mixing it with air to form a dry explosive gas, is held to be solved by the Planhard by its double concentric air and mixture tube construction. The fuel nozzle is in the centre and is entirely surrounded by the fixed or constant air tube. This is contracted at the upper end to form a venturi tube around the nozzle. Surrounding this tube, and between it and the float chamber wall is an annular opening through which auxiliary air is admitted. The construction is depicted in an accompanying illustration presenting a sectional view.

The maker holds that this is a most important feature in that the columns of mixture and auxiliary air always travel in the same direction and that the last named surround the mixture as it leaves the venturi tube, acting as an envelope to insulate the mixture from direct contact with the cold walls of the manifold. It is pointed out that condensation is prevented, that the surrounding envelope of pure air gradually unites with and thoroughly vaporizes the inner column of rich mixture, and that before it reaches the cylinder all free fuel is absorbed. This makes for a dry, rapid burning mixture and one preventing carbon deposits. Greater efficiency is claimed because of the more complete combustion.

The auxiliary air is admitted through a series of ball valves which are seated in holes in an adjustable screw plate at the bottom of the auxiliary air tube. These seats vary in size, but the bronze balls are all of the same size and weight and are lifted from their sets progressively as more air is required, the ball on the largest seat being raised first. It is held that fluttering is eliminated because the ball valves each lift a distance about equal to that of the lift of a single auxiliary air valve, and raising progressively, their total travel amounts to six or eight times that of a single valve for the same function. A uniform amount of air is admitted for varying engine speeds.

The spraying nozzle is cup shaped, and when the engine is inoperative, this fills automatically with gasoline to within a short distance of the top. This priming device makes for easy starting upon low grades of fuel and when the motor is cold. The float chamber is provided with a flooding device, also a vent. The air pan at the bottom of the carburetor is secured by a wing nut, which also serves for clamping the adjustable auxiliary ball plate, which is knurled on its periphery, so that the lift of the auxiliary ball valves may be adjusted quickly and easily, and



Sectional View of Improved Planhard Carburetor Employing Ball Valves for Controlling Auxiliary Air and Having Priming Device, Making for Easy Starting in Cold Weather.

the plate locked afterward by a wing nut. The Planhard carburetor is not only simply and sturdily constructed, but the maker claims that it will control the mixture of gasoline and air in any desired and unvarying proportions, making for greater efficiency from the motor, as well as economy of fuel.

The Hudson cars, made by the Hudson Motor Car Company, Detroit, are enjoying popularity with royalty. The machines have entered India in large numbers and are now used by five Maharajahs, as follows: Tikari, Chota Nagpur, Huthwa, Nowagar and the Newab of Bogra. Many high English officials are also riding in Hudson machines.

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CORRESPONDENCE WITH THE READER

Function of Spiral Springs.

(1478)—To settle a debate in regard to the use of two spiral springs situated at the base of the steering gear tubing, one on the lead rod and the other on the throttle rod on a model T Ford, I would like to have your opinion as to the purpose of these two springs and the duties they perform. C. R. H.

Somerville, Mass., Jan. 28.

The members referred to are employed for preventing the movement of the levers except when desired by the driver, or in other words, the springs retain them in the position in which they are placed by the driver.

The spark and throttle levers are a part of the rod extending through the tubing housing to the steering column, being bent at the top to form the control members. Each lever has a tooth or sharp edge which meshes with similar teeth on the stationary ratchet plate affixed to the tube member.

At the bottom of each rod is placed the spring

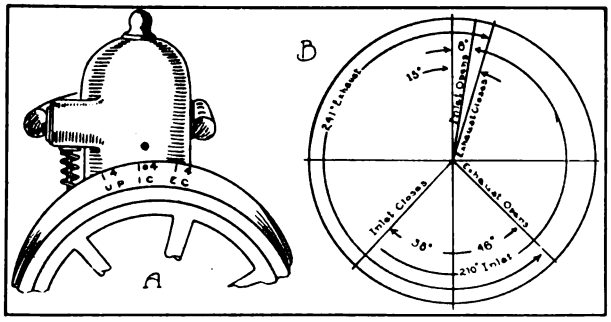


Fig. 1—Valve Timing with Unmarked Flywheel: A, Showing How Cylinder May Be Prick Punched and Flywheel Marked After Degrees Are Laid Out by Diagram Indicated at B.

referred to and its function is to restrict the upward movement of the rod, yet at the same time permit the lever to be moved over the teeth. The tension of the spring is sufficient to hold the lever in the position set. If these springs or a similar arrangement were not employed the lever would move freely, resulting in the increasing or decreasing of the lead or the opening and closing of the throttle when not desired.

The design has been employed by the maker of Ford cars for some time, it having been fitted to the early models, and it may be stated that it is distinctive of the Ford product. It rarely gives trouble and is easily operated and adjusted as to wear.

Back Firing in Carburetor.

(1479)—Will you please explain what causes back firing to the carburetor? What I would like to have explained is how does the gas become ignited. Does the mixture fire before entering the cylinder and go through the explosion and exhaust operation and then come back through the intake when open to take in the new charge of gas? I have been unable to find anyone who can explain how the ignited gas gets back to the carburetor or how it is ignited. F. N. S.

Elgin, Ill., Jan. 30.

The question was fully answered in the Jan. 10th issue of The Automobile Journal in this department.

Timing Splitdorf Magneto.

(1480)—I would like information upon timing and adjusting a Splitdorf magneto, also would like to know how to locate a short circuit which seems to be in the breaker box. J. JOHANSON.

Sioux City, Ia., Jan. 27.

Although the model and type of motor were not mentioned, the timing and adjustment of the Splitdorf magneto is practically the same. Assuming that the engine is a four-cylinder, four-cycle motor, it should be borne in mind that the armature shaft of the magneto must be driven at crankshaft speed and that the direction of the drive must be taken into consideration. The general practise is to drive or revolve the armature shaft in a right hand or clockwise direction, this being indicated on the instrument. Some models are so designed that the direction may be changed.

To change from one direction to the other, remove the breaker box, hold the driven end of the armature firmly with a pair of pliers and remove the small retaining or locking nut. Pull off the cam, which is keyed on with a Woodruff key, turn the cam over, replace the nut and reset it on the shaft with a prick punch so that it will not jar off. Then remove the distributor block and the screws from the lettered ring. Remove the brass protecting cup on the distributor bearings which will be found inside the inverted U formed by the magnets, and the top screw underneath in the centre of the distributor shaft. The distributor and its gear can then be pulled forward out of mesh. Next set distributor gear back into mesh so that the position of the segment will agree with A or C, Fig. 2.

After securing the magneto to its bracket or base on the motor, crank the engine until the piston of the first cylinder, that nearest the radia-

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tor, completes the compression stroke and is on dead centre. Next retard the spark advance lever on the steering wheel to its limit and connect the actuating rods, etc., to the spark advance lever on the breaker box of the magneto. If the armature shaft revolves in a clockwise direction looking at the driving end, the lever should be in its topmost position. If the shaft rotates anti-clockwise, the lever should be at the bottom limit, and advanced upward.

Next revolve the armature shaft in its direction of rotation until the oval breaker cam comes in contact with the roller in the breaker bar and just begins to separate the platinum contact points. The points should begin to separate when the armature core leaves the pole pieces as shown in the sketch. It is important that the position of the bronze of the distributor be ascertained and this must be observed as indicated in the No. 3, the cup above the first member in the drawing is connected by cable with the third cylinder of the motor. The next contact to be made in rotation is the cup marked 4 as the fourth cylinder fires next. The second cylinder is the last to explode and to this is connected the wire leading from the cup marked 2. It should be borne in mind in making connections that while the distributor sector makes a complete circle the cylinders do not fire in 1, 2, 3, 4 order, but 1, 3, 4, 2. By following the wiring diagram one should not experience any difficulty in correctly installing the cables.

There is but little to be done to the instrument. If it becomes necessary to reset the contact points after considerable service, the locking nut is loosened and the screw adjusted so that the break is no more than .03125-inch. If pitted the points should be cleaned with a very fine file,

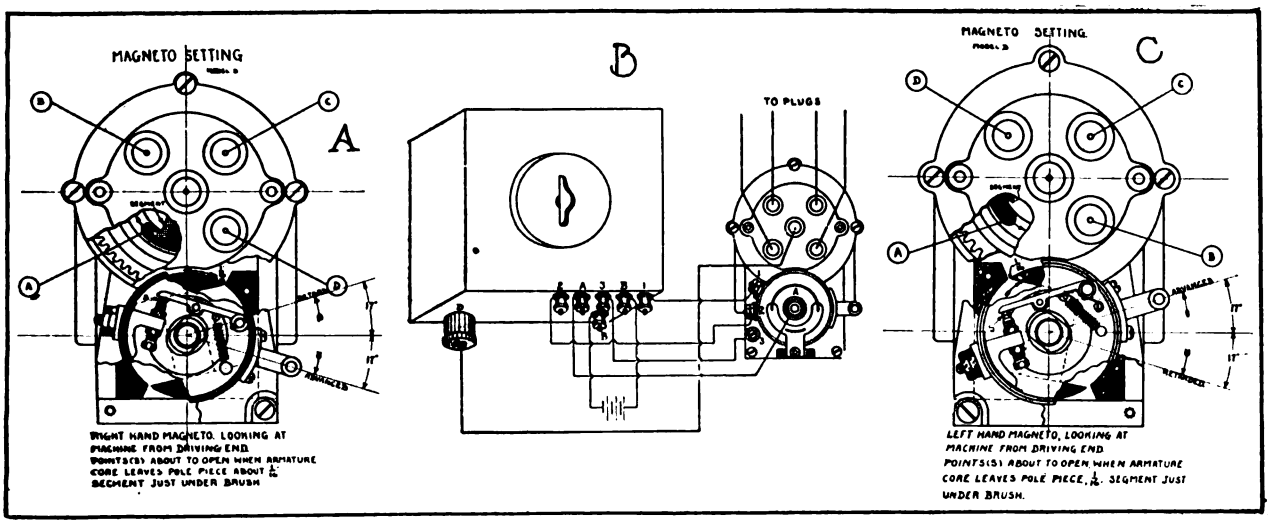


Fig. 2—Setting and Timing of Splitdorf Magneto: A, Diagram for Right Hand Direction; B, Wiring Plan of Vibrating Dash Type of Coil; C, Showing Proper Position of Armature When Driven Left Handed.

the drawing. It should also be borne in mind that the direction of rotation of the distributor is opposite to that of the armature shaft, as the distributor is mounted upon a great driven from another gear on the armature shaft.

The direction of rotation is necessary when connecting the high-tension cables from the cups to the spark plugs. The firing order of the motor must be known and as all four-cylinder engines fire either 1, 3, 4, 2 or 1, 2, 4, 3, it is an easy matter to watch the intake valves and determine the order of explosions.

Assume that the distributor sector is in contact with the No. 1 cable indicated in the wiring plan presented at Fig. 2, B, and the motor fires 1, 3, 4, 2: Here the distributor is rotating clockwise and as the next cylinder to explode is

taking care that the contacts are true.

Relative to the short circuit referred to, it may be caused in the breaker box by the presence of too much dirty lubricant. The member may require cleaning. Flooding of the parts with oil will breed trouble. Lubricate the little roller on the breaker bar about once a month by applying the oil sparingly with a toothpick.

To locate the short circuit the primary wiring should be examined very carefully. The writer recalls an instance of a driver whom he assisted on the road where the owner of the car in replacing the breaker box cover did not affix it securely and the woven wire brush did not make a good contact. It is important that this member make proper contact. Examine the wires leading to the breaker box and make sure that none

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are frayed and have loose strands in contact with points other than incorporated on the breaker box.

Wiring Dual Ignition.

(1481)—Will you kindly give me the wiring plan of dual ignition, battery and magneto, on one set of plugs, and explain the operation of the system, also electric starting devices as installed on 1913 cars? A. G. W.

Boston, Mass., Jan. 23.

The wiring plan of a dual ignition system is presented at Fig. 2, B, which is for a model B Splitdorf magneto with vibrating type of transformer. The machine generates a low-tension current which is collected by brushes and led through the primary wire A to the transformer coil, and the circuit being broken at the proper instant a high voltage current is induced in the secondary winding of the coil. This high-tension current is conducted from the coil by the cable D to the central brush D of the distributor, whence it is delivered to the different cylinders in correct sequence. This distributor operates on the same principle as a distributor of the coil and battery system of ignition.

A dual system is provided by utilizing dry cells or a storage battery. The transformer is employed as a spark coil by employing the mechanism of the circuit breaker to interrupt the current from the battery, permitting the one set of plugs to be used. The distributor is utilized to deliver the current to the plugs as with the magneto system. It will be noted that one side or lead of the battery is not grounded, but both wires are led from the source of current to the coil member.

To explain the construction, operation and application of the various electric motor starting systems, as represented on the 1913 motor cars, would require considerable space. The subject will be taken up in detail in an early issue of The Automobile Journal and will be fully illustrated.

Valve Timing.

(1482)—I have an old car and in overhauling the motor removed the camshaft without marking the gears for remeshing and these were not marked at the factory. I wrote the maker for the timing plan and received it, but the flywheel is not marked with the valve openings and the plan sent me is for degrees. The diameter is 17 inches. How should I go about it to put back the camshaft? READER.

Louisville, Ky., Feb. 3.

To replace the camshaft and remesh the gears it should be borne in mind that having the timing order and the diameter of the flywheel the gears should be meshed so that the cam actuating the intake valve of the first cylinder should begin to move and lift the valve when the flywheel is rotated a certain number of degrees.

Assume that the motor is a four-cylinder unit and the valve timing is as follows: Intake opens eight degrees past upper dead centre and closes when it is 38 degrees past lower dead centre. The exhaust opens 46 degrees before the lower dead centre and closes 15 degrees past upper dead centre. This indicates that the inlet opens and closes late and that the exhaust opens early and closes late.

The flywheel being 17 inches in diameter it is a simple matter to lay out the degrees on its periphery or lay the latter out by inches. The figures will be as follows: Inlet valve opens late 1.1875 inches, closes late 5.65625. Exhaust valve opens early 6.84375 and closes late 2.234275. Top and lower dead centres are essential and these may be secured by turning the flywheel until the pistons of the first and fourth cylinders are at the top. Mark the flywheel for these positions and make a prick punch mark on the rear cylinder as indicated at Fig. 1, A.

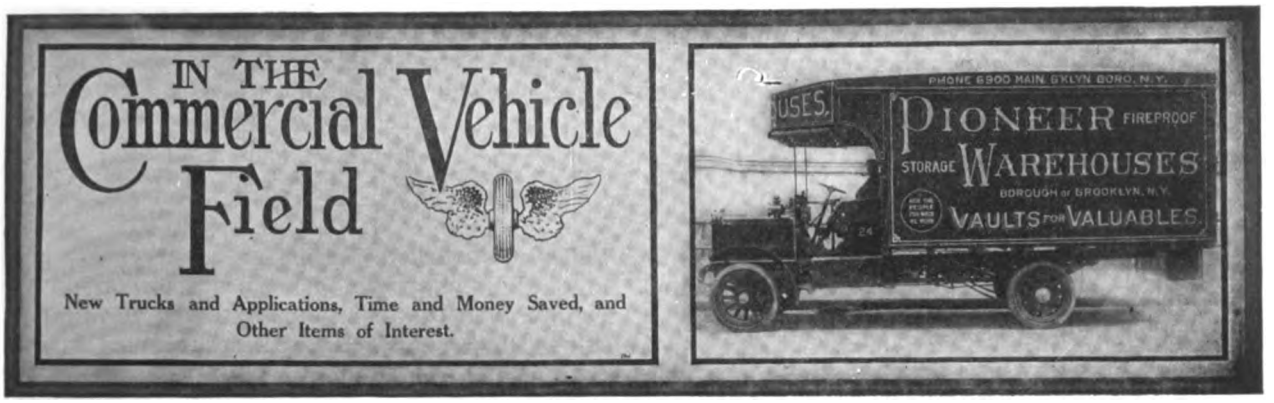
Next measure off 1.1875 inches on the periphery of the flywheel to the right and the inlet valve opens late. Turn the flywheel to the left until the mark registers with that on the cylinder and replace camshaft, meshing the gears in such manner that the inlet valve of the first cylinder will begin to lift. After fitting the camshaft rotate the flywheel in the direction opposite to which it travels and then move it to the left to make sure that the inlet valve of the first cylinder starts to lift when the mark on the flywheel coincides with that in the cylinder.

The timing may be checked up for each valve to make sure the setting is correct by measuring off the distances on the flywheel and marking these with a prick punch. Assuming that the firing order of the motor is 1, 3, 4, 2, the marks on the flywheel will be as follows:

1-4,	I-O	.....inlet	valves	1 or 4 open
1-4,	I-C,	.....inlet	valves	1 or 4 close
1-4,	E-O	.....exhaust	valves	1 or 4 open
1-4,	E-C	.....exhaust	valves	1 or 4 close
2-3,	I-O	.....inlet	valves	2 or 3 open
2-3,	I-C	.....inlet	valves	2 or 3 close
2-3,	E-O	.....exhaust	valves	2 or 3 open
2-3,	E-C	.....exhaust	valves	2 or 3 close

The setting of each valve may be tested by rotating the flywheel in the normal direction until the mark on the flywheel for the inlet valve of the first cylinder registers with that on the cylinder and the balance of the valves are checked in a similar manner. If the valve lifting mechanism is adjustable, it can be changed to correspond with the marks on the flywheel.

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ELECTRICS IN DELIVERY SERVICE.

Two Prominent Concerns Replacing Horses with Waverley Half-Ton Wagons.

The adaptability of the electric wagon of the light delivery type for department store service has been demonstrated to the satisfaction of L. S. Ayres & Co., Indianapolis, Ind., which recently purchased seven Waverley electrics, made by the Waverley Company of that city. Six of these are of 1000 pounds capacity, while the seventh is rated at one ton. They will replace 12 single and one double horse wagons in local and suburban delivery work.

Before making the purchase the company made an exhaustive test of the new system. It was found that the average daily mileage was 35, with a maximum of 57. The average number of packages handled daily by each vehicle was 241, with a maximum of 462. The electric left the store at the usual time and returned much earlier than was possible with the horses. The cost of operation figured out as follows: Operating expense, including charging, washing, garaging, etc., $2 a day; fixed charges, including depreciation and interest, $1.30; driver's salary, $2.50.

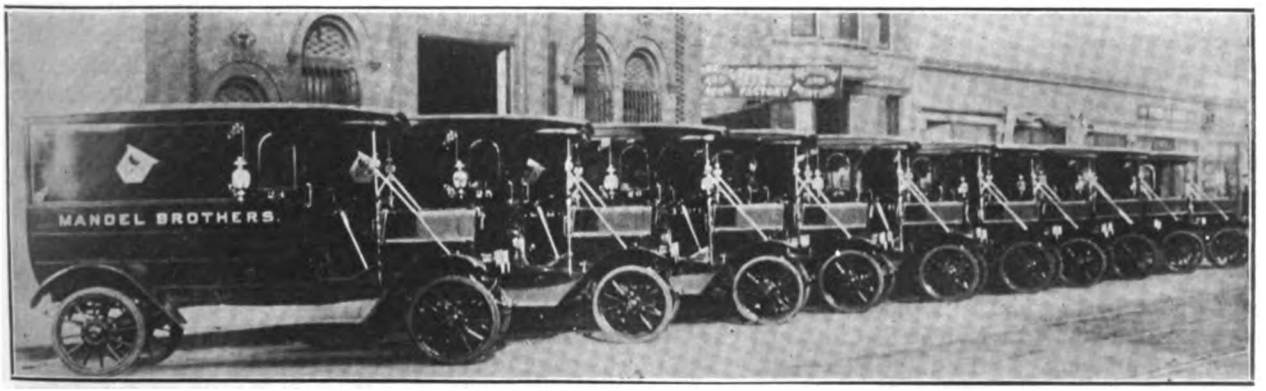
Mandel Bros., Chicago, has been experimenting with both gasoline and electric vehicles for a number of years, and recently placed an order with the Waverley Company for 10 Waverleys of 1000 pounds capacity. Five of these wagons are equipped with batteries capable of giving 60 miles to a charge, and the others with batteries giving from 75 to 100 miles.

GOOD RECORD FOR WHITES.

Seven 'Buses Average 150 Miles a Day at Operating Expense of 4.5 Cents.

Sixty thousand miles have been covered by each of the seven White motor 'buses, made by the White Company, Cleveland, O., and operated by the Rapidtransit Motor Company of Indianapolis, Ind., during the past year. In summer and winter this fleet maintained its efficiency steadily despite a high average of 150 miles daily travel and an operative schedule of 17 hours each day. Without taking into account the item of overhead expense, the company found that the cost a mile was only 4.5 cents.

In winter, under extreme conditions, this figure was slightly increased, but the Whites were



Fleet of Waverley Electric Wagons Recently Added to the Delivery Equipment of Mandel Bros., Chicago.

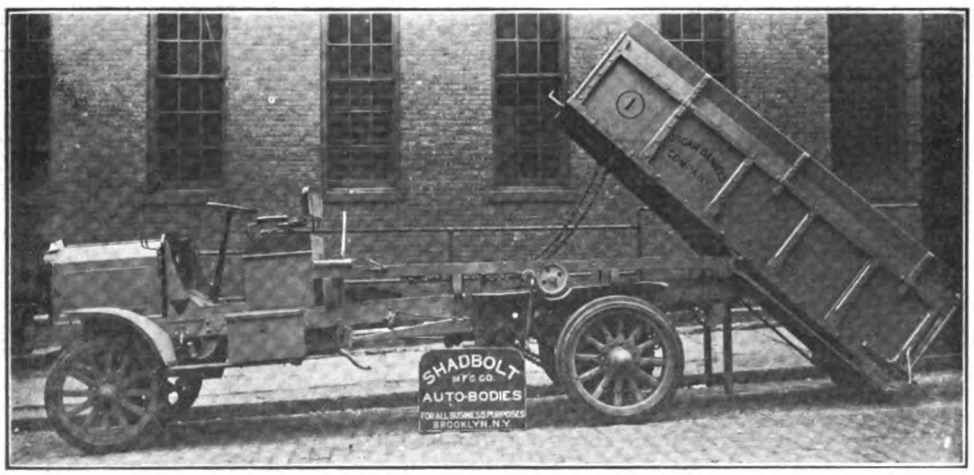
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able to maintain their schedule at times when the street car service was crippled by bad weather. The year's record shows an average of 10 miles to a gallon of gasoline and 300 miles to a gallon of oil. The officials of the company state that after a year's service three of the machines were overhauled and found to be as good as new, without any perceptible wear in the motor parts.

INTERESTING DUMPING BODY INSTALLATION.

WITH the more general adoption of the mechanical transport as a means of solving the haulage problem, there has been decided interest in the subject of body construction, particularly by those engaged in certain lines. Special reference is had here to the handling of coal, building materials, etc., and in such work it hardly will be denied that some form that will admit of quick unloading is most desirable, if the owner is to obtain the fullest measure of economy and efficiency from his equipment.

The Shadbolt Manufacturing Company, Brooklyn, N. Y., which has been engaged in the business of supplying bodies for horse vehicles for some years, has brought out a dumping body, constructed of wood, which is intended to minimize labor in this respect. An accompanying illustration shows the method of operation in a measure.



Shadbolt Rear End Dumping Body, Showing Winch and Chain for Unloading.

The body is mounted on a superstructure or frame that is clipped to the chassis side members, and there is a slight inclination to the bottom when ready for loading. On the sills at either side, under the rear portion, are heavy steel guides which take the ends of a stout rod extending through the side rails of the superstructure. These guides are formed at the forward ends to endure under heavy strain.

The body can be drawn forward or backward on the frame the length of the guides, chains being connected to a cross shaft carrying a gear at one end, into which meshes a pinion on the countershaft that can be operated by hand crank. When lowered the body is secured by a latch that also is operated by hand. To unload the latch is released and the body drawn back on the frame until just back of the centre of gravity, when it automatically tilts and the rear end falls until it rests upon the ground. By reversing the movement of the hand crank, the body is drawn back on the frame and automatically takes its position.

The construction is with heavy wood frame, panels and floor. The size is varied according to requirements, and often it is possible to increase the carrying capacity by the use of flare boards. The tail gate is designed so that it may be opened at the top or bottom, or it may be removed if desired. The company also makes a number of other body types, including those for discharging at the side. A semi-trailer is another specialty, one of the types being with capacity of 10 tons of stone, sand, etc., for use with a five-ton truck, for example, while another is designed for the handling of lumber. The engineering department is now at work upon a detachable body which is expected to meet with decided favor by lumber men.

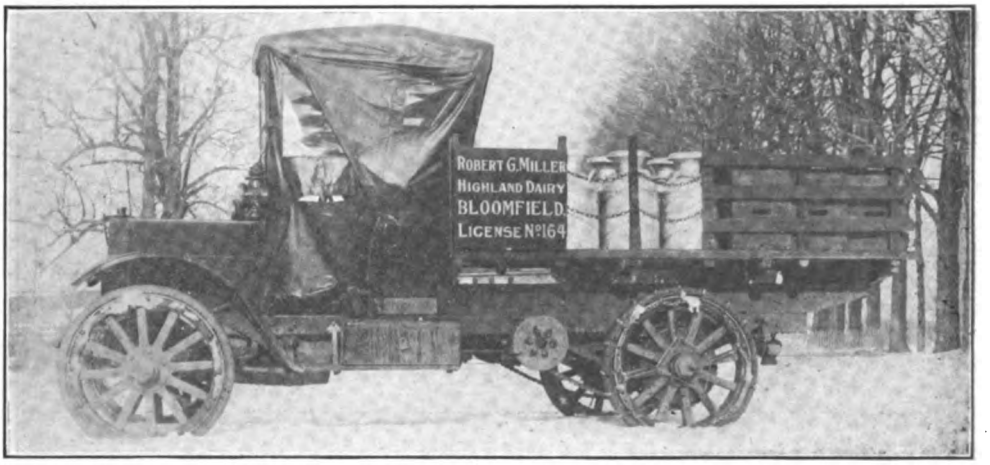
The Animal Rescue League of Pittsburg, Penn., which some time ago put into operation an automobile dog ambulance of two tons capacity, made by the Lange Motor Truck Company of that city, has given an order for a second machine of the same design. The machine is divided into 34 compartments, preventing well dogs from mingling with diseased ones.

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ECONOMICAL HAULAGE IN DAIRY BUSINESS.

THAT there is ample reason for the purchase of a motor truck for the delivery of milk in the East is the opinion of Robert G. Miller, proprietor of the Highland Dairy, Bloomfield, Conn. He began experimentation about two years ago, and while the first machine was a small one, equipped with pneumatic tires, he found it so valuable in his work that he expresses the situation as follows: "It was a case of buy a motor truck or go out of business."

The present car is a one-ton Federal, made by the Federal Motor Truck Company, Detroit, and he has driven it some 7000 miles. The farm comprises 225 acres, and 10 horses are employed upon it. The dairy is about 6.5 miles from the market in Hartford, and the route is for the most part over good roads with few hills. The average daily mileage made by the truck is 25. It leaves the dairy at 7 in the morning and returns at noon, while with horses it was necessary to leave home at 4 in the morning and begin peddling milk in Hartford at 5 in order to have the afternoon for other farm work.



Federal One-Ton Truck Which Does Work of Four Horses at a Substantial Daily Saving.

Mr. Miller has kept careful record of the cost of operating the machine, and finds this to be as follows: Gasoline and oil, 90 cents a day, $328.50; tires at one cent a mile, $120; depreciation, $6000; interest at 6 per cent., $117; insurance, $111, making an annual total of $1276.50. This gives the daily cost as about $3.50. Inasmuch as the first cost of the truck was $1950, the annual depreciation of $600 is about 30.6 per cent.

Mr. Miller states that to do the same work with horses he would need four. Feed would cost 80 cents a day, or $3.20 for the four. Two horses would be used each day, resting the alternate day. From these figures it can be seen that the economy effected by the truck is decidedly material.

In addition to caring for the milk route, the truck is utilized to advantage in other work during the afternoon. Last summer Mr. Miller oiled 32 miles of road in the towns of Bloomfield and Granby. Transportation work of the usual character in connection with a farm of such proportions is done by the Federal whenever occasion demands.

KISSELKARS IN ST. PAUL.

Thirty of These Are Replacing 145 Horses with Slight Increase in Investment.

The Kissel Motor Car Company, Hartford, Wis., finds there are 30 of its KisselKar trucks in service in St. Paul, Minn., these ranging in capacity from 1500 pounds to three tons, no four or five-ton machines having been sold in that city. These have replaced 145 delivery horses and cover an aggregate daily mileage of 1566, making 3537 deliveries.

The most significant feature of the case and the most gratifying from the standpoint of the truckman, is the comparative average of initial investment. The trucks, including several that were specially designed, represent a total cost of $65,600. The horses replaced, including wagons, harness, etc., represented an investment of $62,-150. This slight difference in first cost taken in connection with the ability of the motor vehicles to more than double their present mileage if worked a sufficient number of hours, offers food for thought.

H. H. Lundahl, Walnut Grove, Minn., has used a Reo truck for over a year in hauling milk without repair cost.

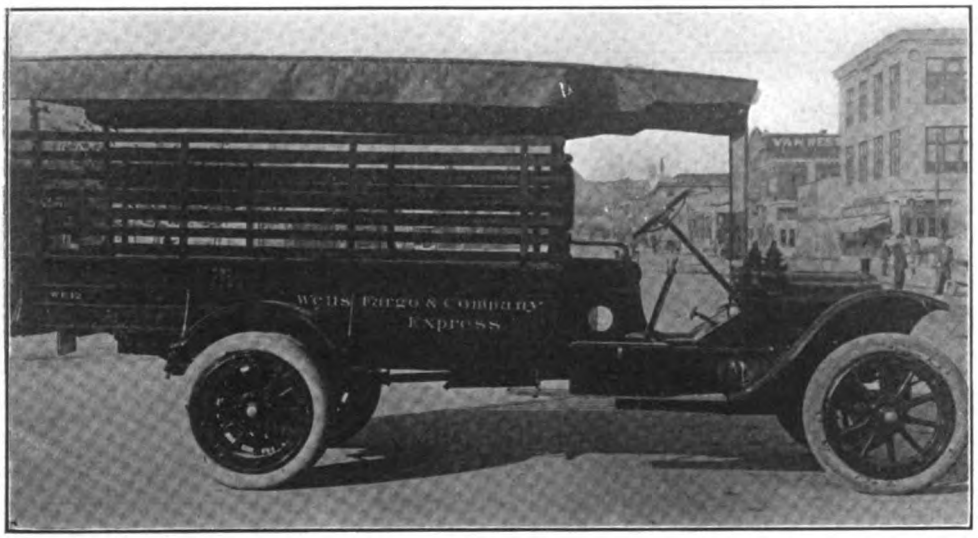
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MORELAND FOR HONDURAS.

Truck Utilizing Distillate for Fuel Will Carry Mails to Capital City.

H. E. Dean, who has the contract for carrying mail for the government of Honduras, Central America, has purchased a Moreland distillate truck, made by the Moreland Motor Truck Company, Los Angeles, Cal. It will run between Tegucigalpa, the capital of Honduras, located in the interior, and Amapala, on the sea coast, a distance of 115 miles. It is at present the only motor driven apparatus in the country and the road to be covered also is the only good highway in the territory.

Mr. Dean plans to make the round trip in two days, thus giving Tegucigalpa three mails a week, instead of one as has been the case with slow moving horse teams. Passengers will be carried, the truck being covered with canvas as a protection from rain



One of a Fleet of 1.5-Ton Whites Recently Ordered by Wells Fargo Express Company.

WILL REPLACE HORSES.

Newark Coal Dealer Well Pleased with His Five-Ton Pope-Hartford Dumper.

Among the recent motor truck installations to attract attention is that of a Pope-Hartford five-ton chassis equipped with a self-discharging coal body, delivered to Joseph H. Lucking of Newark, N. J. The vehicle has a capacity of six tons and has been delivering from 45 to 50 tons of coal daily at an average haul of five miles a load. The truck far exceeded the expectations of Mr. Lucking, who has ordered a three-ton vehicle of similar design, with the intention of disposing of his horses as quickly as he can replace them with motor equipment.

Delivery is made from the right side. The body is elevated and the coal is discharged in about two minutes. The machine was made by the Pope Manufacturing Company, Hartford, Conn.

WHITES FOR EXPRESS WORK.

Wells Fargo Company in San Francisco Receives First Machine on Recent Order.

An accompanying illustration presents the White 1.5-ton truck, made by the White Company, Cleveland, O., which is the first to be delivered to the Wells Fargo Express Company, San Francisco, Cal., on an order for four of these cars. Inasmuch as the express companies of the country have been experimenting with several types of vehicles before making decision in the matter of ordering in quantities, it must be accepted as demonstrated that the White trucks are able to satisfy the requirements of this concern in this particular field.

The body is specially designed for the work it is to perform, being fitted with an extension top to provide for carrying larger loads should occasion require. The location of the package compartment is with particular reference to weight distribution. The pneumatic tires, single in front and dual in the rear, are stock equipment on this size of White cars.

Stewart motor trucks, made by the Stewart Motor Corporation, Buffalo, N. Y., are now used as far north as Edmonton, Alberta, Canada, and as far south as Buenos Aires. Pratt & Co. of the latter is handling Stewart trucks for Argentine, the first shipment to that country having been made recently.

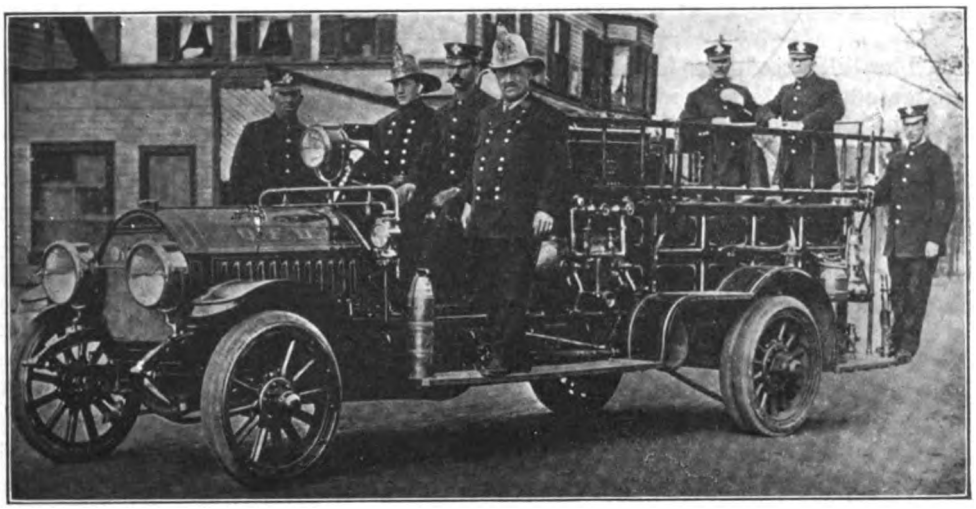
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KISSELKARS FOR FIRE DUTY.

Two Pieces Added to the Equipment of the Department in Quincy, Mass.

The fire department in Quincy, Mass., has just added to its equipment a new KisselKar combination chemical engine and hose wagon and a KisselKar chief's car, made by the Kissel Motor Car Company, Hartford, Wis. The chief's machine formerly was a touring car used for demonstration purposes by the Kissel company. The rear seat was displaced by a 25-gallon chemical tank and other appointments were added to make it conform to the requirements of its new service, including 150 feet of chemical hose, axes, crowbars, etc.

The combination wagon is of special design, in that it is somewhat larger than the original vehicle purchased by this city. It carries two chemical tanks, 200 feet of chemical hose, 1000 feet of regulation fire hose, second-story and roof ladders, axes, crowbars and the other usual fire fighting appliances. The engines of both cars are six-cylinder units of 60 horsepower. On a recent test the combination vehicle, fully equipped and carrying in addition 21 men, climbed the steepest hills in the city with ease.



KisselKar Combination Fire Wagon Recently Placed in Service in Quincy, Mass.

OPERATES LARGE FLEET.

New Haven Concern Does Extensive Trucking Business in New England States.

The Smedley Company, New Haven, Conn., one of the largest trucking concerns in that state, now has a fleet of 15 motor trucks covering New England. Not only has the company been able to handle goods much more quickly than formerly, but has increased its business decidedly, according to Harry Smedley, one of the proprietors.

Included in this fleet are three Alcos of two, 3.5 and six tons each, made by the American Locomotive Company, Providence, R. I.; one 3.5-ton Kelly, built by the Kelly-Springfield Motor Truck Company, Springfield, O., and two G. V. electrics, produced by the General Vehicle Company, Long Island City, N. Y. These machines are constantly on the road between New Haven, Boston and New York, and have been chosen in many instances by persons desiring to escape the disadvantages of moving furniture and merchandise by railroad freight cars.

TRUCK RELIABILITY RUN.

American Automobile Association Is Asked to Arrange for a Contest This Summer.

Agitation which it was said originated at Detroit for an annual national reliability event for motor trucks, received notice formally at the recent meeting of the executive committee of the American Automobile Association in New York City. The question came up in the form of a resolution, which was adopted, authorizing the president to appoint a committee to discuss the matter with the National Association of Automobile Manufacturers, and if sufficient support in the form of a representative entry list is forthcoming, the president is further empowered to appoint a committee and otherwise arrange for such an event during the coming summer.

What form of contest will be recommended was not made known, but William E. Metzger, a member of the A. A. A. executive committee and president of the N. A. A. M., favored the application which was made for a national non-stop run to be conducted at Detroit at the time of the Michigan state fair, with an open air motor truck exhibition to be held on the state fair grounds.

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GOVERNOR SIGNS ONE BILL.

Violation of Motor Vehicle Law in New York State Is Now a Misdemeanor.

The bill providing for the punishment of intoxicated drivers and intended to remedy a defect in the so-called Callan law in New York State has passed the legislature and has been signed by Gov. Sulzer. It makes a violation of any of the provisions of the motor vehicle law a misdemeanor, punishable by a fine of not more than $500 or a year's imprisonment, or both.

Assemblyman Farrell has introduced a bill which raises the minimum age of operators of motor cars from 18 to 21 years and provides the annual fee for the license renewal shall be $1 instead of $2. It makes the renewal of the license mandatory, unless the person has been convicted for violation of law, and this provision will be contested by the secretary of state's office, which has refused to issue licenses for sufficient reasons. Instances have been shown where chauffeurs have indirectly participated in crime, and yet escaped conviction on technicalities and the license bureau desires the privilege of refusing license to this class of offenders.

LEGISLATION IN JERSEY.

Proposed Amendments Affecting Provisions of Recently Enacted Reciprocity Measure.

Drastic legislation is promised at the present session of the New Jersey legislature, particularly with reference to the so-called reciprocity law enacted last year. It is declared that the 15-day tourist privilege is abused and no way has been found to remedy conditions. Bills have been introduced to repeal the reciprocity law and another proposed measure authorizes the governor to appoint three commissioners to meet with similar commissioners to be named by other states of the Atlantic seaboard to consider plans and suggestions for uniform automobile legislation. It is believed that by this plan real reciprocity can be obtained.

A series of bills, which have the indorsement of State Motor Vehicle Commissioner Lippincott, looking to a number of changes in the existing laws, has been introduced by President Fielder, which provide as follows: Raising the age limit for drivers' licenses from 16 to 18 years, increasing the license fees, changing the method of rating the power of machines, increasing the number of inspectors from 10 to 16, changing the method of carrying license plates, placing a red light at the rear, visible at least 50 feet, and making possible a penalty of $100 fine for failure to obey the summons of a motor vehicle inspector.

INTERESTING FRENCH DECISION.

Court Holds Automobile Manufacturer Is Liable for Damages in Certain Instances.

A case of exceptional interest to automobile makers and chauffeurs has been decided by the Paris court of appeal. As reported on this side, the court in effect ruled that automobile manufacturers are responsible for accidents arising from the faulty construction of the steering wheel and steering gear of automobiles and that the driver can be held responsible only for proper lubrication. The judgment was delivered in connection with an appeal arising out of a claim for damages by Mr. Strawbridge of Philadelphia, Penn., who met with an accident six years ago while touring in the Pyrenees with his wife and family governess, which resulted in the amputation of both his legs.

He subsequently brought an action for $100,-

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000 damages against the Societe Routiere, from which he had hired the automobile at the rate of $35 a day. That company denied any liability and maintained that the responsibility devolved upon the manufacturer from whom it bought the machine. In the first instance the court awarded Mr. Strawbridge $14,000 damages and held the manufacturer was not responsible on the ground that it was the driver's duty to constantly supervise the steering gear. This decision has now been amended by the court of appeal, which holds that the automobile maker is liable for any constructional defect and that, in fact, the chauffeur, who is not an engineer, must rely solely upon the proper initial construction of his automobile. The manufacturer of the automobile in question and not the Societe Routiere, was ordered to pay the $14,000 damages to Mr. Strawbridge.

SEEK UNIFORM REGULATIONS.

California Motorists Particularly Active with Reference to Matter of Speed Limits.

A troublesome problem to the automobilists of California is the large number of conflicting laws in relation to the speed limit, etc. The Automobile Club of Southern California has taken the matter in hand and its legislative committee has plans for the drafting of a law which will be presented to the legislature for enactment.

There are many good motoring laws in California, but they are county and not state laws. Thus the law in one county will be found to differ widely from that in an adjoining county, so that motorists, especially strangers, are constantly violating the law unconsciously. For instance, in one town the speed limit will be 12 miles an hour, while in the next it will be found to be 20 and in the next beyond that possibly five miles is the limit, thus causing a bewildering confusion. The plan is for state wide legislation to remove this condition and thus far a majority of county officials and citizens favor the change.

WOULD TRANSFER AUTHORITY.

Bill Makes Its Appearance in California Providing for New Licensing Methods.

The highway commission of California is endeavoring to obtain the passage of a law providing for the relicensing of all the automobiles of California and the transfer of the motor vehicle department from the state to the highway department. The purpose of the proposed change is to make the license revenue directly applicable to road maintenance.

Secretary of State Jordan is bitterly opposed to the legislation and declares it not so much in the interest of the state as of patronage. The motor vehicle department now employs two men, he states, while under the proposed act it would require 15 persons to operate it under the highway department. He threatens to take the matter before the people on a referendum vote if the law passes.

AMENDED TRUCK BILL.

Massachusetts Legislature Will Take Up Matter of Limiting Their Weight.

Many important changes in the laws governing the operation of automobiles in Massachusetts are recommended in the annual report of the state highway commission. The report cites the increase in use of motor trucks and states the commission's belief that the law should limit the weight and speed of such vehicles. "Motor trucks and commercial vehicles now travel long distances," says the report, "and the commissioner feels that it is only fair that the same fee should be charged for their registration as for automobiles of like horsepower."

It is understood that the proposed bill limiting the weight of vehicles which may utilize the highways of Massachusetts without a special permit will come before the legislature again this year in amended form. As originally introduced the weight of the vehicle and load was fixed at a maximum of six tons, which is held to be the legal limit in that commonwealth, although the existing law is admittedly a dead letter. The amendments are the result of the hearings which were held a year ago and provide a maximum weight of 12 tons, graduated as to weight permitted for each inch of tire width. Speed limits are also to be set, approximately as follows: Trucks of four tons weight, 15 miles an hour; six tons and over on rubber tires, 12 miles, and six tons and over on metal tires, six miles. The highway commission recommends, in view of the increasing number of automobiles, an absolute maximum speed limit, say of 25 miles an hour.

A bill introduced in the Maine legislature provides that the town of Eden, in which is located Bar Harbor, the famous summer resort, at any legal meeting of the voters may open to the use of automobiles and motor vehicles any of the public highways within its limits.

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In The Aviation Field

With the Manufacturer and Operator in America and Abroad

While there can be little doubt that the progress of development in the field of aviation was decidedly marked during 1912, the situation with reference to world's records did not receive the same consideration as in previous years. The efforts of constructors and pilots was along somewhat different lines, and although the hydraeroplane made its first appearance in 1911, much attention was paid to this newer branch of the industry last year.

An acompanying table sets forth the changes in world's records, the marks being unofficial in a measure, since the Federation Aeronautique Internationale has not yet made its report for the year. It will be noted that in some instances there has been no new record during 1912, and this applies to at least three items, which otherwise should be included in the tabulation.

The records for an aviator and two passengers, speed according to distance, are still held to the credit of the late Edouard Nieuport, who created the following marks with a 50 horsepower Nieuport monoplane at Mourmelon, France, March 9, 1911: 10 kilometers, 6:00; 20, 11:59.4; 30, 17:52.6; 40, 22:44.4; 50, 29:37.4; 100, 59:08.

Guillaume Busson, flying a 100 horsepower Deperdussin monoplane at Rheims, France, March 10, 1911, created the following records for an aviator and three passengers, speed according to distance: Ten kilometers, 6:16.6; 20, 12:34.2; 30, 18:48; 40, 25:05.6; 50, 31:23.2. The same day and with the same machine he also secured the following records for an aviator and four passengers, speed according to distance: Five kilometers, 3:34; 10, 7:08; 20, 14:00.6. These still remain without change.

Some new records have been established since the first of the year. That for greatest duration without alighting for an aviator and four passengers is now held by Arthur Faller with an Aviatik biplane, who flew at Mulhausen, Germany, 1:18:00, Jan. 3. The same day he flew with five passengers, 1:06:05; with six, 1:00:00, and with seven, 6:49.

At Buc, France, Jan. 10, Maurice Chevillard



Machines Lined Up in Front of Sloane Aviation School on Long Island: Left to Right, 45 Horsepower Caudron, 60 Horsepower Passenger Deperdussin, School Deperdussin, School Blerlot, Curtis Type Biplane.

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with an Henri Farman biplane flew to an altitude of 4921 feet, creating a new altitude record for an aviator and three passengers. At Milan, Italy, Jan. 24, Slavorossoff (name of machine unknown) created new records for an aviator and one passenger, speed according to distance, as

been received in this country at this writing.

Perhaps one of the most interesting flights of the new year was that of Jean Bielovuccie, a Peruvian aviator, who successfully accomplished the flight over the Alps into Italy by way of the

COMPARING WORLD'S AEROPLANE RECORDS AT CLOSE OF 1910-11-12.

Kilos	Miles	Machines	Aviators	Place	Date	Time 1912	Time 1911	Time 1910
Speed According to Distance, Aviator Alone.								
5	3.1	140 h. p. Deperdussin	J. Vedrines	Chicago, Ill.	Sept. 9	1:44.2	2:18.4	2:34.6
10	6.2	140 h. p. Deperdussin	J. Vedrines	Chicago, Ill.	Sept. 9	3:27.6	4:30.2	5:30.9
20	12.4	140 h. p. Deperdussin	J. Vedrines	Chicago, Ill.	Sept. 9	6:36.0	9:14.8	11:04.8
30	18.6	140 h. p. Deperdussin	J. Vedrines	Betheny, Fr.	July 13	10:33.8	13:53.8	16:38.3
40	24.8	140 h. p. Deperdussin	J. Vedrines	Betheny, Fr.	July 13	14:05.6	18:31.6	22:12.5
50	31.0	140 h. p. Deperdussin	J. Vedrines	Betheny, Fr.	July 13	17:37.6	23:10.0	27:51.2
100	62.1	140 h. p. Deperdussin	J. Vedrines	Betheny, Fr.	July 13	35:17.6	46:27.4	1:01:04.7
150	93.2	140 h. p. Deperdussin	J. Vedrines	Betheny, Fr.	July 13	52:52.8	1:11:36.2	1:43:19.6
200	124.2	140 h. p. Deperdussin	J. Vedrines	Betheny, Fr.	July 13	1:10:55.0	2:13:35.4	2:18:30.6
250	155.3	50 h. p. Morane-Saulnier	M. Tabuteau	Pau, Fr.	Mar. 1	2:07:54.2	.....	.....
300	186.4	50 h. p. Caproni	E. Cobiono	Somma, It.	Mar. 28	2:49:00.0	.....	.....
350	217.4	50 h. p. Morane-Saulnier	E. Gilbert	Etampes, Fr.	Dec. 30	3:26:16.0	.....	.....
400	248.5	50 h. p. Morane-Saulnier	E. Gilbert	Etampes, Fr.	Dec. 30	3:55:27.6	.....	.....
450	279.6	50 h. p. Morane-Saulnier	E. Gilbert	Etampes, Fr.	Dec. 30	4:24:44.4	.....	.....
500	310.6	50 h. p. Morane-Saulnier	E. Gilbert	Etampes, Fr.	Dec. 30	4:54:06.2	.....	.....
600	372.7	50 h. p. Morane-Saulnier	E. Gilbert	Etampes, Fr.	Dec. 30	5:52:38.0	.....	.....
Speed According to Distance, Aviator and One Passenger.								
5	3.1	50 h. p. Etrich	H. Bier	Neustadt, Aust.	Oct. 1†	.....	2:58.0	.....
10	6.2	80 h. p. Zeus	G. Legagneux	Corbeaulieu, Fr.	July 20	4:24.8	5:44.4	7:31.2
20	12.4	80 h. p. Zeus	G. Legagneux	Corbeaulieu, Fr.	July 20	8:51.0	11:23.2	15:14.4
30	18.6	80 h. p. Zeus	G. Legagneux	Corbeaulieu, Fr.	July 20	13:18.6	17:02.4	22:56.4
40	24.8	80 h. p. Zeus	G. Legagneux	Corbeaulieu, Fr.	July 20	17:44.8	22:35.8	29:40.0
50	31.0	80 h. p. Zeus	G. Legagneux	Corbeaulieu, Fr.	July 20	22:13.0	28:09.8	38:19.4
100	62.1	80 h. p. Zeus	G. Legagneux	Corbeaulieu, Fr.	July 20	44:36.6	59:08.0	.....
150	93.2	80 h. p. Zeus	G. Legagneux	Corbeaulieu, Fr.	July 20	1:07:10.0	1:28:04.4	.....
200	124.2	100 h. p. Etrich	H. Bier	Neustadt, Aust.	Oct. 1†	.....	2:03:49.0	.....
250	155.3	100 h. p. Etrich	H. Bier	Neustadt, Aust.	Oct. 1†	.....	2:39:37.0	.....
Speed, Regardless of Distance.						M. P. H.	M. P. H.	M. P. H.
Aviator alone		140 h. p. Deperdussin	J. Vedrines	Chicago, Ill.	Sept. 9	108.7	82.7	71.6
1 passenger		80 h. p. Zeus	G. Legagneux	Corbeaulieu, Fr.	July 20	84.3	67.1	.....
2 passengers		80 h. p. Nieuport	C. Nieuport	Vienna, Aust.	June 23	64.8	63.9	.....
3 passengers		80 h. p. Nieuport	P. Mandelli	Vienna, Aust.	Aug. 17	65.9	59.8	.....
4 passengers		100 h. p. Deperdussin	G. Busson	Rheims, Fr.	March 10†	.....	54.2	.....
Greatest Distance, Without Alighting.						Miles	Miles	Miles
Aviator alone		80 h. p. M. Farman*	G. Fourny	Etampes, Fr.	Sept. 11	628	462	362
1 passenger		70 h. p. Nieuport	H. B.-Kennett	Salisbury, Eng.	Feb. 14	249	215	141
2 passengers		100 h. p. Etrich	H. Bier	Neustadt, Aust.	Oct. 4†	.....	69	57
3 passengers		80 h. p. Nieuport	P. Mandelli	Vienna, Aust.	Aug. 17	65.8	31	.....
4 passengers		100 h. p. Deperdussin	G. Busson	Rheims, Fr.	March 11†	.....	15	.....
Greatest Duration, Without Alighting.						Time	Time	Time
Aviator alone		80 h. p. M. Farman*	G. Fourny	Etampes, Fr.	Sept. 11	13:18:00.0	12:12:00.0	8:12:47.0
1 passenger		50 h. p. Etrich-Rumpler	J. Suvelack	Johannisthal, Ger.	Dec. 8†	.....	4:34:00.0	3:19:39.0
2 passengers		100 h. p. Albatross*	J. Pietschker	Johannisthal, Ger.	Oct. 1	2:19:00.0	1:05:18.3	1:38:40.0
3 passengers		100 h. p. Harlan	K. Grulich	Johannisthal, Ger.	Jan. 25	1:35:00.0	45:46.0	.....
4 passengers		100 h. p. Wright*	Abramovitch	St. P'burg, Rus.	Sept. 24	45:54.0	17:28.2	.....
5 passengers		70 h. p. Somner*	H. Molla	Doual, Fr.	Jan. 26	1:05:48.2	.....	.....
Greatest Altitude.						Feet	Feet	Feet
Aviator alone		80 h. p. Morane-Saulnier	R. Garros	Tunis, Africa	Dec. 11	18,378	13,950	10,745
1 passenger		120 h. p. Lohner-Arrow*	Lieut. Blaschke	Vienna, Aust.	June 29	14,300	9,600	.....
2 passengers		120 h. p. Lohner-Arrow*	Lieut. Blaschke	Vienna, Aust.	June 23	11,756	3,916	.....
3 passengers		125 h. p. Bomhard-Pfeil*	Sablating	Berlin, Ger.	Sept. 27	3,673	.....	.....
5 passengers		80 h. p. H. Farman*	F. Verschaeve	St. Job, Bel.	Dec. 23	1,955	.....	.....

*Biplane, all others monoplane; †mark for 1911, record was not exceeded in 1912.

follows: Two hundred kilometers, 1:56:30; 250, 2:24:30.

Jules Vedrines with a Deperdussin monoplane claims to have exceeded the records for 250 and 300 kilometers while flying at Etampes, France, Jan. 9. He landed heavily at the end of 300 kilometers, and no definite figures for the flight have

Simplon pass, from Brig to Domodossola, Jan. 25. It will be remembered that this was the task in which Georges Chavez, also a Peruvian aviator, lost his life, Sept. 27, 1910.

Bielovuccie utilized an Hanroit monoplane and had been waiting since Jan. 8 for favorable weather. He made his first attempt Jan. 14, but

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after reaching an altitude of 6000 feet was forced to return to Brig on account of the wind. The successful flight was accomplished in 25 minutes.

Bielovuccie is not yet 24 years old. He first came into prominence in August, 1910, when he encircled the Eiffel tower. In September of the same year he flew 335 miles across country from Paris to Bordeaux, by way of Orleans, Poitiers and Angouleme. At that time he was flying a Voisin biplane.

In view of the contemplated flights across the Atlantic during the present year, the performance of Roland G. Garros of France in flying his Morane-Saulnier monoplane from Tunis in Africa to Rome, Italy, in December, is of decided interest. The total distance covered was 515 miles, approximately 335 of which were over water. The



Type of Hanriot Monoplane Utilized by Jean Bielovuccie in His Recent Flight Over the Alps into Italy.

first stage was from Tunis to Trapani, Sicily, across the Mediterranean, 160 miles. After a delay of three days making necessary adjustments to the machine, Garros flew across the Tyrrhenian sea to St. Eufemia, Italy, 175 miles. The remainder of the distance to Rome was over land, 180 miles, with a stop at Naples.

Jan. 24, M. Bider, a French aviator, flew over the Pyrenees, from Pau, France, to Madrid, Spain. The only stop in the 317 miles was at Guadalajara, where the fuel tanks were replenished. The flying time was 5:35:00, and the weather was very bad, rain falling throughout the entire journey.

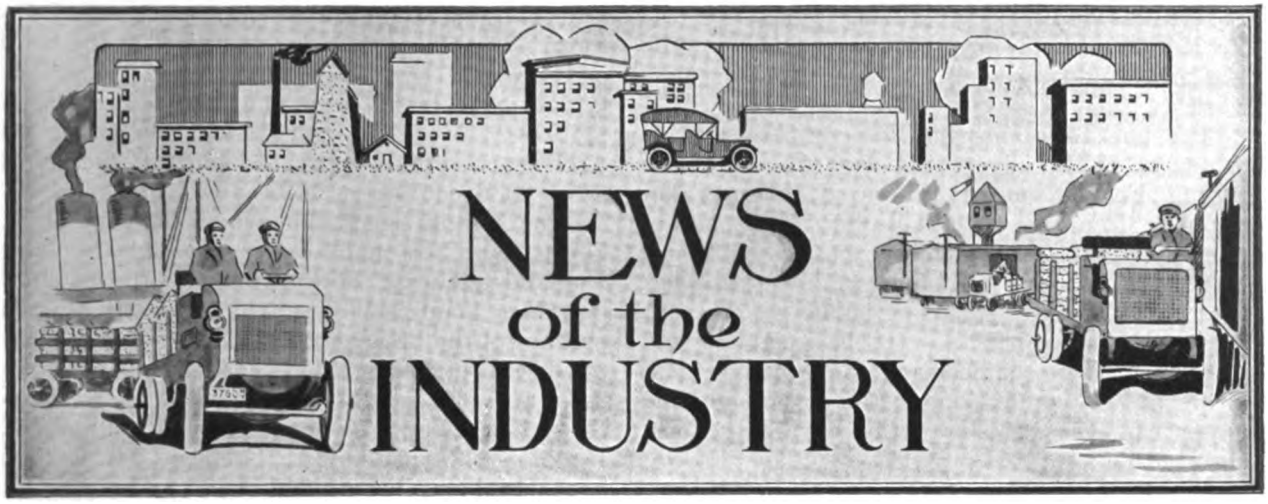
It is understood that the Burgess Company & Curtis, Marblehead, Mass., maker of Burgess-Wright biplanes and Burgess-Curtis hydraeroplanes, is working on a new flying boat which will be tested by the United States navy some time this month. From such announcement as has been made public it would appear that this will be the first machine in America to incorporate the Doutre stabilizer, which is said to have undergone decidedly satisfactory tests in France. The object of the device is to present automatic stability so far as possible.

Brig.-Gen. James Allen, chief signal officer of the United States Army, has announced the requirements for the new military aeroplanes, three of which will be purchased before July 1. They must be capable of flying at from 38 to 55 miles an hour, carrying two persons, ascending to an altitude of 2000 feet in 10 minutes carrying a live load of 450 pounds, and sustaining a continuous flight of four hours. An innovation is an enclosed protective body, composed of chrome steel at least .075 inch in thickness, which shall be subject to a penetration test for small arms fire under the conditions prescribed by the War Department. The machine also must carry a radio apparatus and other aerial instruments.

The power plant may be designated by the chief signal officer, this provision being inserted in case it is desired to adopt a foreign motor. A muffler for the engine and a stabilizer are regarded as desirable, but are not required by the army specifications. In addition to the wireless outfit, which is expected to weigh about 75 pounds, provision must be made for carrying a tachometer, compass, aneroid barometer, barograph, map holder, pad and pencil holder, clock and indicator of angle of incidence. The machine must be capable of being transported by road, in which event it must not exceed 10 feet in width. The construction must be such that it can be assembled for flight within one hour by six men.

Jacques Schneider of France, through the Aero Club de France, has offered $20,000 with which to found an international hydraeroplane prize. This will take the form of a work of art valued at $5000, accompanied by three annual cash awards of $5000 each. The conditions of the award will be announced by the club soon.

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PEERLESS' EXPANSION PLANS.

With Additional Capital and New Stockholders Decided Growth Is Anticipated.

The Peerless Motor Car Company, Cleveland, O., which has been successful in producing and marketing Peerless pleasure cars and trucks under a comparatively moderate capitalization, is making elaborate plans to do business on a larger scale during 1913. It has raised its authorized capital stock from $3,000,000 to $10,000,000. Several new stockholders of wealth and influence have entered the company, while others have largely increased their holdings. While the pleasure car will in no wise be neglected, much more energy and capital than heretofore, it is understood, will be applied to the advancement of the commercial vehicle line.

The Peerless company has resolved to pay a dividend of 40 per cent. to its stockholders, payable out of the surplus of the common stock of the company. It has also offered the stockholders the right to exchange one-half of their holdings for an equal amount of preferred stock. A majority has announced its intention to make the exchange. The increase in capital stock is designed to carry out the development plans of the officers who have subscribed so liberally to the new stock and of the new interests working in complete harmony.

The new stockholders are known to have been successful in kindred fields and the automobile manufacturing company will be a large gainer in 1913 by their determination to take personal interest as members of the board of directors. These men are: F. S. Terry, H. A. Tremaine, B. G. Tremaine, J. B. Crouse and J. Robert Crouse. The Peerless company started the new year with a paid-in capital stock of $4,300,000 and assets, after deducting all liabilities of every kind, of between $5,000,000 and $6,000,000, exclusive of patents, trade marks and good will.

ACKERMAN IS PRESIDENT.

Prominent Detroit Accessory Maker Starts New Year Under Satisfactory Auspices.

Joseph N. Smith & Co., Detroit, maker of automobile accessories, recently held its annual meeting, when E. L. Ackerman was elected president and general manager, C. E. Chamberlin, the former president, having retired. The other officers are: Vice president and factory manager, James Shand; secretary and treasurer, C. E. Blaesser.

No change was made in the directorate of the concern, the following being reappointed: Chairman, E. L. Ackerman; C. E. Chamberlin, James Shand, C. E. Blaesser and William Lemmer, Sr. While the output of this progressive concern during the past year exceeded any previous record, its current contracts indicate that the coming year will show even greater advances.

LEAVES REO TRUCK COMPANY.

C. E. Easton Joins Gleeson Murphy in New Detroit Advertising Agency.

Charles E. Easton, formerly sales manager of the Reo Motor Truck Company, Lansing, Mich., has resigned his position to join the Detroit staff of the H. K. McCann Company, advertising agency, of which Gleeson Murphy, formerly with the General Motors Company, is the head. Mr.

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Easton has acted as advertising director of the Reo concern for the past two years and joins the McCann company well equipped for his new work.

Previous to joining the Reo company he was in charge of the advertising departments of the Buffalo Forge Company and E. R. Thomas Automobile Company, both of Buffalo, N. Y., and of the Inter-State Automobile Company, Muncie, Ind. Mr. Easton is a graduate engineer who has made a study of advertising along several different lines of business. He has planned and handled both mechanical and sales management in his various connections in the automobile and motor car accessory industries during the past eight years.

LEAVES AUTOMOBILE INDUSTRY.

F. E. Dayton Resigns After Long Record with the Manufacturer of Columbia Cars.

F. E. Dayton, who has been sales manager of the Columbia Motor Car Company, Hartford, Conn., maker of Columbia cars, for about 10 years, or since the time of the Electric Vehicle Company, has resigned coincidentally with the announcement of his appointment as general manager of the National Incinerator Company, with executive offices at New York City, a foundry at Albany, N. Y., and erecting plants all over the country.

Mr. Dayton is one of the oldest men in point of continuous service with one line in the industry, having been successfully branch manager of the Electric Vehicle Company, original builder of Columbia cars, at Hartford, Boston and Chicago. He was connected with the firm since 1903 and was invited to continue with the reorganized United States Motor Company. He began his new duties Feb. 1.

NEW OIL CONCERN.

Invader Oil Company Acquires Business Heretofore Conducted by Chas. F. Kellom & Co.

The entire business and good will of Chas. F. Kellom & Co., Philadelphia, Penn., maker of Invader oil, has been acquired by a new corporation to be known as the Invader Oil Company. T. E. Tomlinson, one of the first men to study deeply the development of special oils for automobile use, will be vice president and general manager of the new concern. Charles F. Kellom will be president and the Kellom manufacturing and selling organization will remain intact. H. Dunthorn will be secretary and treasurer of the company, which has been incorporated under the laws of New Jersey with an authorized capital of $250,000. While the factory will remain at 113 Arch street, Philadelphia, the general offices will be at 80 Broad street, New York City.

The Kellom sales staff, which includes D. A. Scheu, who for many years covered the New England territory, will be retained, and in addition Mr. Tomlinson has associated with him a number of the better known men who were identified with him in previous enterprises. Among them are: H. Dunthorn, J. T. Rose, A. A. Francesconi, Howard Plowman, Harvey Wilkins, E. Kalkhof, F. Menke and A. Rafelson. Mr. Kellom began business in 1881 and claims to be the first to introduce light oil for use in automobiles, and has seen it come into general use, despite the suspicion which attended his action. Mr. Tomlinson first engaged in the oil business several years ago and created the famous Havoline oil, with which he became known nationally. He later organized the Wolverine Lubricants Company, which he built to large proportions.

BUYS FISK RUBBER STOCK.

John N. Willys Purchases Interest in Tire Company Which Seeks Massachusetts Charter.

It is announced that John N. Willys, president of the Willys-Overland Company, Toledo, O., maker of Overland cars, who controls an interest in several pleasure and commercial vehicle concerns, has purchased an interest in the Fisk Rubber Company, Chicopee Falls, Mass., maker of Fisk tires. It is also stated that Mr. Willys' purchase is merely in the nature of an investment in a substantial firm, and he will not become an officer or director of the company, taking no active part in its management.

Harry T. Dunn, president of the Fisk Rubber Company, in discussing the report, stated that he and Harry G. Fisk, secretary-treasurer, will materially increase their holdings and will remain in full charge of the company, which will continue to retain its individuality. It is further stated that the Fisk Rubber Company is a Delaware corporation, but a Massachusetts corporation is in process of formation and practically completed, with an authorized capital of $15,000,000, of which $5,000,000 is first preferred stock, $3,000,000 of which will be issued; $2,000,000 second preferred and $8,000,000 common.

This Massachusetts corporation will acquire

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all of the assets of the Delaware concern in the immediate future. The Massachusetts Fisk Rubber Company's active management will be identical with the present management of the Delaware company.

REFEREE WILL HOLD SALE.

Property of the Niagara Lead & Battery Company to Be Offered at Auction.

Notice has been given to the creditors of the Niagara Lead & Battery Company, Niagara Falls, N. Y., which is now in bankruptcy, that the property will be offered for sale at auction Feb. 25. The property includes the brick factory and land, also engines, boilers, machinery and apparatus of all kinds within the factory, all of which is subject to a mortgage held by the Niagara Falls Power Company.

The sale will be made subject to the lien on said mortgage by the power company. All of the property will first be offered for sale by parcel and then by bulk and the bid which realizes the largest amount therefor will be accepted by the trustee. If a bid made in good faith and for cash, amounting to $3000, is received, the property will be struck off to the highest bidder, but if no bid is made subject to the encumbrances, such as liens and mortgage, the entire property will be offered free of all encumbrances, the lien of the mortgage to be attached to the funds realized and the validity of the lien then to be determined by the court. The sale will be made subject to the confirmation of the referee.

BRISCOE FRERES ORGANIZED.

Former Head of United States Motor Company Forms New Concern at Billancourt, France.

Benjamin Briscoe, formerly president of the United States Motor Company, has opened an automobile factory at Billancourt, France, the home of the Renault and in the heart of the French automobile manufacturing district. The company is registered under the name of Briscoe Freres.

It is understood that this factory is at work on the production of a new car to be placed on the American market in ample time for the 1914 season. It is claimed that the new machine will be a five-passenger vehicle to sell at less than $1000. When the car is completed it is said that it will be manufactured at Detroit and that an assembly plant will be erected in England for supplying the European market.

NEW R-C-H MANAGER.

Something About the Man Who Has Been Selected to Head Well Known Concern.

It was announced some few weeks since that Peyton R. Janney would soon become general manager of the R-C-H Corporation, Detroit, maker of R-C-H cars. The story of his rise from machinist's apprentice to his present position is one which has few counterparts outside of the automobile industry. In other words, Mr. Janney is one of those men to whom the title of self-made may be applied with much truth.

When he was 10 years of age he entered the agricultural implement business as a machinist's apprentice, and he worked his way to the position of superintendent when most boys are just beginning to think of their life work. His knowledge of automobile affairs has been gathered during 12 years of connection with the industry. Mr. Janney has been in every division of the trade, retail sales as well as factory sales and production. For two years before joining the R-C-H forces he was associated with the General Motors Company as manager of various truck and pleasure car companies subsidiary to that concern.



Peyton R. Janney, General Manager, R-C-H Corporation.

He is a big man physically, as well as in a business way, for standing over six feet tall, he weighs more than 220 pounds.

ADDITION TO PILOT PLANT.

Increased Demand for Product Makes Necessary Securing Large Addition at Once.

The construction of a large addition to the plant of the Pilot Motor Car Company, Richmond, Ind., maker of Pilot cars, has been started

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and the company will soon be in a position to add to its production in a substantial manner. The new building will be two stories high and will face the P. C. C. & St. L. railroad station.

Large sales of the concern demanded that the capacity of the factory be increased, and according to President George Seidel of the Pilot company, its size will be trebled. Because of the immediate need for the new building a force will be maintained large enough to complete the work within 40 days.

TWO NEW FIRESTONE MEN.

Bates Heads Pneumatic Tire Sales and Harris Joins Advertising Force.

The Firestone Tire & Rubber Company, Akron, O., announces the appointment of two new men to important places in its official family. George J. Bates has assumed charge of the sales in the pneumatic tire department and Roy C. Harris becomes assistant advertising manager. Both will reside in Akron.



George J. Bates, Sales Manager, Firestone Tire & Rubber Company.

Mr. Bates has a wide circle of friends in the industry, having been connected with the production and sale of tires for a long period. He goes to the Firestone company from the Diamond Rubber Company of Akron, with which concern he has been a department manager for the past five years.

Mr. Harris has been in charge of sales and publicity for the Vreeland Chemical Company of New York City for the past three years, and previous to that connection he was with the Crasselli Chemical Company of Cleveland, O. Although not quite as well known in the industry as Mr. Bates, Mr. Harris comes to his new duties with a thorough knowledge of advertising and business methods.

SEEKS ANOTHER BUILDING.

Sanford Motor Truck Company Is Preparing for Increased Business During 1913.

The Sanford Motor Truck Company, Syracuse, N. Y., maker of Sanford trucks, is increasing its facilities in anticipation of a larger output and has purchased of the Syracuse Savings bank the three-story building at the end of West Fayette street. The purchase price is not named. At least 300 trucks, it is expected, will be made this year, more than doubling the output.

While the company at present has only about 50 men on its payroll, it is anticipated that between 200 and 300 will be employed before the end of the year. Last summer the corporation's capital stock was increased from $25,000 to $50,000 for the purpose of caring for the increasing demand for its product. J. Frank Durston is president of the concern and F. F. Sanford is secretary and treasurer.

REORGANIZING KNOX COMPANY.

Will Specialize in Six-Cylinder Pleasure Cars, Fire Apparatus and Martin Tractor.

Arrangements for the reorganization of the Knox Automobile Company, Springfield, Mass., maker of Knox pleasure and commercial vehicles, which was recently petitioned into involuntary bankruptcy, are in progress and in a short time it is expected that the reorganized concern will be in full possession. The American Appraisal Company has been making an estimate of the value of the property for the purpose of effecting a just reorganization.

Edward O. Sutton, Harry G. Fisk and Charles C. Lewis of Springfield, Mass., were appointed receivers by Judge Morton in the United States district court and they qualified under a bond of $15,000 each. Mr. Sutton and Mr. Fisk have been assignees of the company since last September, when financial difficulties were first encountered. It is reported that the company will standardize the manufacture of six-cylinder pleasure cars, the Martin tractor and fire apparatus. Sales of the Martin tractor are said to have increased to a satisfactory volume and the fire apparatus business is stated to have also shown a steady growth. The Knox company reports that during the past three months under the trustees it has shipped for delivery to customers more cars than in the corresponding three months of the previous year.

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NAMES CAUSE CONFUSION.

Therefore Michigan Automobile Company, Ltd., Becomes Fuller & Sons Manufacturing Co.

Exactly 10 years from the date of its incorporation, the Michigan Automobile Company, Ltd., Kalamazoo, Mich., ceased its existence and was succeeded on Dec. 31, 1912, by a new corporation, known as the Fuller & Sons Manufacturing Company. The firm has not built complete motor cars for a number of years and the change in name was thought desirable for numerous reasons. The recent incorporation of the Michigan Motor Car Company of the same city, maker of newer lines of Michigan cars, by the owners of the Michigan Buggy Company, caused confusion.

F. D. Fuller has been at the head of the Michigan Automobile Company, Ltd., since its organization and heads the new company as president and largest individual stockholder. His two sons have entered the firm and the eldest, L. C. Fuller, is designer, while W. P. Fuller is manager of sales. For several years the business has tended towards a smaller variety of parts, and transmissions have been specialized. Two types and sizes of planetary transmissions were developed and owing to the large demand much work has been done to perfect a variety of styles of 30 to 40 horsepower selective transmissions. The new company has a good machine tool equipment and many builders of complete motor cars buy its components rather than make them. The Fuller & Sons Manufacturing Company has $100,000 capital.

ANNOUNCES NEW DELIVERY CAR.

Baltimore Pleasure Vehicle Manufacturer to Add Commercial Line in Near Future.

An announcement of importance to the automobile world generally is made by Carl Spoerer's Sons Company, Baltimore, Md., maker of Spoerer pleasure cars, in regard to the new 1500-pound delivery wagon which the company will market about May 1. The car has been designed by Engineer Morrow and it is said the concern expects to manufacture 50 of them this year.

The officials, comprising Jacob Spoerer, Charles Spoerer, John F. Reus and B. J. Reus, believe there is a big future for the commercial light delivery car. The new wagon has a 30 horsepower, four-cylinder motor and a transmission affording four speeds forward and reverses. Its introduction will not affect the manufacture of the pleasure models and it is probable that the company will be forced to enlarge its factory.

TO INCREASE ITS OUTPUT.

Lord Baltimore Truck Company Expected to Erect a Large Factory Building.

The Lord Baltimore Motor Car Company, Baltimore, Md., has announced its intention of greatly increasing its output of commercial vehicles during the present year. John Luntz, Jr., president and general manager of the concern, also is quoted as saying that the firm contemplates the immediate erection of a large factory to produce and market the number of cars it has contracted for.

For several years the Lord Baltimore company has been making commercial cars in a somewhat limited way. The officers of the company are: President, John Luntz, Jr.; vice president and treasurer, John Luntz, Sr.; secretary, J. Elmer Stryker; engineer and designer, Otto R. Bieler.

EXTENDS BUSINESS FACILITIES.

Motor Accessories Mart in Chicago Adopts New Plan for Co-Operating with Manufacturers.

The Motor Accessories Mart, Chicago, has made a radical departure from its former line of business and has greatly extended its service and placed it upon a more practical basis. It has opened a salesroom devoted exclusively to the accommodation of factory representatives and manufacturers' agents of automobile accessories, this being located adjacent to the New Southern hotel and to all of Chicago's accessory jobbers.

Ample desk quarters are being furnished to patrons, with heat, light, janitor, telephone and stenographic service and only representatives of reliable and diversified lines are being admitted. The firm endeavors to make its place the common meeting spot of western buyers and sellers. Further service is being rendered in the matter of receiving mail, telegrams, express, etc., to promote the interest of the patrons.

The Studebaker Corporation, Detroit, recently filled an order for 40 of its Studebaker motor delivery wagons, secured through the company's London branch. This vehicle is the type so generally used by the United States government for the delivery of the parcel post.

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ACTIVITIES OF MOTORCYCLISTS, THE RIDER, THE MANUFACTURER, AND THE DEALER



THE CHICAGO SHOW.

The first independent national show under the auspices of the Motorcycle Manufacturers' Association opened in the Manufacturers' Exhibition hall, Chicago, Ill., Monday evening, Feb. 3, for the remainder of the week. While at this writing the event is still in progress there is every evidence that the success of the venture will be such as to warrant continuing the plan, although this is a matter which will be taken up by the association at an early meeting.

Owing to the fact that the committee was unable to secure possession of the building until Sunday morning, there was no opportunity for decorations. There is little reason for believing that this situation interfered in any manner with the display in a business way, since it must be taken for granted that the thousands of visitors came to see the new models rather than their setting. It may be added, however, that the time for arrangement was so short that when the show was formally opened Monday night a few of the exhibitors were without full representation of their lines.

The majority of the machines were shown for the first time this season in New York, in connection with the automobile display in Grand Central Palace, and these already have been commented upon in these columns. Among these makes were the following: Merkel, Emblem, Pope, Monarch, Dayton, Excelsior, Thor, R-S, Harley-Davidson, Indian, Schickel, Pierce, Eagle, M-M, Henderson and Yale. Those which were reserved for presentation at Chicago were: A-M-C, Black Hawk, Crawford, De Luxe, Feilbach, Iver Johnson and Jefferson.

The New Machines.

The A-M-C is made by the Allied Motor Corporation, Chicago, and is marketed in two models, a four horsepower single with either belt or chain drive and a seven horsepower, chain driven twin. It follows conventional practise this year in utilizing mechanical valves. The magneto is a Bosch and the carburetor a Heitger. The forks are of the double acting rocker type. Grip control is employed, and all models are fitted with the Eclipse free engine clutch. Tires are optional, a choice of 28 by 2.5 inches or 29 by 2.75 being given.

The Black Hawk is a 4-5 horsepower single, produced by the Black Hawk Motor Company, Rock Island, Ill. A choice of either flat belt or chain drive is afforded. Both inlet and exhaust valves are mechanically operated. The magneto is a Bosch and the carburetor a Schebler. Lubrication is by force pump. The combination tank has a fuel capacity of 1.75 gallons and an oil capacity of three quarts. The brake and clutch are of the company's own design. The wheelbase is 53 inches and the tires 28 by 2.75.

The Crawford is a nine horsepower twin, chain driven, designed by R. S. Crawford and made by the Mid-Land Manufacturing Company, Saginaw, Mich. It has magneto ignition, mechanical valves, sight feed lubrication, disc clutch, cradle scroll spring forks, and 28 by 2.75-inch tires. The fuel capacity is 2.5 gallons.

The De Luxe is marketed in two chain driven models, one of seven horsepower and the other of nine. The maker is the Excelsior Cycle Company, Chicago. Both valves are mechanically operated. The magneto is a Bosch and the carburetor a Schebler. Lubrication is by a combined sight feed and force pump system. The gasoline capacity is two gallons and the oil capacity one. The forks are of the cradle suspension spring type. The brake is a Musselman. The wheelbase is 57 inches and the tires 28 by 2.75 inches. The clutch is an Eclipse.

The Fielbach is made by the Feilbach Motor Company, Milwaukee, Wis., and is a five horsepower single, belt driven. Both valves are mechanically operated. The magneto is a Herz and the carburetor a Heitger. The brake is a Corbin and the clutch an Eclipse. The tires are 28 by

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2.75 inches or 28 by three at an option.

The Iver Johnson is produced by the Iver Johnson's Arms & Cycle Works, Fitchburg, Mass., in two models, a 4-5 horsepower, V belt single and a 7-8 horsepower, chain twin. Mechanical valves, Bosch magneto, Schebler carburetor, Corbin brake and Iver Johnson clutch are among the features. The twin has a gasoline capacity of 2.5 gallons and the single two gallons. The oil capacity is two and 1.5 quarts, respectively. Tires are 28 by 2.75 inches on the twin and 28 by 2.5 on the single.

The Jefferson is the new name of the P. E. M., which formerly was the Waverley, and is made by the Waverley Manufacturing Company, Jefferson, Wis. It is produced in two models, both chain driven, a four horsepower single and a seven twin. Both valves are mechanically operated. The magneto is a Bosch and the carburetor

Barco Brass & Joint Company, Chicago.

Lamps—Hawthorne Manufacturing Company, Bridgeport, Conn.; Badger Brass Manufacturing Company, Kenosha, Wis.; Chicago Cycle & Supply Company, Chicago; Hine-Watt Manufacturing Company, Chicago; Victor Auto Parts Company, Cincinnati, O.

Motors—F. W. Spacke Machine Company, Indianapolis, Ind.; North Chicago Machine Company, Chicago; Wizard Motor Company, Indianapolis, Ind.

Saddles—H. & F. Messinger Manufacturing Company, New York City; Troxel Manufacturing Company, Elyria, O.

Speedometers—Corbin Screw Corporation, New Britain, Conn.; Standard Thermometer Company, Boston, Mass.; Stewart-Warner Speedometer Corporation, Chicago.

Tire chains—Weed Tire Chain Grip Company, New York City.

Tubing, frames, etc.—Standard Welding Company, Cleveland, O.

Tandem attachments—Ero Manufacturing Company, Chicago; Angesten-Koch Company, Chicago; Queen City Iron & Wire Works, Denver, Col.; Fox Manufacturing Company, Seattle, Wash.

Belting—Graton & Knight Manufacturing Company, Worcester, Mass.; Chicago Belting Company, Chicago.

Sidecars—Angsten-Koch Company, Chicago; Greyhound Motor Company, Buffalo, N. Y.; Majestic Manufacturing Company, Worcester, Mass.; Hendee Manufacturing Company, Springfield, Mass.; Baxter Sidecar Com-



Members of Hartford Motorcycle Club, Hartford, Conn., Lined up for One of Their Long Distance Runs.

a Heitger. Lubrication is by force pump. The gasoline capacity is two gallons and the oil capacity two quarts. The brake is a Corbin and the clutch an Eclipse. Tires are 28 by 2.75 inches. The wheelbase is 56 inches.

Those Who Displayed Accessories.

A large number of accessory houses were represented, some of whom were not to be seen at the automobile shows, although making motor car fittings and supplies. The list follows:

Magnetos and spark plugs—Bosch Magneto Company, New York City; Herz & Co., New York City; Splitdorf Electrical Company, Newark, N. J.

Brakes—New Departure Manufacturing Company, Bristol, Conn.; Corbin Screw Machine Corporation, New Britain, Conn.; Eclipse Machine Company, Elmira, N. Y.; Miami Cycle & Manufacturing Company, Middletown, O.

Carburetors—Wheeler & Schebler, Indianapolis, Ind.; Heitger Carburetor Company, Indianapolis, Ind.; J. W. Bottomley, Chicago.

Chains—Sarco Engineering Company, New York City.

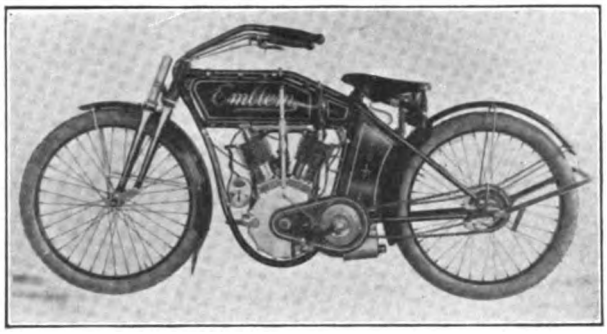
Horns and signalling devices—Purdy Bros., Chicago; pany, Cambridge, Mass.; Aermore Manufacturing Company, Chicago; National Cycle Accessory Company, Aurora, Ill.

Miscellaneous—H. T. Roberts, Chicago Cycle Supply Company, Excelsior General Supply Company, Purdy Bros. Company, Atlas Specialty Company, Chicago; Fentress-Newton Manufacturing Company, Detroit; Jenkins & Co., Des Moines, Ia.; Van Cleef Bros., Chicago; Morrison-Ricker Company, Grinnell, Ia.; Hughes & Wessling, Chicago; Kokomo Rubber Company, Kokomo, Ind.

Considering One Show Only.

It is stated that there is a proposition being considered by the various motorcycle manufacturers for one great national motorcycle show, to be held each year at Chicago, the New York City exhibition being entirely eliminated. The manufacturers are said to be dissatisfied with the space they received at New York during the big automobile show and regard the display in any event as practically a dealers' proposition, inasmuch as the eastern territory is closed up by the

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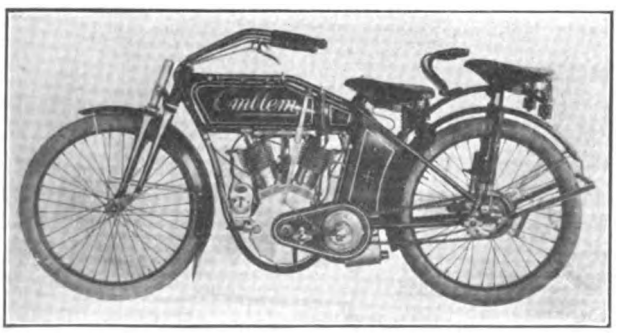
Eight Horsepower Emblem Twin, Equipped with Either Chain or V Belt.

time it is held. At Chicago, however, dealers from all over the West flock to the exhibition, at which time sales and contracts are consummated. Opinion has been sought relative to the proposal to hold one big show annually, as is the case in England, and although the majority of manufacturers appear to favor it, there were some who desired to wait until after the show at Chicago this year before expressing their convictions. It is quite likely that the matter will be given serious attention at a future meeting of the association.

The New Emblem Line.

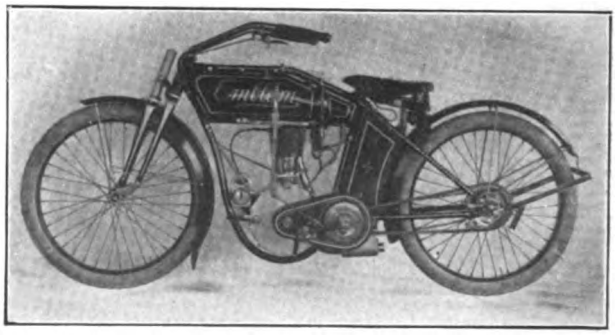
While it has been known in a general way for some weeks that the Emblem Manufacturing Company, Angola, N. Y., was to produce a big twin, the recent New York show was the first opportunity afforded for making careful examination of its interesting features. Besides this model, which is rated at 10 horsepower, and is chain driven, is another eight horsepower twin, fitted with either chain or V belt, and a five horsepower single, chain or V belt. Perhaps it would be more nearly correct to say there were two single models, since this machine may be supplied either with magneto or battery ignition. The others are equipped with magneto only.

The product of the Emblem Manufacturing Company has gained a wide reputation for its excellence, the motorcycles being particularly sturdy in construction, as is evidenced by the uses to which they have been put. It is not out of place to remark in this connection that the company also makes bicycles with the same standard in view. The secret is held to lie in the fact that Angola being a beautiful little town on Lake Erie, near Buffalo, the employees of the company are situated apart from the distracting influences of a large city and are able to devote their whole time and attention to the work in hand. Moreover, they are permitted to share in the company's profits, thus engendering a certain personal pride in the production of an article which merits the reputation it enjoys.



The Big Emblem Twin for 1913, Fitted with Tandem Attachment.

Two features stand out prominently on the 1913 Emblem. One is the substitution of the mechanically operated inlet valve for the automatic, and the other is the use of the chain drive on all models, although this latter is optional except on the big twin. Other differences will appear from a more detailed description of the mounts.

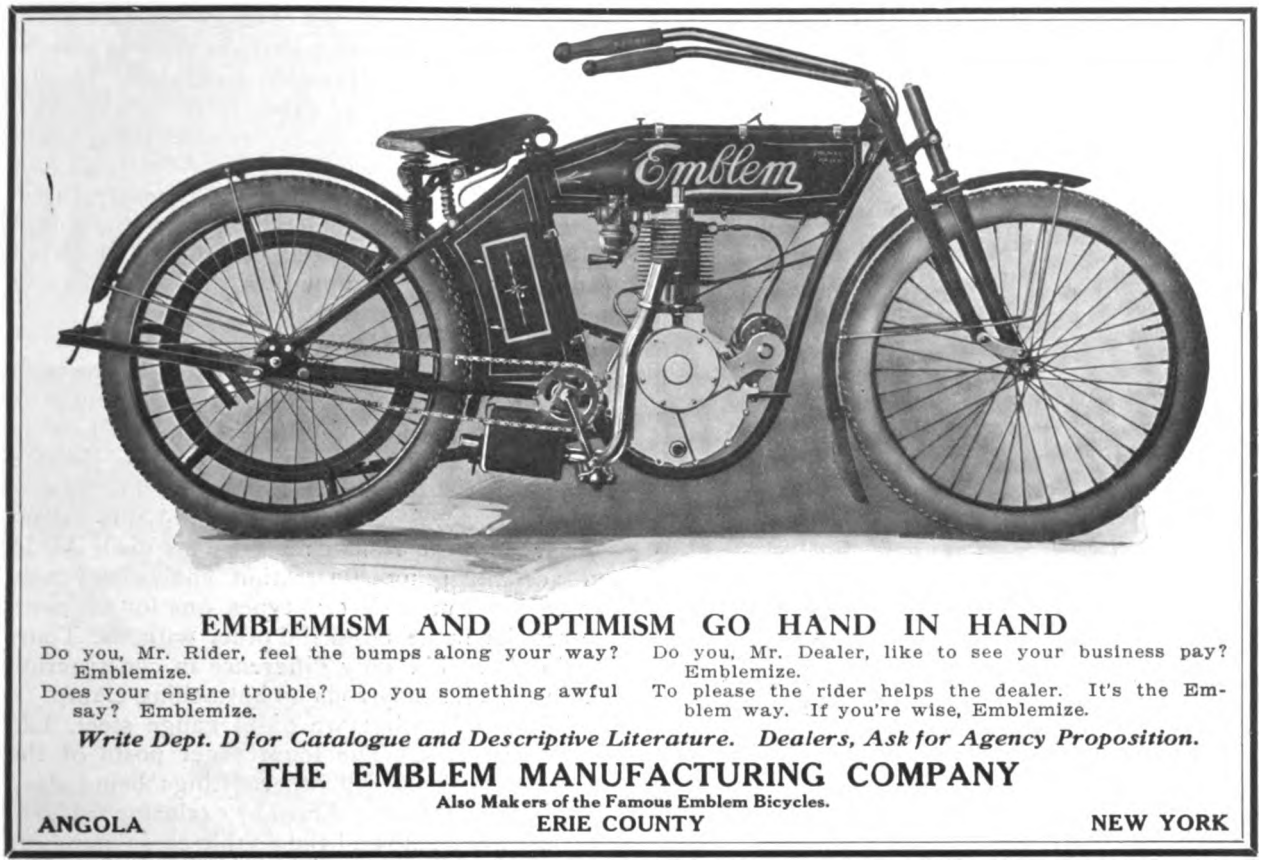


Five Horsepower Emblem Single May Be Had with Battery or Magneto.

The motor of the single and the big twin has bore of 3.5 inches and stroke of four, while that of the smaller twin has bore of 3.375 inches and stroke of 3.75. The cylinder is a special casting, being made in one piece, eliminating the possibility of leaky joints and is ground to a mirror finish. A large air space between the cylinder and the exhaust port makes for free circulation, and this together with the large cooling flanges is held to make for efficient cooling even at the highest speeds. The valves are made of nickel steel, 1.75 inches in diameter, and the exhaust tube is 1.375 inches in diameter.

The crankcase is of aluminum, machined very accurately to make for oil tight joints. On the lower right hand side is the glass oil sight gauge. The fastening of the lugs on the crankcase is designed to permit of quick removal of the motor, there being one on the front and another on the back. The fastening to the frame is by four

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Do you, Mr. Rider, feel the bumps along your way? Emblemize.
Does your engine trouble? Do you something awful say? Emblemize.
Do you, Mr. Dealer, like to see your business pay? Emblemize.
To please the rider helps the dealer. It's the Emblem way. If you're wise, Emblemize.

Write Dept. D for Catalogue and Descriptive Literature. Dealers, Ask for Agency Proposition.

THE EMBLEM MANUFACTURING COMPANY

Also Makers of the Famous Emblem Bicycles.

ANGOLA ERIE COUNTY NEW YORK

bolts, a construction which makes for dismounting in a very few minutes. The cams and camgear are of one piece, the twins having four cams, one for each individual valve, this making for accurate timing. These parts are made from the best quality steel and are of ample size. The camshaft is hollow and allows the oil to flow into the gears and socket arms, keeping them properly lubricated at all times.

The engine flywheel is large in diameter, the bulk of the weight being in the rims, the centres being open, to eliminate unnecessary weight and aid in proper lubrication. The connecting rod is a steel forging, fitted with a non-grain bronze bearing at the crank end. The piston is a special steel casting with convex top, fitted with two piston rings. Both piston and rings are heat treated and ground to a mirror finish.

Lubrication is by force feed pump and sight feed, both of which are part of the tank, located just ahead of the saddle, making for convenient operation. The crank and flywheel shafts being hollow and being supplied with oil holes, permit the lubricant to flow to all bearings both inside and out. Non-grain bronze bearings are utilized throughout. Provision is made at the base of the crankcase for drawing off all old oil. The combination tank has a fuel capacity of two gallons and oil capacity of two quarts. The carburetor is of special design with auxiliary air intake.

A Herz magneto is employed, and this is driven by a train of gears operated by the camshaft, which is designed in such manner that the covers of the cams, gears and magneto gearcase may be removed readily for inspection or adjustment. The arrangement is such that the magneto may be removed without disturbing the gearcase

JOIN THE F. A. M.

which is the National Organization fostering the interests of motorcyclists along legislative and other lines. Cut this out, mail it, and you will get the reasons.

E. M. ESTABROOK
Chairman Membership Committee Federation American Motorcyclists,
BANGOR, MAINE.

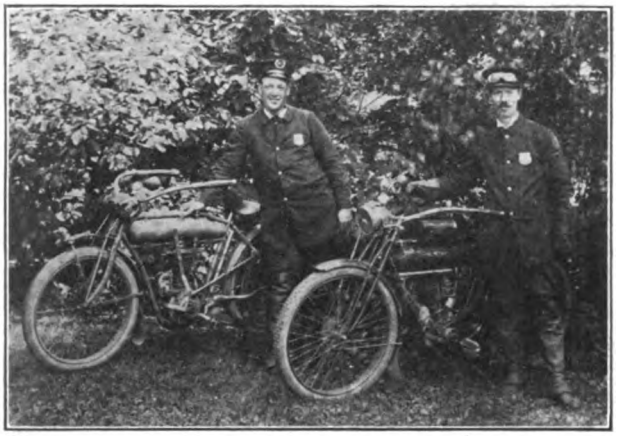
Please send me the F. A. M. Booklet and all information interesting to prospective members.

Name .....

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or gears. On the battery model, three dry cells are utilized, these being securely fastened in a battery case specially designed for this purpose.



Two Police Officers from Hartford, Conn.: Joseph R. Lacy and Pope; Richard E. O'Meara and Flying Merkel.

The frame is of the triangular reinforced type, which has proven a valuable feature in the sturdiness of Emblem construction. The lower tube has a very graceful curve which loops the base of the motor, it being maintained that this eliminates all strain and possible chance of breaking the motor base or fastenings. The frame head has a truss web between the main branches. The material throughout is the best quality of seamless tubing and steel forgings.

The forks have been redesigned with a wide crown, permitting the use of larger tires and non-skid chains. The Emblem fork is held to be very flexible, with an up-and-down movement of 2.5 inches. The spring is long and large in diameter. The lower bearings are made of tool steel, and are securely locked against rattle or looseness. There are four steel rocker links which support the spring fork to the main fork, one on the inside and one on the outside of each.

The triple-stem handle bar is made from one-inch heavy steel tube of special temper, which is held not to bend or twist under the most severe strain. The bars are wide and have a graceful curve, the design being such that when turning sharp corners they are not in the way. The control is of the double grip type.

All models are fitted with the Eclipse free engine pulley and variable speed clutch. An option of Corbin or Eclipse brakes is offered. The saddle is a Troxel with compound springs, or a Messinger cavalry or Person's saddle may be had if desired. Tires are 28 by 2.5 inches, Continental-Erie being fitted as standard, with Goodyear as an option. The equipment also includes an unusually complete set of tools for repair work.

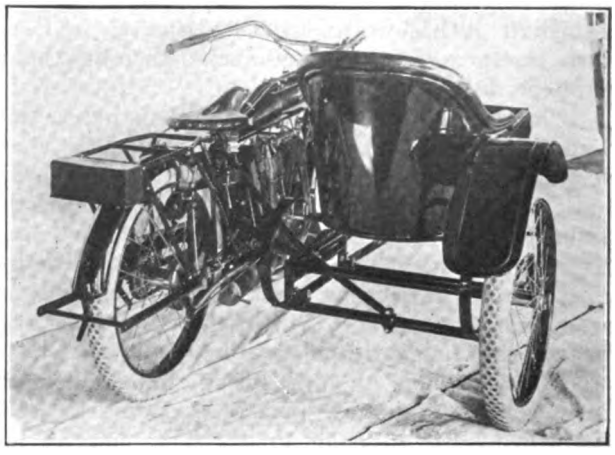
The company offers a cushion tandem attachment, fitted with adjustable handlebars to suit the convenience of the extra rider. It has two large cushion springs on either side, these being encased in steel telescopic tubes. Adjustable foot rests also accompany this equipment. Interchangeable with the tandem attachment is a luggage carrier of substantial design, in which all joints are brazed, eliminating the possibility of shaking loose.

The Indian Sidecar.

In view of the increasing interest in the subject of sidecars as evidenced by the number of concerns now manufacturing this product in America, it is not surprising that the Hendee Manufacturing Company, Springfield, Mass., should have designed an auxiliary of this nature for use with the Indian motorcycles made by it. An accompanying illustration shows the new car, which is made in two types, one for use with the regular models and the other with the Tourist Trophy. The only difference in construction lies in the rear stay rods and attaching clamp.

All chassis tubes are of 14 gauge steel, 1.25 inches diameter. The four corner posts of the frame are of steel, all other fittings being drop forgings. What are claimed as exclusive features are the drop frame and the double cross members at the rear and left side. The low frame suspension is held to induce the machine to hold the road at speed and on corners and to make for easier riding. The double cross members are expected to insure extreme rigidity.

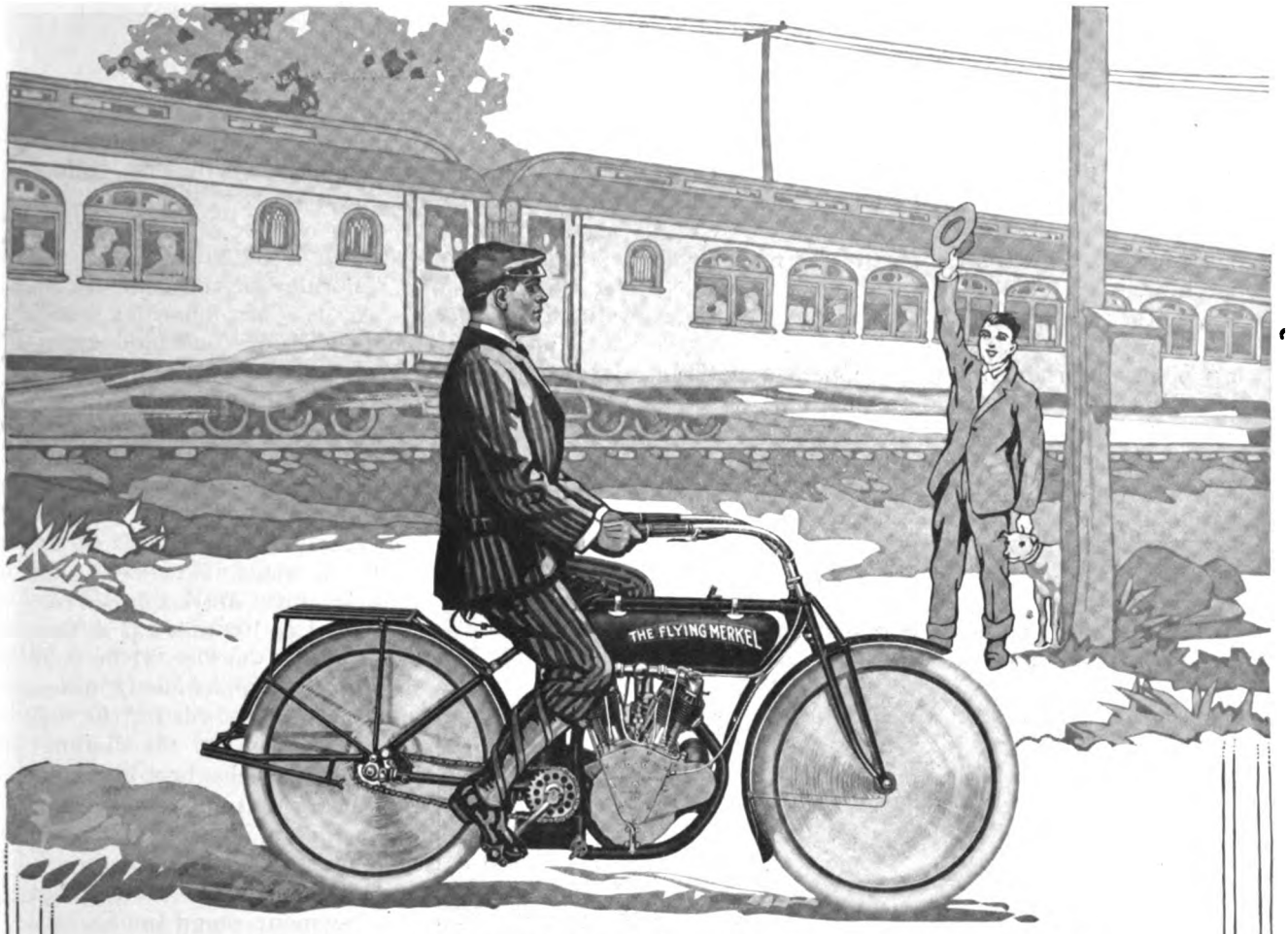
The rear stay rods connecting the sidecar to



Neat and Attractive Sidecar Utilized Exclusively with Indian Mounts.

the motorcycle have slidable anchorage to permit the car and machine being properly aligned in a parallel vertical plane before being rigidly

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THE PULLMAN OF THE OPEN ROAD

but inadequately expresses the superior and exclusive features embodied in the motorcycle which has created a sensation wherever motor vehicles are known.

THE FLYING MERKEL

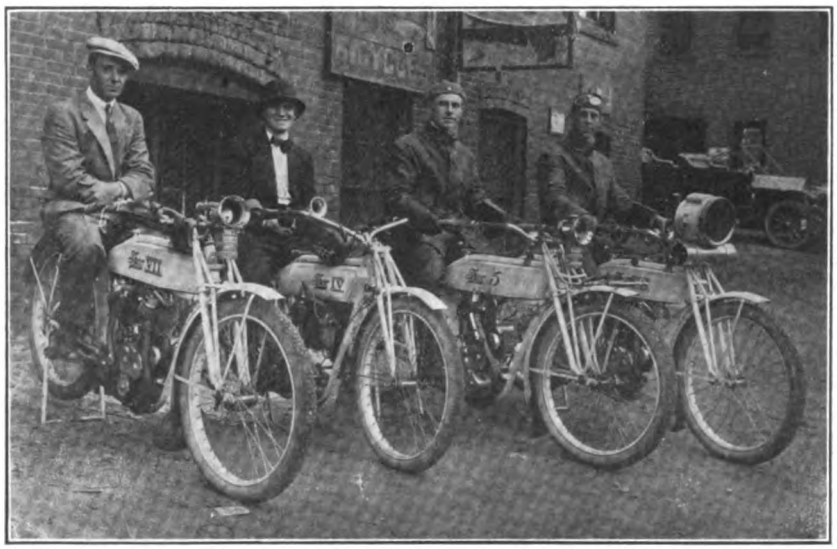
for 1913 is the only motorcycle in the world with a Self-Starter and Two-Speed Free Engine Hub —an exclusive feature which at once makes motorcycling more than ever a sport for gentlemen. The original and improved Spring Frame and Spring Fork makes all roads boulevards, and the full Hess-Bright ball-bearing motor gives the power plant flexibility not found in any other motorcycle engine. Write for art catalog fully describing the famous prize winner "4-45" and "7-75" "Yellow Jacket" models.

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MEMBER M.M.A.

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connected. The chassis wheel axle spindle is of vanadium steel, .875 inch in diameter, and is solidly brazed to the upper rear tubular member. The chassis road wheel is very similar to the regular Indian motorcycle front wheel, but the hub is larger and it carries a 2.75-inch tire. It is set 12 inches ahead of the driving wheel, instead of in a line with it, a practise which is expected to make for less effort on the part of the motorcycle operator.

Another feature for which special advantages are claimed is the width of frame and body, giving plenty of room for a large person without necessitating a wider road tread. This latter is accomplished by mounting the wheel close to the frame and body and attaching a generous fender. Sidecar comfort depends largely upon the springs. Two three-leaf double scroll carriage springs of high tempered vanadium steel are employed. The leaves are .1875 inch wide, while the distance between the front and rear spring eyes is 28 inches. The overall length of the spring is 41.375 inches, and each rides on double seats at the frame corners.



Four Thor Riders from Worcester, Mass.: Left to Right, E. A. Mills, A. J. Noonan, C. Zickell, A. R. Goodwin.

The lateral distance across the chassis is 23.75 inches. Steel is used for the body construction, the important dimensions being: Length from bottom of seat back to forward interior of the hood, 49 inches; seat, 20 inches long and 19 wide; inside height of seat back, 20; outside, 21; door, 13.5 inches wide and 11 high; height of arm rests from seat floor, 12; height of body sides forward of arm rests, 17. Coil springs are utilized in the seat cushions, which are upholstered in smooth black leather. Provision is made for carrying goggles, maps, etc., and there is a spacious tool compartment under the cushion.

Humiston's New Records.

The records established at the Playa del Rey motordrome at Los Angeles, Cal., by Lee Humiston on Dec. 31, 1912, and Jan. 8, 1913, will stand regardless of whether or not the sanction for the event was legally issued, is the statement made by Chairman J. P. Thornley of the competition committee of the F. A. M. Mr. Thornley states that the measurements of Humiston's mount conform to the F. A. M. requirements, the necessary affidavits to this effect having been received from W. G. Collins. The records are now recognized officially, inasmuch as the chairman of the competition committee believes the rider entered the contest in good faith that he was legally sanctioned to do so.

It develops, however, that Humiston did not establish records for 1 to 100 miles as at first announced. On Dec. 31 he rode his Excelsior machine 12 miles, creating new records for the distance, his time for the distance being 7:37.6, the best previous time being that of Ray Seymour on an Indian, 7:39. Comparison of Humiston's time with the official record table shows that Ray Seymour, on an Indian, still holds the records from 13 to 25 miles, inclusive, while from 30 to 100 miles, Humiston secures new marks, his time for the 100 miles being 1:08:01.8. His distance for the hour was 88 miles, 350 yards. This also is a new world's record.

New Merkel Agencies.

The following are new agencies appointed by the Miami Cycle & Manufacturing Company, Middletown, O., maker of Merkel motorcycles: C. E. Wyeth, Newark, O.; Wesley T. House, Wheeling, W. Va.; Kearney Hardware Company, Kearney, Neb.; O. R. Inglis, Rumford, Me.; F. R. Drew Company, Cedar Rapids, Ia.; Anthony Cycle Company, Des Moines, Ia.; C. Jungbluth, Washington, Ia.; L. S. Chidestar, Ottumwa, Ia.; J. K. Haroldson, Rembrandt, Ia.; Washta Implement Company, Washta, Ia.; L. Kirkegaard, Sioux City, Ia.; Jons Auto Company, Boone, Ia.; O. H. Kathman Company, Quincy, Ill.; Stoddard Electric Supply Company, Michigan City, Ind.; W. E. Wandersee, Detroit; L. G.

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Site, Latrobe, Penn.; Ralph T. Myers, Lockhaven, Penn.; Updegraff & Burkhart, Williamsport, Penn.; William F. McCarty, Nashua, N. H.; W. O. Alexander, Lakewood, O.; J. P. Wolf, York, Penn.; A. T. Rogerson, Painesville, O.; D. R. Moody, Birmingham, Ala.; Auto Exchange Company, Columbus, Ga.; S. E. Johnston, Douglas, Kan.; Michael Suttle, Newport News, Va.; G. H. Tompkins, Richmond, Va.; W. S. Aaron, Altoona, Penn.; F. W. Buchanan, Johnstown, Penn.

Chicago Wants the Convention.

The combined motorcycle clubs of Chicago are considering plans to bring the next F. A. M. convention to that city and a tentative programme already has been mapped out. It is claimed that if the convention could be brought to Chicago more riders would participate in the tours, as thousands would attend from Ohio, Indiana, Illinois, Michigan, Kentucky, Iowa, Missouri, Kansas, North and South Dakota, Minnesota and Wisconsin. The programme is formulated to cover a week and a meeting of the Chicago clubs will be held to consider it. The decision with respect to the convention seat will not be made by the F. A. M. directors for some time.

Motorcycles at Toledo Show.

At the recent automobile show at Toledo, O., there was an excellent exhibition of motorcycles, five makes being shown, as follows: Indian, Merkel, Excelsior, Henderson and Yale. The two-wheel machines attracted much attention and the dealers having the exhibits in charge reported numerous sales throughout the week. The agents for the Harley-Davidson, Thor and R-S did not show their machines because of inability to secure space from the show management. However, they report that business is good and they expect to sell more than their yearly allotment.

Growth of Bosch Production.

An accompanying chart illustrates in a graphic manner the growth of Bosch Magneto Company's business in supplying motorcycle magnetos, and inasmuch as a large majority of the American mounts are equipped with Bosch ignition it offers some indication of the growth of the industry. It is pointed out in this connection there were about the same number of manufacturers producing mounts each year, but of course the number of machines utilizing magneto ignition has been growing steadily. This is not in itself sufficient to explain the remarkable increase in the production curve, which for the fiscal year beginning July 1, 1912, shows an increase of 216 per cent. over previous seasons.

The chart indicates that previous to the present season there was disposition on the part of the motorcycle manufacturers to delay calling for shipments of ignition equipment until about Jan. 1 while the demand has been steady throughout the entire year until Jan. 1, 1913. The dotted line, as carried out, number of magnetos that have ben contracted for as to be delivered in the months indicated.

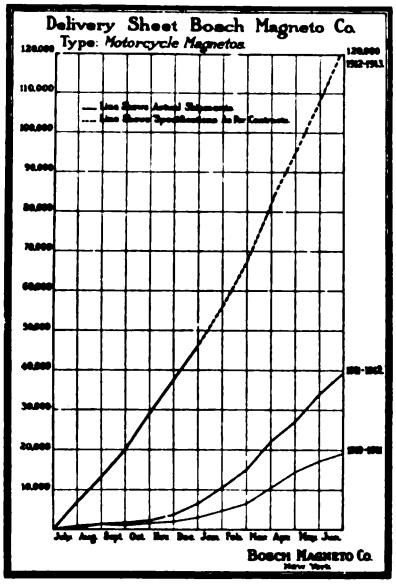


Chart Indicating Production of Bosch Motorcycle Magnetos.

Yale as Economical Transport.

Frank Bitner, a Chicago cement contractor, last year used his Yale machine almost every day in going from job to job and he reports that he found it the cheapest transportation that he could secure. Gasoline and oil were his only purchases and he averaged 78 miles on a gallon of gasoline and better than 190 miles for a gallon of lubricating oil.

INDIAN RIDERS

Cold weather is here. Motor turns over hard. Very hard work to get started. A little kerosene or gasoline injected into cylinder head will remedy this at once. A priming cup is needed in top of cylinder head as it takes too much time to take out spark plug each time. Indian riders, send at once for a finely made and finished priming cup to fit top of cylinder head of your Indian. Price, postpaid, $1 each. Money refunded if you are not satisfied.

B. A. SWENSON 522 Broad St., Cor. Blackstone St., Providence, R.I.

1913 F. N. SHAFT-DRIVE MOTORCYCLES.

Lightweight Single, with Two-Speed Gear	$275
Only Machine Built With Handle Bar Control of Clutch.	
Four-Cylinder	$300
With Handle Bar Control of Clutch	$350
Two-Speed Gear, Extra	$50

Equipment includes two brakes, footrests if desired, compound spring fork, combined luggage carrier and stand.

American F. N. Company, Boston, Mass.

Branch—415 Trumbull St., Hartford, Ct.

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The following concerns have been incorporated recently to manufacture and deal in motor cars, accessories, etc.:

Keystone Motor Supply Company, Pittsburg, Penn.; $12,000; to manufacture, sell, trade and repair motor cars; incorporators, R. V. Campbell, C. H. McDonald, E. H. Biedringhas.

Auto Adjunct Company, Melrose, Mass.; $50,000; incorporators, J. E. Knapp, A. W. Eldredge, E. J. Sanderson.

Universal Truck Company of New England, Boston; $25,000; incorporators, M. Meyers, M. E. Crable, F. L. Hewitt.

Sterling Automobile Company, Mercedes, Hidalgo County, Tex.; $10,000; incorporators, A. G. Crawford, W. D. Chadick, G. E. Simpson.

Ohio Auto Carriage Company, Cleveland, O.; $10,000; incorporators, Alfred A. Bensch, Ralph Goldsworthy, F. A. Federman.

F. P. Miller Motors Corporation, Utica, N. Y.; $5000; incorporators, Henry R. Beebe, William T. Cantwell, Arthur F. Fenner, T. Harvey Ferris, F. P. Miller.

K-W Garage, Inc., South Orange, N. J.; $25,000; general automobile business; incorporators, G. E. Krug, T. R. Were, C. L. Krug.

Gildale Motor Corporation, New York City; to deal in automobiles, etc.; $30,000; incorporators, F. W. Strauch, T. P. Gilman, Jr., E. S. Peck.

United States Tire Filler Company, Camden, N. J.; $125,000; automobiles, tires, etc.; incorporators, R. B. Patton, H. E. Patton, H. R. Gorman.

Autovend Machine Corporation, New York City; $300,000; to deal in automobiles; incorporators, E. Wrigley; A. H. Fenton, C. M. Van Deusen.

Kitto Garage, Muskogee, Okla.; $1000; incorporators, A. L. Kitto, Harry Kitto, S. V. Kitto.

Mohawk Rubber Company, Akron, O.; $350,000; to manufacture rubber goods; incorporators, R. M. Pillmore, J. K. Williams, S. S. Miller.

F. A. M. Auto Supply Company, Buffalo, N. Y.; $20,000; to deal in motor car supplies; incorporators, Frank A. Marburg, John B. Green, Richard H. Templeton.

Alco Motor Supply Company, Cleveland, O.; $10,000; to deal in motor car supplies; incorporators, M. Kluger, C. K. Halle, Frank Butler.

S. & M. Tire & Rubber Company, Akron, O.; $20,000; to deal in automobile tires; incorporators, Alois Michler, Erwin S. Kintz, Charles M. Smith.

Peterman Garage Company, Jamestown, N. Y.; $5000; to operate garage; incorporators, Otto G. Peterman, August Peterman, Myrtle S. Peterman.

Machinery & Motor Company, Quincy, Ill.; $25,000; to operate automobile repair shop; incorporators, F. H. Wilms, B. Kinsey, H. V. C. Tingley.

Ray Harroun Company, Indianapolis, Ind.; $50,000; to deal in motor cars; incorporators, Ray W. Harroun, L. R. Townsley, U. G. Baker.

Model Garage Company, Cincinnati, O.; $10,000; to operate garage; incorporators, Edward Hine, Martin Fette, Carl Reichelman, Clara Heine, Della Cottrell.

Harbor Garage & Machine Company, Indiana Harbor, Ind.; $7500; to operate garage and repair shop; incorporators, Gustave Jernberg, August Jernberg, Charles Saluski.

Park Motors Company, Columbus, O.; $30,000; to deal in automobiles; incorporators, Scott Van Etten, Charles Parkison, A. Van Etten.

Automobile Clearing House Company, Cincinnati, O.; $2500; to deal in motor cars; incorporators, Thomas A. Reilly, Edwin P. Bernardi, Samuel D. Bromley.

Detroit Flash Curtain Company, Detroit; $25,000; to manufacture motor car curtains; incorporators, Fred J. Schaffer, William H. Goodfellow, Harry M. Vaughn.

WITH THE MANUFACTURERS.

R. M. Hawkins, formerly assistant purchasing agent of the Standard Welding Company, Cleveland, O., maker of Stanweld rims, etc., has resigned his position.

The Pierce-Arrow Motor Car Company, Buffalo, N. Y., maker of Pierce-Arrow cars, announces that the Iowa Auto & Tire Company, Davenport, Ia., which handled the company's product at Davenport up to 1911, no longer represents the company, the present distributor being the Mason Carriage Works of that city.

The Bosch Magneto Company, New York City, announces the appointment of the following new distributors: Doubleday-Hill Electric Company, 719-721 Liberty avenue, Pittsburg, Penn.; Motor Parts Company, 185-187 Columbus avenue, Boston, Mass.; Phoenix Automobile Supply Company, 3974-76 Olive street, St. Louis, Mo.

The Packard Motor Car Company, Detroit, maker of Packard cars, has purchased a plot of land at Locust and 22d streets, St. Louis, Mo., through its local agent, the Halsey Automobile Company. It is understood to be intended for service station purposes.

C. Robert Hoyme, prominent on the Philadelphia automobile row for seven years, has been appointed manager of the Alco branch in that city by the American Locomotive Company, New York City, maker of Alco trucks and pleasure cars. Mr. Hoyme previously was sales manager of the International Motor Company's branches at Philadelphia, Baltimore and Washington, and before that was associated with the Autocar Company, Ardmore, Penn., maker of the Autocar line.

Forrest M. Keeton, president of the Keeton Motor Company, Detroit, maker of Keeton machines, announces the appointment of P. L. Lovelace as foreman of the painting department and John Andre as foreman of the trimming department. Both formerly held similar positions with the Packard Motor Car Company, Detroit, maker of Packard cars.

The Kelly-Springfield Motor Truck Company, Springfield, O., has moved its New York City branch to 239-241 West 56th street, where it is in charge of A. S. Holly.

The Cataract Rubber Company, Boston, Mass., maker of Cataract tires, intends soon to open a branch at New York City. The branch recently established at Providence, R. I., to handle all of the Rhode Island business, was the third step in the company's plan to cover the country with distributing stations for its product.

Edward J. Samuels, who has been head of the publicity department of the Goodyear Tire & Rubber Company, Akron, O., maker of Goodyear tires, has gone to London, England, where he will take up the same line of work for this company. Mr. Samuels has been very successful in this country and the Goodyear executives expect excellent results in his new field.

R. Cairncross Campbell, former manager of the Adams Bagnall Company, Philadelphia, sailed for London recently to become assistant manager to F. S. Bennett of the Buick and Oakland branch of the General Motors Export Company.

D. F. Kallah, general manager of the Hartford Auto Parts Company, Hartford, Conn., for the past four years, has resigned to enter a new field of business.

The Findeisen & Kropf Manufacturing Company, 21st and Rockwell streets, Chicago, maker of Rayfield carburetors, has established new branches at 1140 Michigan

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boulevard, Chicago; 1902 Broadway, New York City and 997 Woodward avenue, Detroit, Mich.

W. P. Dean has formed the Keeton Motor Company of New England to distribute throughout that territory the product of the Keeton Motor Company, Detroit. Mr. Dean was manager of the Detroit branch of the Olds Motor Works, Lansing, Mich., maker of Oldsmobiles, from 1908 to 1911. He has already placed agencies for Keeton cars at Bridgeport and Hartford, Conn.; Providence, R. I.; Worcester, Mass., and other cities.

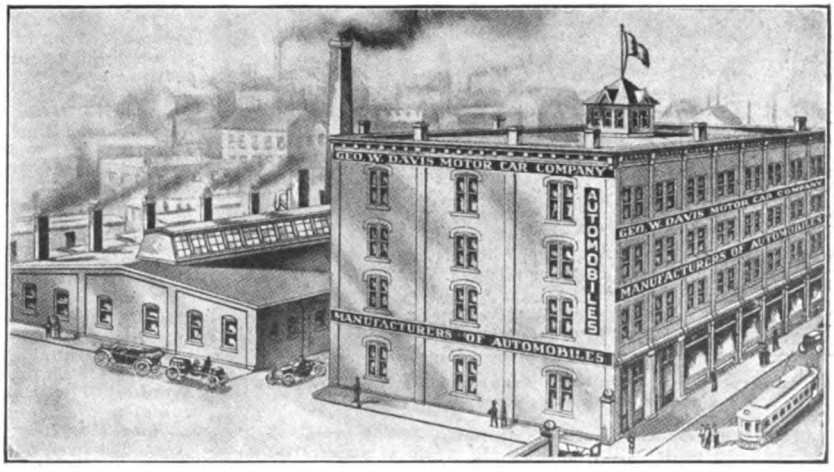
The Marathon Motor Works, Nashville, Tenn., maker of Marathon cars, has plans under way for one of the finest club buildings in the south. It will be used expressly for the employees of the plant and will have all the conveniences of the best clubrooms in the city. Among the many attractive features offered will be a well-equipped gymnasium, a large concrete swimming pool, tub and shower baths, billiard room, large parlor, library room with a liberal supply of the best and latest books and magazines, and a spacious ball room that may be converted into a banquet hall when occasion demands.

The Kelly-Springfield Motor Truck Company, Springfield, O., maker of Kelly-Springfield trucks, has announced the appointment of Henry Schmidt as manager of its new branch at Seattle, Wash. Mr. Schmidt was formerly connected with the Packard selling organization at Seattle for a number of years.

Charles Drum, connected until recently with the production department of the Packard Motor Company, Detroit, maker of Packard trucks and pleasure cars, has become production manager of the Keeton Motor Company, Detroit, maker of Keeton cars.

The Findeisen & Kropf Manufacturing Company, Chicago, maker of Rayfield carburetors, recently held the annual meeting and booster dinner of its sales and service departments at the New Southern hotel, Chicago. Carburetion in all its phases was discussed and much enthusiasm for Rayfield success was demonstrated.

The George W. Davis Motor Car Company, Richmond, Ind., is well equipped for the manufacture of the Davis car, which was displayed for the first time in the East at the recent New York show. An accompanying illustration presents the plant, which is modern in every particular, being equipped with all the latest devices known to the science of metallurgy. Men of national reputation in the industry are in charge of the production of the Davis automobiles, insuring a high class product.



Factory of George W. Davis Motor Car Company, Richmond, Ind.

The Russell M. Seeds Company, Indianapolis, Ind., a well known advertising agency in that city, has removed to more commodious quarters in the Central Union Telephone building, New York and Meridian streets. Rooms 402-417 are being occupied with general entrance at 403.

The Federal Rubber Manufacturing Company, Milwaukee, Wis., has established a factory branch at 361 Golden Gate avenue, San Francisco, and patrons of the company will be given first class service. E. L. Rettig, Pacific Coast manager of the company, is in charge.

The Ernest Lee Machine Company, Cleveland, O., manufacturer of automobile accessories, has plans for the erection of a new factory to cost about $15,000.

J. W. Mount & Co., Red Bank, N. J., maker of automobile bodies, is having a large addition erected to its factory, at the corner of Maple avenue. This is expected to care for the large growth of business which the firm has enjoyed during the last few months.

E. F. Howell is in charge of the new factory branch established by the Chase Motor Truck Company, Syracuse, N. Y., maker of Chase trucks, at 3607 Lancaster avenue, Philadelphia, Penn.

The McNaul Auto Tire Company, Toledo, O., has moved into the three-story building on Superior street and the entire structure will be remodelled to facilitate the manufacture of a tire with an extra heavy tread.

The Moore Truck & Manufacturing Company has been formed at Detroit and will locate in the Debo building on First street. The company will manufacture the Moore patent barrel truck.

The Abendroth & Root Manufacturing Company, Newburg, N. Y., maker of motor trucks, has opened a branch factory and salesroom at 237 Halsey street, Newark, N. J. A. C. Bogardus of Montclair, N. J., is manager of the plant.

The McVey Manufacturing Company, Dayton, O., maker of automobile accessories, with a capital stock of $60,000, is planning to enlarge its factory.

GARAGE AND DEALER.

The Van Winkle Motor Truck Company, Atlanta, Ga., has opened a factory sales office and service branch at 39 Houston street. I. B. Lawton is general sales manager.

F. W. Ramm & Sons, operating a garage at St. Petersburg, Fla., has decided to incorporate in order that a larger and more complete establishment can be maintained to care for increasing business. The capital will be $100,000 and many of the leading business men of the South have taken stock.

The Universal Motor Truck Company, Cleveland, O., is a strong addition to the automobile houses of that city. The sales and service departments are located at 2352 Euclid avenue. C. W. Moody is general manager and M. J. O'Connor and J. A. Boyd will have charge of the sales department.

The Belcher & Loomis Company, 89 Weybosset street, Providence, R. I., is admirably located in the centre of the city, where it maintains a general agency for a wide variety of automobile accessories and supplies. Inasmuch as the store is on the direct line of travel for visiting motorists there is abundant reason for calling attention to the products handled by the concern in attractive window displays. An accompanying illustration presents the manner in which this important feature of the business is conducted.

Joseph A. Hill and Charles L. Vermylea of Catskill, N. Y., have leased a building on West Bridge street which will be entirely remodelled for a first class garage to be operated as the Peerless Garage Company.

James W. Stockard and J. B. Church, managers of the International Auto Company, El Paso, Tex., are having a new building erected on Campbell street, in which they will handle automobiles and accessories.

A. Spencer Wright has opened a first class garage on Prospect street, Oneonta, N. Y. A large workroom for repairing is located in the rear.

Weaver & Wittle, Lebanon, Penn., have opened a first class garage and machine shop in Walnut alley. In addition a repair shop will be operated.

The Ozark Motor Company, Springfield, Mo., has been incorporated with a capital stock of $5000 and will be located at 231 South Jefferson street.

The St. Joseph Automobile Company, St. Joseph, Mo., of which Louis M. Pierce and C. W. Davis are the managers, will occupy and maintain a large modern garage on Ship street, for which a building was recently erected.

The Pugh Motor Car Company, Kingston, Penn., has leased its garage to W. B. Buckley and H. E. Drews, who will in the future conduct the business at 592-594 Market

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street under the style of the Kingston Motor Car Company.

The City Garage, Norfolk, Va., has installed a vulcanizing plant and in addition will handle the Thermoid Rubber Company's Nassau tires.

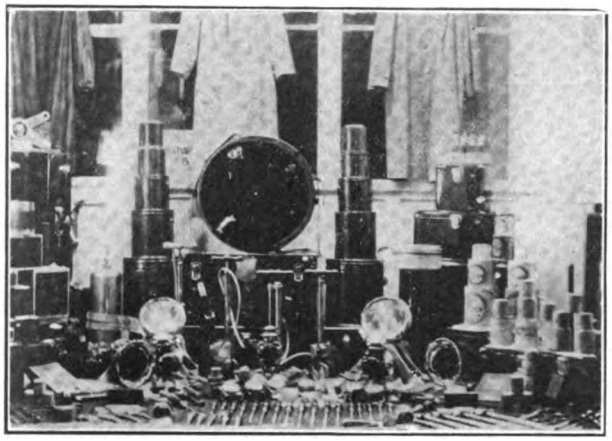
C. W. Moody, formerly with the Nyberg Automobile Works, Anderson, Ind., maker of Nyberg cars, and John Clark, formerly superintendent for the company, will open a new garage in the Zeigler building at Anderson.

The Oklah Garage has been moved from its present quarters at 313 to 317 Keeler avenue, Bartlesville, Okla., and the garage feature will be discontinued. Instead a supply store will be opened, equipped with automobile parts and several good makes of cars will be handled.

Dayre Courtney has opened a garage and automobile supply house on Main street, New London, Ia. He will handle several makes of cars and carry a full line of automobile accessories.

Frank Cook of Lakewood, N. J., has taken over the garage in that place formerly operated by the McCue & Beecroft Company. He will handle all kinds of automobile supplies.

Jones & Williams, owner of the Beaumont Garage & Machine Company, Beaumont, Cal., is erecting a new garage on D street, which is nearly ready for occupancy.



Attractive Show Window Arranged by the Belcher & Loomis Company, Providence, R. I.

The Warner Automobile Company, Watertown, N. Y., has sold its entire interests at 155 Arsenal street to Perl W. DeVendorf. Mr. DeVendorf has secured the agency for the Ford cars, made by the Ford Motor Company, Detroit.

The Mt. Pleasant Garage, Harrisburg, Penn., recently known as the Broadway garage and located at 1358 Thompson street, has changed hands and will resume its former name.

The Colonial Motor Company, Baltimore, Md., distributor for Studebaker cars and Universal trucks, has opened a new fireproof garage on North avenue.

The Morristown Auto Company, Morristown, N. J., recently incorporated with capital stock of $25,000, has located its office at 34 Pine street, with A. Newmark in charge as manager.

The J. S. Hoffman Motor Car Company, Sharon, Penn., has occupied a new garage recently erected at the corner of Vine street. The Chalmers and Overland cars will be handled.

The Modern Garage Company, Titusville, Penn., will soon occupy a new garage, which is now in course of completion on Central avenue.

The Anderson Automobile Company, Lancaster, O., located in the Keller building, is making improvements to its garage.

The Herring Motor Company, Des Moines, Ia., has moved into its new building on West 10th street, which was recently erected at a cost of $100,000. The company is wholesale jobber of automobile accessories and supplies.

Samuel A. Yout, Little Rock, Ark., has purchased the automobile business formerly conducted by the Reinman & Wolfory Auto Company of that city, and will operate it under the name of Arkansas Auto Exchange. The garage on Third street will be remodelled.

Walter Miller has opened a new garage on Broadway, Davenport, Ia. A complete repair shop has been installed and Mr. Miller will do all kinds of automobile, motorcycle and bicycle repairing.

C. O. Donner, Alexandria, Minn., has purchased the entire stock in the Alexandria Auto Company, held by his partner, J. A. Bailey, and will continue the business under its original name.

Donald MacFarlane, who conducts an automobile repair business at Berkeley, Cal., has been forced to enlarge his plant because of additional business.

The Two Republics Garage, Texas street, El Paso, Tex., is being enlarged by the erection of a substantial addition.

Newton B. Smith of New Brunswick, N. J., has opened a new garage in that city at 222 Nelson street. He will do repair work of all kinds and handle the Marion and Studebaker cars.

The Sims Automobile Company, Grand Forks, N. D., has opened a garage at Park River, with Clement Woods, formerly of Grafton, in charge as manager.

The R. M. Allen Motor Sales Company, 1924 Euclid avenue, Cleveland, O., has been formed to handle the Velie and Paige lines.

The Birmingham Motor Company, Birmingham, Ala., will soon occupy a new garage on Avenue C, which will be equipped with a modern repair shop.

The Keystone Garage Company, Altoona, Penn., has opened an up-to-date garage on 11th avenue. A repair shop also has been installed.

The Elgin Motor Company, Elgin, Ill., has been formed to conduct a modern garage, supply house and automobile agency and has located on Spring and Milwaukee streets. The agency for several well known makes of cars has been secured.

Albert Rhyan and Arthur Carbary of Lafayette, Ind., have opened a new garage and repair shop at South and Main streets, to be known as the Oakland garage.

The Boyett-Brannon Tractor Company, 70 South Forsythe street, Atlanta, Ga., announces that it will for the present manufacture its motor tractors by contract.

The Hanover Garage on Abbottstown street, Hanover, Penn., will soon be enlarged, the business having greatly increased under the management of Robert E. Spangler.

The Southern Auto & Equipment Company, Atlanta, Ga., has established a business at 94 South Forsythe street. In addition to doing repair work a full line of supplies and accessories will be carried.

The Steinbach Company, Asbury Park, N. J., is erecting a garage adjoining its present establishment on Bangs avenue. The company handles the Mack and Flanders vehicles.

The Rustling Stone Company, Irvington, N. J., has erected a new garage at 152 Shaw avenue, equipped with modern appliances.

The A. P. Tire & Vulcanizing Company, Asheville, N. C., has established business in the Arbogast Motor Company's building on North Main street. The company will deal in automobile tires and rubber goods and has also installed a rectifying apparatus for charging storage batteries.

The Adams Garage, 306 Franklin street, Natchez, Miss., has been sold to the Motor Repair Exchange and the business will be merged and conducted at the same address.

The Streaker Implement Company, Bellevue, O., has taken the agency for Studebaker cars, made by the Studebaker Corporation, Detroit, Mich., and will remodel the building on West Main street.

Dr. H. A. Davis has sold his interest in the Dickinson Motor Car Company, Dickinson, N. D., and that concern is now under the management of Wilcox & Clark.

The Dell Rapids Auto & Supply Company, Dell Rapids, S. D., has outgrown its plant and is building extensive additions.

The Stewart Automobile Company, 231 West 54th street, New York City, has taken the agency for the Pullman cars, made by the Pullman Motor Car Company, York, Penn. A service station has been established and all parts of the Pullman machines are carried in stock.

The Abbott Motor Sales Company, Toledo, O., of which L. E. Barger is manager, has made arrangements to occupy its new building at Madison avenue and 15th street. Its former quarters were at 623 Madison avenue.

The Central Garage, recently established by Frank Cliber and Andrew Stone, Jr., at Hollidaysburg, Penn., has been opened to the public and is enjoying generous patronage. The garage is modern in all particulars and the structure is fireproof.

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COMING EVENTS.

February.

Feb. 8-15—Show, Hartford, Conn.
Feb. 10-15—Show, Minneapolis, Minn.
Feb. 10-15—Commercial car show, Chicago, Ill.
Feb. 10-15—Show, Ottawa, Can.
Feb. 11-15—Show, Binghamton, N. Y.
Feb. 15-22—Show, Richmond, Va.
Feb. 15-22—Show, Albany, N. Y.
Feb. 15-22—Show, Newark, N. J.
Feb. 17-22—Pleasure car show, Kansas City, Mo.
Feb. 17-22—Show, Portland, Me.
Feb. 19-22—Show, Davenport, Ia.
Feb. 19-23—Show, New Orleans, La.
Feb. 20-March 1—Show, Toronto, Can.
Feb. 22-March 1—Show, Brooklyn, N. Y.
Feb. 24-27—Commercial car show, Kansas City, Mo.
Feb. 24-March 1—Show, Omaha, Neb.
Feb. 24-March 1—Pleasure car show, Cincinnati, O.
Feb. 24-March 1—Show, St. Louis, Mo.
Feb. 24-March 1—Show, Memphis, Tenn.
Feb. 24-March 1—Show, Paterson, N. J.
Feb. 24-March 1—Show, Bangor, Me.
Feb. 25-28—Show, Eau Claire, Wis.
Feb. 25-March 1—Show, Syracuse, N. Y.
Feb. 26-March 1—Show, Glen Falls, N. Y.

March.

March 1- 8—Show, Pittsburg, Penn.
March 3- 8—Commercial car show, Cincinnati, O.
March 3- 8—Show, Sioux City, Ia.
March 3- 8—Pleasure car show, Des Moines, Ia.
March 3- 8—Show, Bridgeport, Conn.
March 5- 8—Show, Louisville, Ky.
March 8-15—Pleasure car show, Boston, Mass.
March 10-15—Commercial car show, Des Moines, Ia.
March 12-15—Show, Ogdensburg, N. Y.
March 17-22—Commercial car show, Buffalo, N. Y.
March 19-26—Commercial car show, Boston.
March 24-29—Show, Indianapolis, Ind.

Goodyear tires, made by the Goodyear Tire & Rubber Company, Akron, O., were regular equipment on 142 of the 329 cars displayed at the recent New York automobile show. Goodyear tires were, on the average, displayed on one-third of the cars exhibited during 1912 at the automobile shows throughout the country, it is claimed, and the increase this year indicates the growing popularity of this make.



"There's Where YOU Are Wise!

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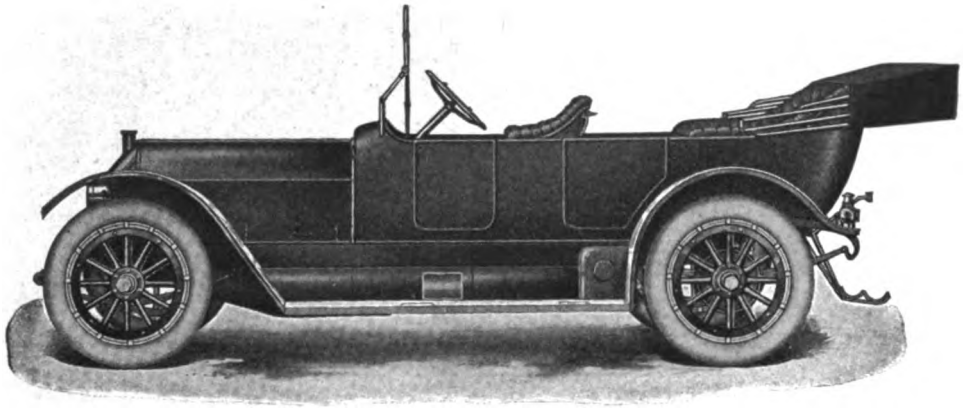
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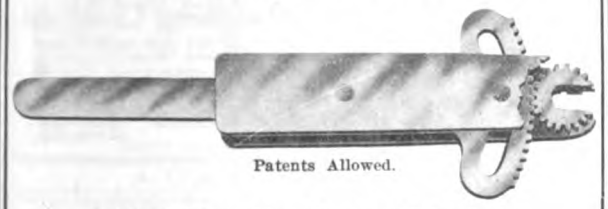
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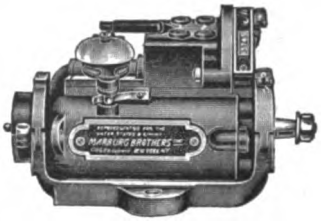
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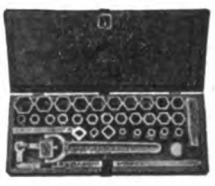
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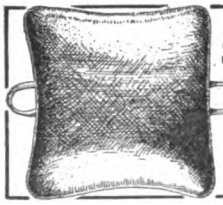
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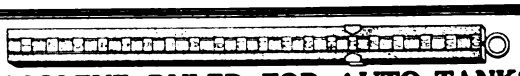
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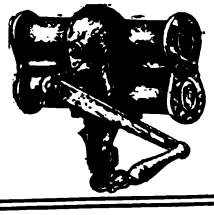
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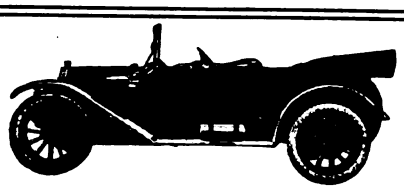
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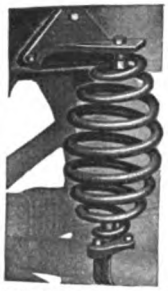
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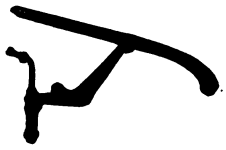


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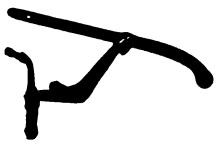
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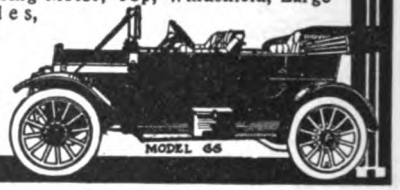
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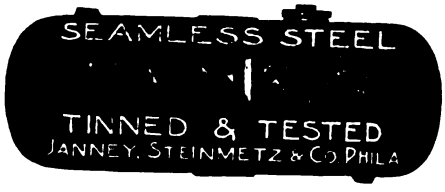
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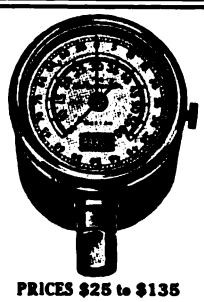
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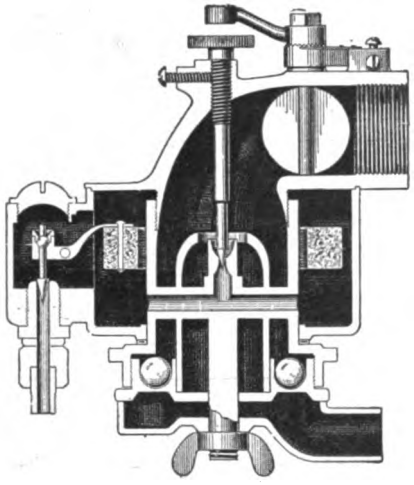
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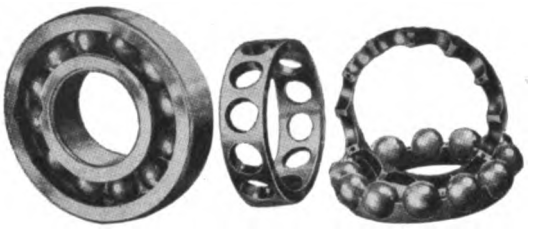
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Texas Company, The, 7 West St., New York.
Branches: Boston, Philadelphia, Chicago, St. Louis, Norfolk, Atlanta, New Orleans, Dallas, El Paso, Pueblo, Tulsa, Houston.

Vacuum Oil Co., Rochester, N. Y. (Mobiloil.)
Branches: 49 Federal St., Boston; 29 Broadway, New York; Fourth and Chestnut Sts., Philadelphia; 154 Exchange St., Bangor, Me.; 406 Hitchcock Bldg., Springfield, Mass.; 117 Commercial St., Portland, Me.; Fisher Bldg., Chicago; Ford Bldg., Detroit; Indiana Pythian Bldg., Indianapolis.

Valvoline Oil Co., 27 State St., Boston. (Valvoline.)

MAGNETOS AND SUPPLIES.

Bosch Magneto Co., 223-225 W. 46th St., New York.

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CLASSIFIED BUYERS' GUIDE—Continued

Branches: 119-121 E. 24th St., Chicago; 1250 Woodward Ave., Detroit; 357 Van Ness Ave., San Francisco.

Bretz Co., J. S., 250 W. 54th St., New York. (U. & H.)

Marburg Bros., 1786 Broadway, New York. (Mea.)

Remy Electric Co., Anderson, Ind. (Remy.)

Splitdorf Electrical Co., 98 Warren St., Newark, N. J.
Branches: 10-20 W. 63rd St., New York; 1110 S. Michigan Ave., Chicago; Mass. Ave. & St. Germain St., Boston; 430-36 Van Ness Ave., San Francisco; 868 Woodward Ave., Detroit; 1226 S. Olive St., Los Angeles, Cal.; S. W. Cor. Cherry & Juniper Sts., Philadelphia; 1823 Grand Ave., Kansas City; Seattle, Wash.; London, Eng.; Buenos Ayres.

MEASURES.

Dover Stamping & Manufacturing Co., Cambridge, Mass. (Auto and Savol.)

MIXING DEVICES, GASOLINE.

Royal Equipment Co., 422 Housatonic Ave., Bridgeport, Conn. (Gyrex.)

MOTORCYCLES AND SUPPLIES.

American F. N. Co., Boston. (F. N.)
Branches: 49 Union St., Providence; 415 Trumbull St., Hartford, Conn.

Emblem Manufacturing Co., Angola, N. Y. (Emblem.)
Branches: Los Angeles, San Francisco.

Hawthorne Manufacturing Co., 29 Spruce St., Bridgeport, Conn. (Old Sol Lamps.)

Miami Cycle & Manufacturing Co., 320 Hanover St., Middletown, O. (Flying Merkel.)

Swenson, B. A., 522 Broad St., Cor. Blackstone St., Providence. (Indian.)

MOTORING ORGANIZATIONS.

Federation American Motorcyclists, E. M. Estabrook, Bangor, Me.

MOTORS AND POWER PLANTS.

Rutenber Motor Co., Marion, Ind. (Rutenber.)

PATCHES.

National Motor Supply Co., 1911 Euclid Ave., Cleveland.

POLISH.

International Metal Polish Co., Quill St. and Belt R. R., Indianapolis, Ind. (Blue Ribbon.)

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The Automobile Journal, 24 issues, $1.00 the year.

The Motor Truck (Commercial Car) Monthly, $1.00 the year.

The Accessory and Garage Journal, Monthly, $1.00 the year.

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PUMPS, OIL AND GREASE.

Randall-Faichney Co., Boston. (B-Line.)
Branches: See Horns.

PUMPS, TIRE.

Dewey-Anderson Co., Toledo, O. (Dewey Power.)

Hawthorne Manufacturing Co., Inc., 29 Spruce St., Bridgeport, Conn. (Hawthorne.)

RIMS—REMOVABLE AND DETACHABLE.

Boyd, F. Shirley, 903 Boylston St., Boston. (Dorian.)

Firestone Tire & Rubber Co., Akron, O.
Branches: In all principal cities.

United States Tire Co., Broadway and 58th St., New York. (Continental and Whittlesey Demountable.)
Branches: New York, Chicago, San Francisco.

ROAD BUILDING MATERIALS.

Barrett Manufacturing Co., New York. (Tarvia.)
Branches: Chicago, Philadelphia, Boston, St. Louis, Cleveland, Pittsburg, Cincinnati, Kansas City, Minneapolis, New Orleans, Seattle, London, Eng.; Montreal, Toronto, Winnipeg, Vancouver, Can.; St. John, N. B.; Halifax, N. S.

SELF-STARTERS.

National Gas Engine Starter Co., 30-32 N. Dearborn St., Chicago. (National.)

Willard Storage Battery Co., 5716 Euclid Ave., Cleveland. (LBA.)
Branches: See Batteries.

SHOCK ABSORBERS AND SUPPLEMENTARY SPRINGS.

Boyd, F. Shirley, 903 Boylston St., Boston.

"J-M" Shock Absorber Co., 210 So. 17th St., Philadelphia. ("J-M.")
Branches: 218 W. 84th St., New York; 222 Eliot St., Boston; Teck Building, Buffalo; 10 W. Eager St., Baltimore; 41 Dexter St., Pawtucket, R. I.

Sager Co., J. H., 271 South Ave., Rochester, N. Y. (Peerless.)

Sumner, George, Inc., 1841 Broadway, New York. (Velvet Auxiliary.)

SOAPS.

Hopewell Brothers, Newton, Mass. (Paos.)
Branch: 1974 Broadway, New York.

SOLDERS.

Simplex Aluminum Solder Co., 108 Broadway, Long Island City, N. Y. (Simplex.)

SPARK PLUGS AND IGNITERS.

Bosch Magneo Co., 223-225 W. 46th St., New York.
Branches: See Magnetos and Magneto Supplies.

Frontier Specialty Co., 734 Main St., Buffalo. (All-in-One.)

Heinze Electric Co., Lowell, Mass. (H. E. Co. Priming.)

Janney, Steinmetz & Co., Philadelphia.

Mosler, A. R., & Co., P. O. Box M, Mt. Vernon, N. Y. (Spit Fire.)

Randall-Faichney Co., Boston. (Mac-Kae.)
Branches: See Horns.

Splitdorf Electrical Co., 98 Warren St., Newark, N. J.
Branches: See Magnetos and Magneto Supplies.

Standard Co., The, Torrington, Conn. (Black Eagle.)

SPARK PLUG TERMINALS.

Randall-Faichney Co., Boston. (Mac-Kae Blitz.)
Branches: See Horns.

SPEEDOMETERS.

Hoffecker Co., The, Motor Mart, Boston. (Hoffecker.)

Jones Speedometer, New Rochelle, N. Y.
Branches: Broadway and 76th St., New York; 109 Massachusetts Ave., Boston; 1416 Vine St., Philadelphia; 1430 Michigan Ave., Chicago; 852 Main St., Buffalo; 253-255 Jefferson Ave., Detroit; 530 Golden Gate Ave., San Francisco; 1229 So. Olive St., Los Angeles, Cal.; 329 Ankeny St., Portland, Ore.; 917 E. Pike St., Seattle, Wash.

Warner Instrument Co., 1221 Wheeler Ave., Beloit, Wis. (Auto-Meter.)
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SPRINGS FOR AUTOMOBILE SUSPENSION.

Marburg Bros., Inc., 1786 Broadway, New York. (Marburg-Hagen.)

Perfection Spring Co., No. 1 Plant, 2414 Superior Ave., N. W.; No. 2 Plant, East 65th and Central Ave., Cleveland.

SPROCKETS.

Boyd, F. Shirley, 903 Boylston St., Boston. (Baldwin.)

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Standard Welding Co., Cleveland.

STORAGE SYSTEMS—GASOLINE AND OIL.

Janney, Steinmetz & Co., Philadelphia.

Scaife & Sons Co., Wm. B., Pittsburg, Penn.
Branch: New York City.

SWITCHES, LOCK.

Blackburn Specialty Co., 1120 Prospect Ave., S. E., Cleveland. (Autolock.)

TANKS, ACETYLENE GAS.

Prest-O-Lite Company, 271 East South St., Indianapolis. (Prest-O-Lite.)
Branches: See Cylinder Cleaning Compound.

TANKS FOR FUEL AND WATER.

Janney, Steinmetz & Co., Philadelphia.

Scaife & Sons Co., Wm. B., Pittsburg, Penn.
Branch: New York City.

TANKS, TIRE INFLATING.

Prest-O-Lite Co., 271 East South St., Indianapolis. (Baby Tire Filler, The Emancipator.)
Branches: See Cylinder Cleaning Compound.

THERMOS CASES.

Dover Stamping & Manufacturing Co., Cambridge, Mass.

TIRE ACCESSORIES.

Firestone Tire & Rubber Co., Akron, O.
Branches: See Rims—Removable and Detachable.

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TIRE CASES.

Hopewell Brothers, Newton, Mass. (Hopewell.)
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TIRE CHAIN GRIPS. (See Chains.)

TIRE PRESERVATIVES AND PROTECTORS.

Gray Specialty Co., 148 Avon Ave., Newark, N. J.
National Rubber Co., 4433 Papin St., St. Louis, Mo. (Tirenew.)
Page-Lester Co. 2644 Indiana Ave., Chicago. (Tite-Wad Rubber Putty.)

TIRES—CASINGS AND INNER TUBES.

Diamond Rubber Co., Akron, O. (Diamond.)
Firestone Tire & Rubber Co., Akron, O. (Firestone.)
Branches: See Rims—Removable and Detachable.
Fisk Rubber Co., Chicopee Falls, Mass. (Fisk.)
Branches: 811-813 Boylston St., Boston; 17½ Dorrance St., Providence.
Frontier Tire & Rubber Co., 1054 Main St., Buffalo, N. Y. (Frontier.)
Goodyear Tire & Rubber Co., Madison St., Akron, O. (No-Rim-Cut.)
Branches: In all principal cities.
Hood Rubber Co., Watertown, Mass. (Shawmut.)
United States Tire Co., Broadway and 58th St., New York. (Continental, G & J, Hartford, Morgan & Wright.)
Branches: See Rims—Removable and Detachable.

TIRES—CUSHION.

Cataract Rubber Co., Wooster, O. (Cataract.)
Branches: Boston, New York, Providence.
Firestone Tire & Rubber Co., Akron, O. (Firestone.)
Branches: See Rims—Removable and Detachable.
Motz Tire & Rubber Co., The, Akron, O. (Electric Special Motz Cushion.)
Branches: Boston, New York, Philadelphia, Pittsburg, Chicago, Kansas City, Detroit, Cleveland, Los Angeles.

TIRES—MOTORCYCLE.

United States Tire Co., Broadway and 58th St., New York. (Morgan & Wright. G & J.)
Branches: See Rims—Removable and Detachable.

TIRES—SOLID AND COMMERCIAL.

Diamond Rubber Co., Akron, O. (Diamond.)
Firestone Tire & Rubber Co., Akron, O.
Branches: See Rims—Removable and Detachable.
Fisk Rubber Co., Chicopee Falls, Mass.
Branches: See Tires—Casings and Inner Tubes.
Motz Tire & Rubber Co., The, Akron, O. (Motz.)
Branches: See Tires—Cushion.
Republic Rubber Co., Youngstown, O. (Republic.)
United States Tire Co., Broadway and 58th St., New York.
Branches: See Rims—Removable and Detachable.

TOPS AND ATTACHMENTS.

Springfield Metal Body Co., 20 Medford Ave., Springfield, Mass.

TROUBLE FINDERS.

Hopewell Brothers, Newton, Mass. (Vibrator.)
Branch: 1974 Broadway, New York.

TRUCKS—See Cars, Commercial.

TRUNK RACKS.

Connecticut Steel & Wire Co., Hartford, Conn.

TURNTABLES.

Beach Co., T. C., 108 Ottawa St., St. Johns, Mich. (Beach.)
Canton Foundry & Machine Co., Canton, O. (Universal.)

UNIVERSAL JOINTS.

Bretz Co., J. S., 520 W. 54th St., New York. (Hartford.)
Kinsler-Bennett Co., The, P. O. Box 124, Hartford, Conn. (Kant-Break.)

VALVE GRINDERS.

Wall, J. H., 200 Hope St., Bristol, R. I. (Ford.)

VULCANIZERS.

McVey Manufacturing Co., Third and Canal Sts., Dayton, O. (McVey.)
National Motor Supply Co., 1911 Euclid Ave., Cleveland. (Garage and Individual.)
Branches: In all principal cities.
Williams Foundry & Machine Co., Akron, O.

WELDING OUTFITS.

Prest-O-Lite Co., 309 W. South St., Indianapolis. (Prest-O-Welder.)
Branches: See Cylinder Cleaning Compound.

WELDING, STEEL.

Standard Welding Co., Cleveland.

WHEELS.

Eberly & Orris Mfg. Co., Mechanicsburg, Penn.

WIRES AND CABLES.

Diamond Rubber Co. of N. Y., Akron, O. (Diamond.)

WIRE MECHANISM.

Bretz Co., J. S., 250 W. 54th St., New York. (Bowden.)

WRENCHES AND COMBINATION OUTFITS.

Coes Wrench Co., Worcester, Mass.
Cutter, George A., Taunton, Mass.
Walworth Manufacturing Co., Boston. (Stillson.)

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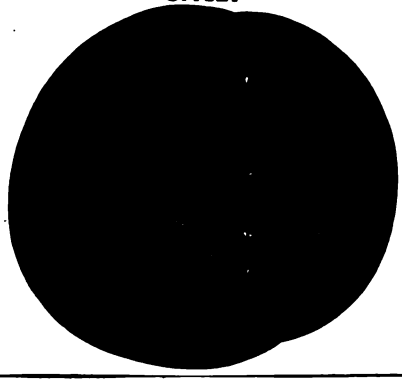
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"OFFSET"



"ROUND"



"LIMOUSINE"



Primarily intended for use inside the bodies of large enclosed cars, and for such use its case can be given a variety of fine finishes. It also makes an attractive clock for use on dashboards. Only made in 2¾-inch size.

The Justly CELEBRATED 8-Day, High-Grade "CHELSEA" AUTO CLOCK (*Trade-mark*)

NOW and for YEARS the RECOGNIZED STANDARD of EFFICIENCY

Clocks built with a view to stand the jars and jolts and rough riding of Automobiles. Reputation the highest. Used by parties demanding the BEST.

☞ ALL SIZES STATED ARE THE APPROXIMATE DIAMETERS OF THE DIALS.

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The 3½ MOTOR "OFFSET" is likely to prove a quick, ready seller. Very attractive.

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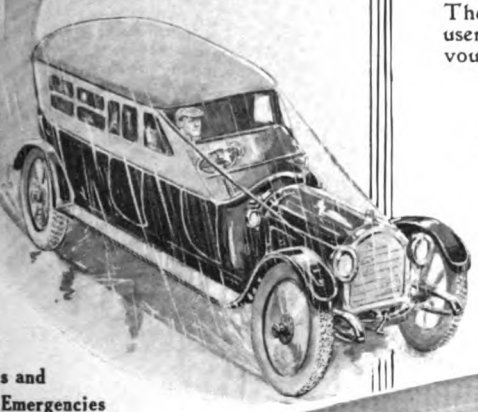
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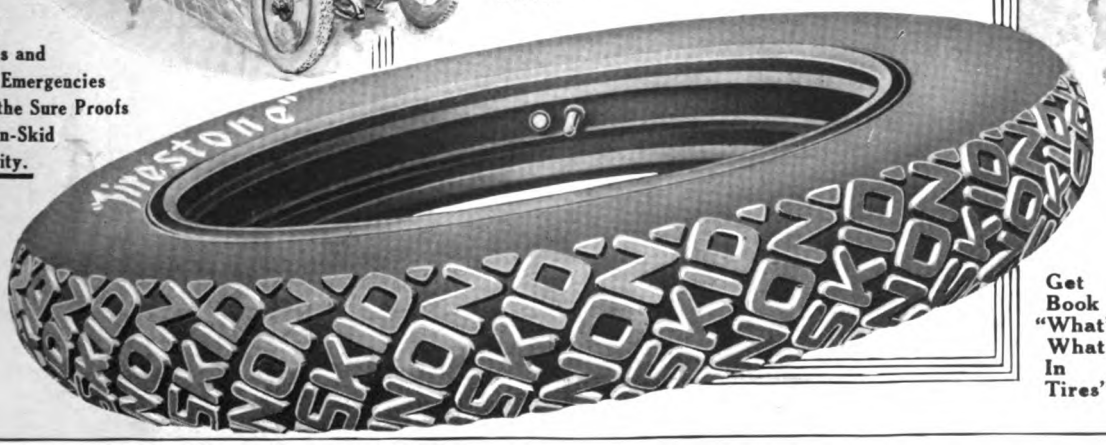
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All Principal Cities



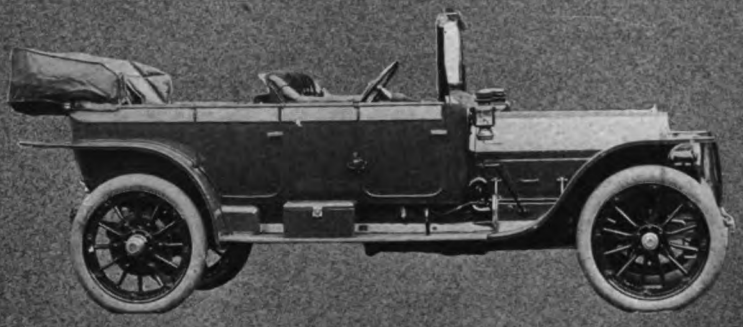
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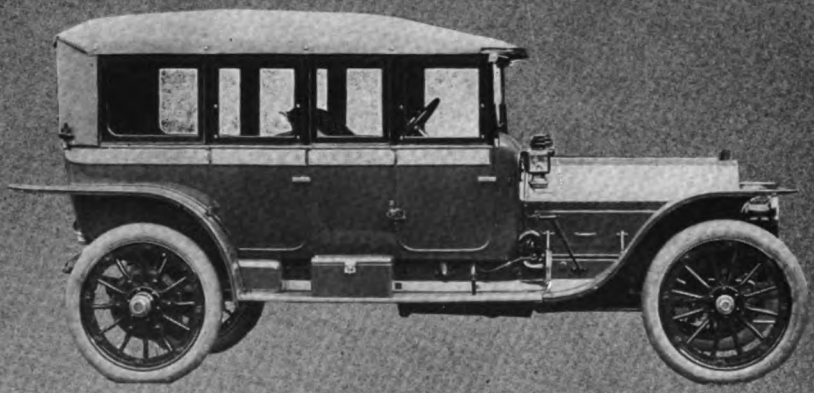
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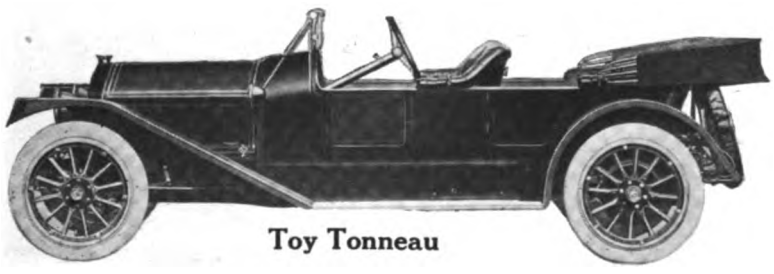
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As you sit at the wheel of the *National* you experience that complete confidence which comes only to the man who feels himself the perfect master of great power. No hill is too steep, no road too heavy, no emergency too sudden—for the *National.*

In addition, the *National* represents the highest possible development of *luxury* in motor car manufacture. Every little detail which in any way can make for greater *comfort* has been cared for.

Truly, the *National* is a car of superb power, luxurious comfort and graceful beauty—sold at a remarkably moderate price. We have an intensely interesting book which tells the whole story. It is called *"National 40"*, and is *free to you.*

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30 Horsepower
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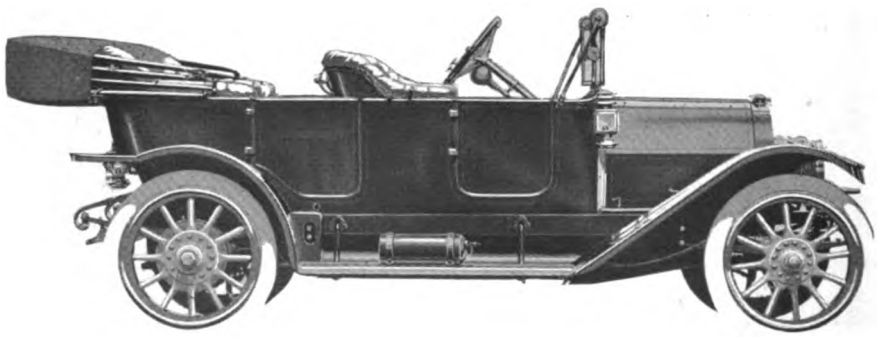
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Prest-O-Lite Tank

THERE is over $3,000,000 worth of the most modern automatic machinery in the Overland factories. Such equipment as this makes it possible for us to make the average $1,200 car for $985. We have one department which does nothing but take out and sell machinery replaced by more improved types. Let this simple arithmetic sink in: The installation of new machinery costing $100,000 means $20 per car to a maker of 5000 cars; to us it means but $2.50.

Think that over and you will realize why the car, described above is possible.

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INDEX TO ADVERTISERS



American F. N. Company..... 93
Austin Automobile Co.....105
Barrett Manufacturing Co.....106
Beach Co., T. C.....106
Borne, Scrymser Company.....108
Bosch Magneto Company..... 3
Boston Automobile Dealers' Ass'n. 8
Boyd, F. Shirley.....100
Bretz Company, The J. S.....103
Broadway Central Hotel.....103
Buckeye Manufacturing Co.....106
Cameron Mfg. Co.....107
Cartercar Company.....102
Cataract Rubber Co.....104
Chelsea Clock Co..... 2
Coes Wrench Company..... 4
Cole Motor Car Company.....108
Croxton Motor Car Co., The.... 99
Cutter, Geo. A.....101
Cutting Motor Car Co.....104
Dean Electric Company.....108
Dixon Crucible Co., Jos.....103
Dover Stamp. & Mfg. Co.....101
Eagle Oil & Supply Co.....107
Emblem Manufacturing Co..... 91
Empire Automobile Co.....106
Federation Amer. Motorcyclists. 91
Firestone Tire & Rubber Co.... 5
Fisk Rubber Company.....103
Frontier Specialty Company....102
Geiszler Bros. Storage Bat. Co..102
Goodnow Mfg. Co.....104
Goodyear Tire & Rubber Co....105
Gray Specialty Co.....108
Harris Oil Company, A. W..... 99
Haws, Geo. A.....100
Hawthorne Mfg. Co.....104
Haynes Automobile Co.....104
Herreshoff Motor Co.....107
Hoffecker Company, The.....105
Holtzer-Cabot Electric Co.....105
Hupp Motor Car Co.....105
Ideal Motor Car Company.....101
Indian Refining Co.....Cover
Invader Oil Co..... 7
Jackson Automobile Co.....105
Janney, Steinmetz & Co.....105
J. M. Shock Absorber Co.....104
Jones Speedometer Company....101
Kissel Motor Car Company.....101
Knox Automobile Company.....100
K-R-I-T Motor Car Co.....104
Leavens & Co., William.....104
Lenox Motor Car Company.....108
Marburg Bros.....101
McVey Mfg. Co.....104
Mea Magneto.....101
Mercer Automobile Company....103
Miami Cycle & Mfg. Co..... 89
Michigan Motor Car Co.....107
Miller, Chas. E.....Cover
Moller Brothers Controller & Economizer Co.....102
Mosler & Co., A. R.....106
National Motor Vehicle Co..... 9
New Departure Mfg. Co.....102
Nordyke & Marmon Co.....100
N. Y. & N. J. Lubricant Co.....102
Owen & Co., R. M.....100
Paige-Detroit Motor Car Co.....105
Perfection Spring Co.....104
Pierce-Arrow Motor Car Co..Cover
Pilot Car Sales Co.....106
Planhard Mfg. Co.....108
Randall-Faichney Co.....105
Remy Electric Company..... 12
Reo Motor Car Company.....100
R. I. V. Company.....100
Royal Equipment Co.....105
Sager Company, J. H.....106
Selden Motor Vehicle Co.....102
Speedwell Motor Car Co.....103
Splitdorf Electrical Co.....108
Springfield Metal Body Co..... 6
Standard Co., The.....107
Standard Oil Company.....106
Standard Welding Co.....104
Standard Woven Fabric Co.....102
Studebaker Corporation.....103
Sumner, George, Inc.....100
Swenson, B. A..... 93
Texas Company, The.....104
United States Tire Co.....104
Valvoline Oil Company.....100
Waite Auto Supply Co.....100
Warner Instrument Co.....105
Wall, J. H.....101
Warren Motor Car Company.....105
Weed Chain Tire Grip Co..... 98
Willard Storage Battery Co..... 1
Willys-Overland Company..... 10

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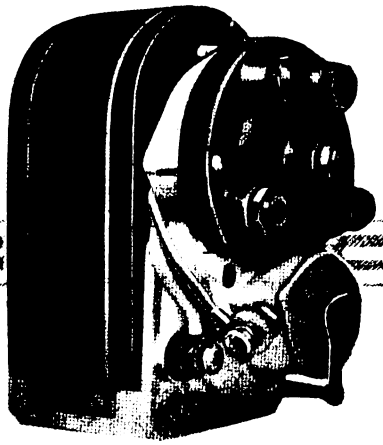
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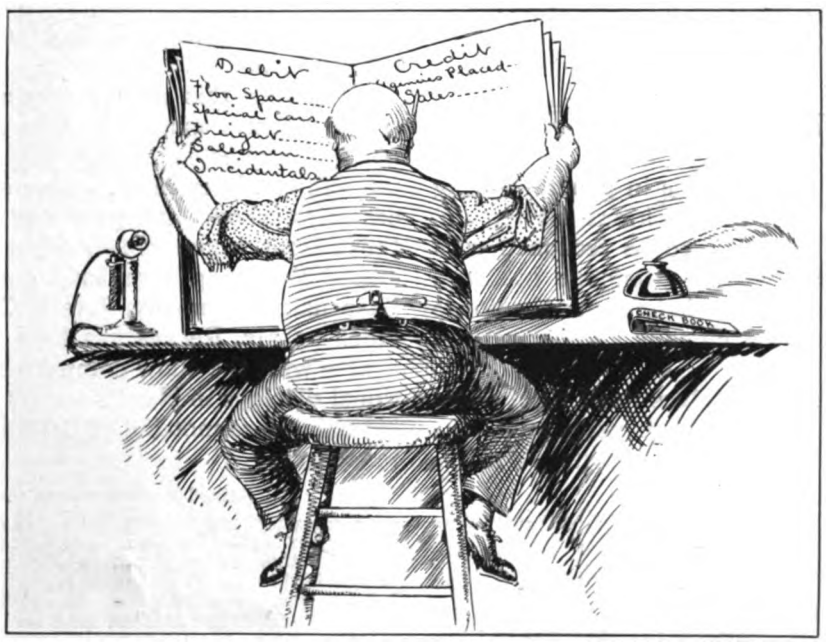
THE AUTOMOBILE JOURNAL

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NATIONAL VS. DEALER'S SHOWS.

An Interesting Symposium, Presenting Opinions of Motor Car and Accessory Manufacturers and Others Relative to the Value and Importance of Each--- A Brief Review of the Horse Drawn Vehicle Show Situation.

DESPITE the unanimous action of the executive committee of the National Association of Automobile Manufacturers at a meeting held during the recent Chicago pleasure vehicle display, arranging for a 1914 show in that city on dates corresponding with those of the present season, the question raised by Albert L. Pope, president of the Pope Manufacturing Company, Hartford, Conn., in a letter to the motor car producers at the close of the New York exhibition, appears to be occupying the attention of the industry. It will be remembered that this letter suggested the advisability of abandoning national shows in the future.



The Motor Car Industry Is Seriously Considering the Show Situation.

The members of the committee present at the meeting were the following: W. E. Metzger, Metzger Motor Car Company (now a constituent of the Maxwell Motor Company, Inc., under the name of Flanders Manufacturing Company); S. T. Davis, Jr., Locomobile Company of America; H. H. Rice, Waverley Company; H. O. Smith, Premier Motor Manufacturing Company; Charles Clifton, Pierce-Arrow Motor Car Company; Hugh Chalmers, Chalmers Motor Company; L. H. Kittredge, Peerless Motor Car Company; W. C. Leland, Cadillac Motor Car Company; S. A. Miles, general manager, and J. S. Marvin, traffic manager.

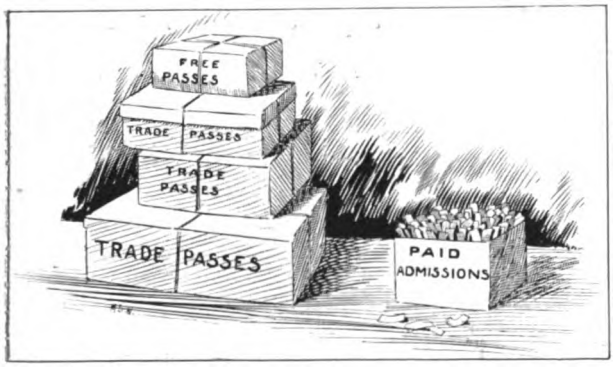
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Mr. Pope's Letter to Manufacturers.

Mr. Pope's letter has had the effect of causing serious consideration of the entire show situation. "I have thought it over from every standpoint," reads his letter, "and wondered in my own mind how long this industry of ours could stand such expense as automobile shows in general entail." Mr. Pope continues as follows:

"The past week I have been more impressed than ever at the Madison Square Garden show as to the matter of expense, for the automobile industry in general pays for it. Last year I understand gate receipts paid by the public at Madison Square Garden were only 40 per cent. of the total. It is too early at this writing to say what they will be this year, but in all probability they will be somewhat less. The trade in general paying for and giving away the tickets not only pays the rent and decorations, but a large part of the patronage as well.

"The disorganization of your factory and



Gate Receipts Paid by the Public Only 40 Per Cent. of the Total—Albert L. Pope.

sales department and business in general during the weeks of the show is a serious matter and I think one that will have to be reckoned with in the near future by the automobile industry. The money in addition that is left with the hotels in New York and other cities is another serious point.

"Now the situation resolves itself right down to this: Can the automobile industry stand the expense of these shows with all its ramifications?"

In the remainder of the letter, which was published in full in the last issue of The Automobile Journal, Mr. Pope calls attention to the advisability of discussing the question from all points of view, and to the necessity for taking prompt action, if for any reason it should be deemed wise by a majority to discontinue shows, because in the very near future the association would be making leases and arrangements for shows in 1914. Those who felt as he did, that shows should be discontinued, or at least, that the matter should be thoroughly discussed by the manufacturers, were invited to write the N. A. A. M. requesting that a meeting be called for this purpose.

Mr. Miller's Suggestion.

Following Mr. Pope's letter was an announcement by Chas. E. Miller, New York City, the pioneer accessory man, suggesting that the national New York show was now such in name only, because all the products have been shown and in use for months previous to the opening of the displays. "Hence," said Mr. Miller, "the exhibitions themselves are no longer maker's shows, but dealer's shows; who retail directly to the user." He added:

"If the New York exhibition were a local show like the big Boston display, the local dealers, branch houses and jobbers in supplies could control it. Then the show could be held in one building, the profits going directly to the dealers, for certainly the makers have no license to be in the show business for profit. All the makers would need to do would be to furnish the sample cars and do the big metropolitan advertising.

"The motor business wagon show should be held out-of-doors, in the late summer or early fall, so that practical demonstrations of loading and unloading, for example, could be held. This would indicate the real value of the product to the intending purchasers."

Believing this matter of decided importance to the industry as a whole, The Automobile Journal has requested expressions of opinion upon the subject from manufacturers of cars and accessories, show managers and others. Among those from whom replies have been received is Alfred Reeves, general manager of the Hartford Suspension Company, Jersey City, N. J. Inasmuch as Mr. Reeves has been identified prominently with the show committee in charge of national displays in New York City for some years, his opinion cannot fail to be of interest. His letter follows:

Alfred Reeves States Position.

Acknowledging your recent letter on the subject of the holding of automobile shows, beg to state that the attitude of this company is that national automobile shows of the highest possible character, as have obtained during the past 10 or 12 years, should be continued in New York and Chicago, just as long as the general public shows a readiness to come in increasing numbers each year and pay 50 cents admission to see what we, as manufacturers, have to sell them.

I think the question of a continuance of automobile shows will be best answered by the attendance or non-attendance of the public and every year has seen an increase in attendance.

As to the cost of shows, they generally cost exactly

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what the manufacturer will permit his company to spend. The cost of space is almost all returned in one form or another; while the manufacturer should look upon the show as a business proposition and have his employees conduct themselves accordingly.

I don't believe that the dealers could afford to put on a show equal to what New York and Chicago has expected and received during the past few years, when to some degree, a part of the expense was borne by the manufacturers.

It may be that the time to retire is when one is at the highest point of their career, in which case, this year or next would be the time for the shows, but it would have to be by mutual agreement on the part of all manufacturers, else shows not so representative in character might be held to the detriment of the automobile industry's reputation.

There is not an industry in this country today that would not be willing to pay many hundreds of thousands of dollars to have the same keen interest by the public, as well as the dealers, in an exhibition of their product as is favored the annual motor car exhibition.

I believe the national show, as well as the local show, will gradually be eliminated as interest in those affairs cease among those who buy.

Yours truly,
HARTFORD SUSPENSION COMPANY,
By ALFRED REEVES, General Manager.
Jersey City, N. J., Feb. 18.

It would appear that several manufacturers have accepted Mr. Pope's invitation to address letters to the National Association of Automobile Manufacturers. Among these is the Inter-State Automobile Company, a copy of the letter being as follows:

Inter-State Enters Protest.

For the past few years we have been making a study of the National Association exhibits held at New York and Chicago. We are led to believe, from what experience we have had, that these shows are not worth the money expended.

We find it almost impossible to sell cars for 60 to 90 days previous to the holding of these shows. This works a hardship on the manufacturers. The expense entailed in preparing the show jobs for exhibition in our factory demoralizes production.

The price we pay for show exhibit space is exorbitant. The men we have in attendance at these shows and the money they expend is another item to be taken into consideration seriously.

These shows are held during the very bad weather and there is a great deal of exposure. The unventilated rooms, overcrowded condition of the show rooms is not beneficial to health. The holding of these shows breaks up our production and selling organization for two or three months in the year. We find that the agents and contemplated agents visiting these shows are bewildered at what they see and cannot come to a decision.

A very great majority of them go to the cities to have a good time and they have it, and little or no attention is paid to actual business. Taking all these things into consideration, we believe it would be well to discontinue the annual exhibits.

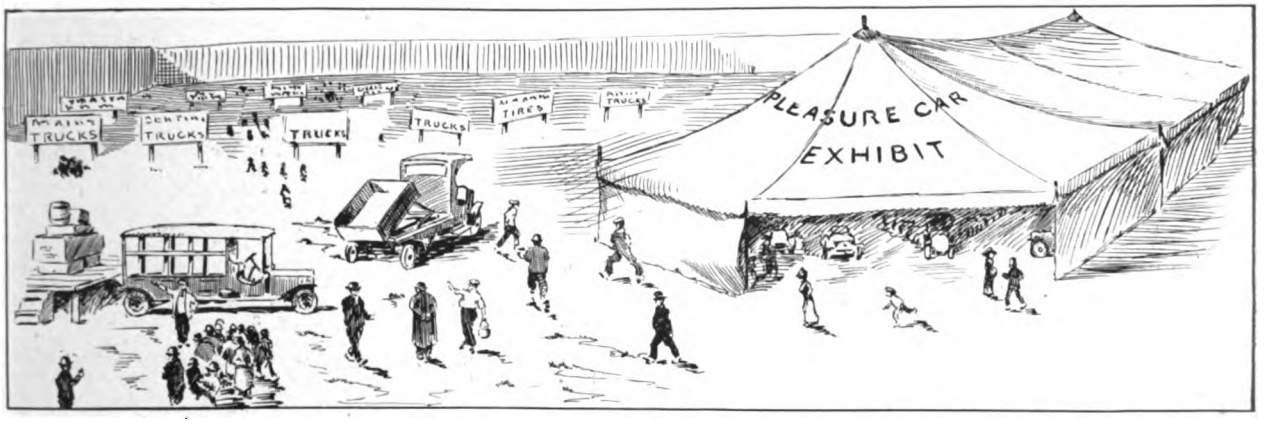
We would like very much to learn that our protest against these shows, together with protests that you may receive from others, have your very careful consideration.

Yours very truly,
INTER-STATE AUTOMOBILE COMPANY,
By ————————, President.
Muncie, Ind., Feb. 11.

Some concerns have preferred to address their replies to Mr. Pope. W. C. Shepherd, receiver for the Matheson Automobile Company, Wilkesbarre, Penn., is one of these. Mr. Shepherd takes up a number of conditions, which he discusses as extravagances, and among these he classes the show business. Upon this question he writes as follows:

Show Period as "Marking Time."

The show marks a period of the year which can be described as "marking time." It gets one nowhere, costs a large amount of money, interrupts manufacture, challenges competitive companies, is an acknowledgment to the general buying public of a willingness on the part of the manufacturers to compare and change or add to. It is notice to the dealer of a cessation of business until he can be shown the latest and best—or worst—of the industry, and instead of being an incentive to the dealers is oftentimes a disappointment because of the fact of the carrying over by them of a number of cars which the manufacturer has depreciated by the new exhibit, and in fact the show is handed down from the early period of the industry. It has served its purpose and no longer is it wise or businesslike to continue. It is neither worth while nor desirable since the standardization of motor cars to exploit or exhibit refinements and details at such a frightful cost of time and money.



Suggestion for Out-Door Summer Show as Made by Chas. E. Miller and Amplified by Forrest M. Keeton.

The practise obtaining in the automobile industry of distributing thousands of dollars' worth of tickets free to anyone who wished them gives a false import to the interest shown in the industry. Since I have been connected with this company I have stopped this practise.

The shows, as you say, simply form a stimulus for advertising in all directions, in newspapers and publications, which already has passed a point where wisdom and commonsense no longer rule, and where the automobile industry stands challenged from every standpoint of economy and good business as exhibiting a great waste of money, great extravagance through a multiplicity of advertising mediums and the immense amount of money spent in making known to the public what it has to sell. No business on earth would stand such expenditures—and neither will the automobile business stand it.

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The letters received indicate that the subject as presented both by Mr. Pope and Mr. Miller has received serious consideration. They make an interesting symposium of the situation. Some of those written by automobile manufacturers are given below:

Agrees with Mr. Pope.

Mr. Pope has expressed the sentiment of the Warren Motor Car Company, with reference to the discontinuance of the national shows. While we have not heard all of the arguments and have not given the matter a great deal of consideration, still we feel that the manufacturers or the dealers should conduct all of the shows, in which event the expense incident to an exhibition would be greatly reduced.

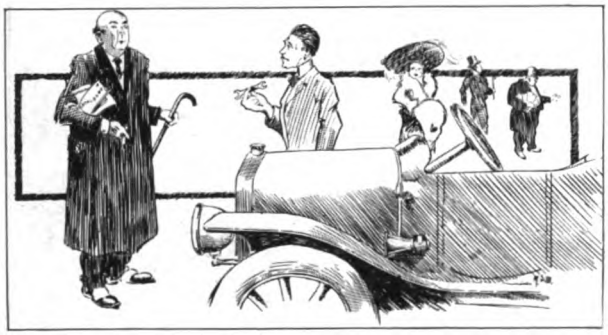
Yours very truly,
WARREN MOTOR CAR COMPANY,
By R. W. ALLEN, General Manager.

Detroit, Mich., Feb. 11.

Wants Dealer's Shows.

We are in favor of discontinuing national shows and allowing dealers to conduct the shows in New York City and in Chicago as they do in other large centres. We received a letter from Mr. Pope some weeks ago and replied favorably to it.

Manufacturers as a rule now present their new models in June or July and contracts with dealers are



Models Shown Are for Most Part Those Which Have Been on the Streets for Months—M. J. Hammers.

as a rule generally closed by the first of September, and thus it cannot be expected that there will be much dealers' trade at a show held in January or February. We did not exhibit at New York this year, but did at Chicago.

Yours very truly,
THE BARTHOLOMEW COMPANY,
By G. G. LUTHY.

Peoria, Ill., Feb. 10.

Would Abandon National Shows.

Beg to state that this company takes the stand that they would be very glad to see the national shows abandoned, and that the same be carried on by the dealers in the different cities.

We have not been in favor of these shows at any time, and the sooner they are abandoned the better we think it would be for the manufacturers.

Very truly yours,
JAMES CUNNINGHAM, SON & CO.

Rochester, N. Y., Feb. 10.

Shows Not Particularly Beneficial.

Will say that the directors of our companies have had no recent discussion as to the merits of the present system of automobile shows. The writer can, therefore, only speak for himself.

I have watched the recent shows very carefully, and have arrived at the conclusion that they are not particularly beneficial to the automobile manufacturers except in an indirect way. I would not care to discredit the entire system, but do not believe that the New York and Chicago shows differ in any respect from the Boston, Philadelphia or other shows of that class, and I believe the time is near at hand when the New York and Chicago shows will be treated exactly as automobile shows are treated in other cities; that is, merely as a means of boosting the dealer's business locally.

Very truly yours,
REO MOTOR CAR COMPANY,
By H. M. SNYDER, Secretary.

Lansing, Mich., Feb. 10.

Discontinue All Shows.

These shows have been not only a source of great expense to the manufacturers, but their business has been interrupted by so many of their employees being away attending them that, in our opinion, it would be to the advantage of all concerned if all shows were discontinued.

We do not agree that it would be advisable to discontinue the New York and Chicago shows, or run them on a different basis, and continue the local shows. In our opinion if any shows were held at all, they should be the two national shows; or better still, only one national show; or still better, no shows at all.

Yours truly,
D. McLAREN, Receiver,
COLUMBUS BUGGY COMPANY.

Columbus, O., Feb. 10.

Change Might Create Greater Evil.

I have yours of Feb. 6, and note your reference to Mr. Pope's letter. On the whole I believe it is a good proposition, and in some ways it will probably work serious harm.

As manufacturers we have been forced to take the position that we could not make any show otherwise than at New York and Chicago. Local dealers in all towns have prevailed on us, urged and insisted that we should help them at their local shows, that we should either pay for the space, send our representative or do something. We have held to the opinion that we promoted the national show, or helped to, and did not feel that we could go farther. Now, if we elliminate the national shows we feel that the expense will be far greater. At the present time shows work very well for the industry, they keep up the interest and we are enabled to sell a volume of work through this interest.

It is further questioned as both of these large cities would continue to have a show if not under some national organization, at least controlled by a local organization, so that I do not know that anything special would be gained in eliminating the national show and putting it into private ownership. In several cities where they started out with a show you will notice that they have run counterwise and the result has been two shows, and this does not always work out to the best interest of the industry or the exhibitor.

So on the whole canvassing the situation with some serious thought we believe if it is an evil we have, better meet the evil other than change it so it may grow into a greater evil.

Respectfully,
W. H. McINTYRE COMPANY.

Auburn, Ind., Feb. 11.

Something to Be Said Both Ways.

This is one of those subjects about which "there is much to be said on both sides." The Chalmers company have found this year's shows in both New York and Chicago very profitable. The national automobile shows seem to have lost none of their drawing power, and our sales this season were far in advance of any earlier show season.

However, the suggested alternative might give even better shows. Dealer's shows are conducted with great success in Buffalo, Detroit, Minneapolis, Cleveland, Omaha, Kansas City, Boston, Philadelphia and a great many other cities.

It is really rather early to say which type of show is most productive of business. Of course, the national shows hold the records at the present time, and it is hard to judge if a dealer's show in New York or Chicago would do better business, because such shows have never been held there.

Very truly yours,
CHALMERS MOTOR COMPANY,
By LEE ANDERSON, Advertising Manager.

Detroit, Mich., Feb. 10.

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Makes but Very Little Difference.

I do not see that it makes but very little difference to the average manufacturer whether the New York and Chicago shows are called national shows or dealer's shows. Nearly all of the prominent companies have branches in those cities, and I feel quite sure that the preponderance of branches is so great that the dealer would in most cases induce the manufacturer to pay practically the same expense that he pays today. I do not believe in discontinuing the pleasure car shows, but I am not so sure in regard to truck shows.

Yours very truly,
L. H. KITTREDGE, President,
PEERLESS MOTOR CAR COMPANY.
Cleveland, O., Feb. 11.

Willing to Give Bond.

Wish to say that we heartily agree with Mr. Pope's suggestions to abandon the shows; in fact, they should all be abandoned, not only by the manufacturers, but by the dealers. We do not favor any show. It does not protect the manufacturer in any way. He is compelled to wait until the spring of the year for half of his customers to make up their mind as to what car they desire to buy and all of them wait for the show, or at least the greater part of them. Besides it is a great source of expense that is unnecessary.

We would be only too glad to give bond not to make a show in the United States if other members of the National Association will do likewise.

Yours very truly,
WESTCOTT MOTOR CAR COMPANY,
By H. L. ASHLEY, Secretary and Treasurer.
Richmond, Ind., Feb. 10.

Expense Disproportionate to Returns?

I must say in reply that the suggestion to abandon the national shows in New York and Chicago has been given serious thought for some time by the officers of the Cutting Motor Car Company.

In our selling organization we have never considered it feasible to economize too strictly in a matter of placing our car before the public in a satisfactory light, and at the same time helping each of our agents to place his proportion of our product.

The question has arisen in our minds as to whether or not the expense the manufacturer is subject to in exhibiting at New York and Chicago is out of proportion to the returns received. We feel that this matter should receive serious consideration at the hands of a committee from the National Association who are best qualified to judge, and we hope in the near future such a meeting will be called.

Yours very truly,
CUTTING MOTOR CAR COMPANY,
By W. W. CLARKE, Secretary and Treasurer.
Jackson, Mich., Feb. 13.

Interfere with Deliveries.

We, as manufacturers, are in favor of abandoning the shows, as we feel that the expense is entirely out of proportion to the good resulting therefrom. It not only costs a great deal of money to show in New York and Chicago, but at the same time entails considerable incidental expense, which we feel could be very easily dispensed with. Coming as they do in the very busiest time of the year, the national shows tend to disrupt our manufacturing and sales forces, and seriously interfere with deliveries.

The amount of money expended for shows throughout the country each year is enormous, and we think that even the dealers could apply same to the promotion and development of their business in a much better way. We have expressed these sentiments to all inquiries this season, and shall certainly stand by them if the matter is brought to an issue by the National Association of Automobile Manufacturers, which body is now seriously considering the matter.

Yours very truly,
KLINE MOTOR CAR CORPORATION,
By CHAS. E. SWEENEY.
Richmond, Va., Feb. 11.

More Good from Local Shows.

We wish to express our views to you in regard to the holding of national shows in New York and Chicago.

There seems to have been a growing disposition to discontinue the shows. We are heartily in accord with some change being made. The manufacturers have their output all sold months before the shows are held, either in New York or Chicago, and it causes a disruption of business, as the dealers will hold off placing their specifications until after they have been to the shows, we believe more as a pretext, and when the shows come, very seldom do they place their orders. The factories are demoralized for months before the shows come and the organization is entirely disrupted; the sales department is at a standstill, and we believe, taking it all in all, that it would be better for the business if there were no national shows held.

Then, the expense seems to be enormous, as all advertising mediums make life miserable for the manufacturers just before and after the shows. This, of course, is a secondary consideration.

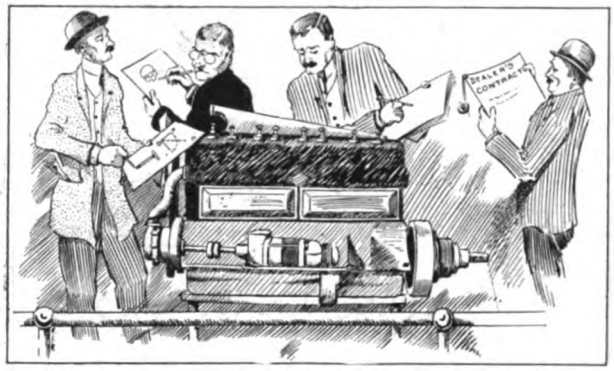
We believe more good can be done by holding local shows in the vicinities of the large dealers. Then they will get the direct advertising. We do not wish to be understood that there is no good comes from the automobile shows, for there is along certain lines, but we believe they have served their usefulness, and we certainly trust some methods will be used to discontinue them and adopt some other methods of advertising.

Very truly yours,
JACKSON AUTOMOBILE COMPANY.
Jackson, Mich., Feb. 11.

Did Good Business at Chicago.

We have your letter in regard to the abandoning of the national shows in New York and Chicago. Our position in that matter is as follows:

We have never been able to secure a great deal of



Show Provides a Meeting Place for Designers, Officials, Etc.—Perfection Spring Company.

business through the New York show. For that reason we have not been represented there for the last two seasons. We were represented there for the two years before that, however. We think possible our inability to secure a paying business at the New York show is largely due to the fact that we were not represented through the East sufficiently. However, we will be compelled to exhibit at the New York show next season, if one is held, because of the large number of dealers we now have in the eastern states.

Now with reference to Chicago show, we would dislike to see this exhibit discontinued as it is certainly a place to get business. We have just returned from last week's show in Chicago with four times the business that we ever received at the shows, and of course, this is sufficient reason for us wanting the Chicago show continued, and in addition to this we have just written Mr. Miles favoring the 10-day plan instead of the week.

We do not believe that we could spend the same amount of money and get the same returns in any other way.

Very truly yours,
CROW MOTOR CAR COMPANY,
By M. E. CROW, President.
Elkhart, Ind., Feb. 11.

Waste of Money to Exhibit.

We wrote Mr. Pope in answer to his letter, stating that so far as we were concerned we would be glad to see the automobile shows eliminated entirely. Not only do

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we refer to national shows in New York and Chicago, but all other shows as well.

Most manufacturers maintain expensive quarters for show rooms where it is convenient for prospective buyers to call and look over their line of cars, and we think it is only a waste of money to exhibit at automobile shows.

Yours truly,
J. I. CASE THRESHING MACHINE COMPANY,
By C. J. FARMER, General Sales Manager.
Racine, Wis., Feb. 18.

Favors Continuing National Shows.

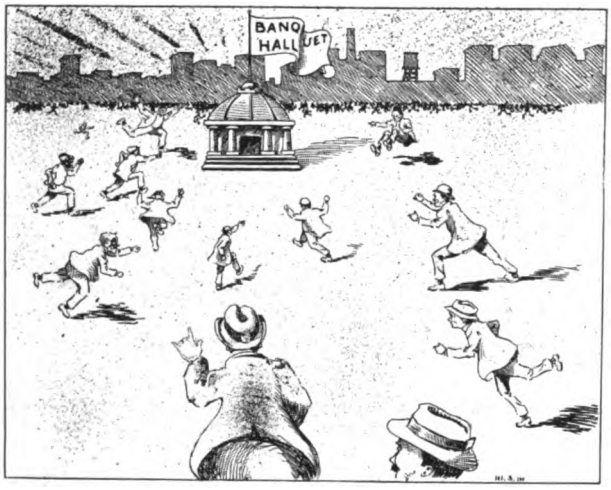
Without going into details as to the why's and wherefore's of the matter, this company is strongly in favor of the continuation of the two national automobile shows, one in New York and one in Chicago.

Very truly yours,
CADILLAC MOTOR CAR COMPANY,
By K. P. DRYSDALE, Advertising Department.
Detroit, Mich., Feb. 13.

Costs Too Much Money.

We have your favor in reference to automobile shows. This letter reached us in the absence of the writer, who was attending the Chicago show. We are of the opinion very firmly that if the trade ceased holding these shows they would be many thousands of dollars ahead every year.

Our show expenses this year are about $30,000, which



A Great Majority Go to the Cities to Have a Good Time and They Have It—Inter-State.

looks awfully extravagant, and we know there are other concerns of about our size and capacity that have spent $20,000 more than we did. It wonders the writer that the automobile buyers and users have not criticised the automobile builders as being a lot of spendthrifts because this is beyond any reason or sense.

We have about come to the conclusion that, if automobile shows will be continued by the association or not, we will quit and that we will entertain our dealers nicely here in the factory for a week or two early in the season, where we will have goods to show, our factory in operation, and they can see how our goods are being made. We believe a week of this kind will be much more educational to the dealer than anything you can do for him. To give you our positive and ending opinion, the show business costs too much money and we want to withdraw from any further shows.

Yours very truly,
IMPERIAL AUTOMOBILE COMPANY.
Jackson, Mich., Feb. 11.

In addition to the letters received, Forrest M. Keeton, president of the Keeton Motor Company, Detroit, has issued the following in the form of an interview:

Favors Summer Display in Detroit.

I believe that there should be no let-up in the matter of shows or contests, and I believe still another show should be added to the list, and that a summer exhibition to be held at Detroit, as 80 per cent. of the automobiles are made in Michigan. It is during the summer that the new models come out, and at the time of the national shows most manufacturers have gotten out their cars many months before and agents have disposed of a large proportion of their outputs. I speak not only for the pleasure car makers, but for the truck manufacturers in this matter.

The show for dealers held in the summer would bring together thousands of agents at a time when agency contracts are made. Providing this show could be held at a place like our Michigan state fair grounds in Detroit, demonstration trips could be held on the track and contests on the roads surrounding Detroit, all of which would be to the best interests of the exhibitors.

The commercial vehicle section, to my mind, should be an out-of-door display, or at least the cars should be shown under tent covers, but in position to be run out at any time for a road demonstration. The state fair grounds have roads within the grounds and on these the trucks could be made to show their paces. The pleasure car sections would then be located in the great fair buildings and grouped according to class, the electric cars in one building, the gasoline pleasure cars up to a certain price in another building and so on.

There is room to exhibit every make of car in the United States and more room could be gained by the erection of a big tent, such as was used for the Indianapolis show of last spring. Given such a show as this, with all buildings connected with a covered passageway, and the industry would have an exhibition at which the amount of business transacted would be enormous and amount to more money in one or two weeks than is totalled at all of the automobile shows held during the winter. The present shows are grand advertising and should be continued, but the country wants a trade show, and I believe that there should be one and at Detroit. I shall do all in my power to help along such a cause.

M. J. Hammers, general manager of the Abbott Motor Company, Detroit, also issues an interview, a part of which is given below:

Nothing New to Be Shown.

That the annual automobile shows as now conducted, especially the New York and Chicago events, have lived their day and fulfilled their original purpose, is the absolute conviction of the majority of automobile manufacturers. Until the past few weeks few people with authority and influence have felt free to publicly express their views on what heretofore has been considered a delicate subject.

The necessity of these events has ceased to be a fact. During the earlier days when the industry required all the encouragement and assistance that could be given it, they were unquestionably a good thing, but the public attitude has changed and the day of educational campaigns to teach people the utility and commercial value of the motor car has passed. The business of manufacturing automobiles has attained such proportions that it ranks in both stability and importance with other great industries. There is now little more logic in holding these periodical exhibitions than would justify a similar display of railway coaches and street cars.

A few years ago we had "shows" in a very acceptable sense of the term, but not so any longer. Then the new models were not made known until they were displayed at the New York show, but now practically all manufacturers are announcing their respective lines not later than August, and many have ceased to make these announcements altogether. Anybody with any degree of interest now attending these shows well knows just what he will see. The models shown are for the most part those which have been on the streets from six to eight months.

After as careful analysis of trade conditions as possible, I have been unable to discover any real demand for the annual show. The situation seems to be that while the majority of manufacturers have had their own private convictions in the matter, each has disliked to be the first to take a definite step, not knowing for a certainty in just what light their position might be regarded.

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LIBRARY OF THE UNIVERSITY OF CALIFORNIA

It is my firm belief that the time has come when the industry can abolish the matter of automobile shows in New York and Chicago in the winter time without suffering anything in the way of reduction in the total amount of automobile business done in the country. If in the opinion of all manufacturers an automobile show should be held it should be held in the summer season at about the time the manufacturers introduce their new models, and hold just one show, and that at some point outside of both New York and Chicago, preferably Detroit.

W. L. Kissel, secretary of the Kissel Motor Car Company, Hartford, Wis., thus describes his attitude in an interview:

Local Shows More Important.

It is all wrong. If the shows were held in the summer when the new models are first announced, there might be some excuse for them, but as a matter of fact, they come so late that very little is shown that the public has not already become perfectly familiar with. Of course there is a great deal of business transacted at these annual "round-ups," but when you come to analyze it, it appears very doubtful whether much of it is business that was not headed your way regardless of the shows.

Relieved of the responsibility of the New York and Chicago exhibitions, the manufacturers could lend more aid and encouragement to the dealer's shows in the smaller cities. These shows are becoming more important every year and their success is a fine tribute to the ability of the dealers and the best possible indication that the dealers of New York and Chicago would be successful in managing any exhibitions that might be arranged in those cities.

I do not care to have this construed as a reflection on the management of either of the national shows. It has in both cases been very able, but I do think that as a national affair the show has survived its usefulness.

The members of the Motor & Accessory Manufacturers, and other accessory houses, also are interested, as is evidenced by Mr. Miller's statement. They have made display as an organized body at the New York, Chicago and Boston shows. The opinions thus far received from these concerns are quite as diversified as those presented by the automobile manufacturers. Some of them are given below:

One Exhibition as Substitute.

We are inclined to think that a show at New York and Chicago is a considerable advantage. It has some tendency to unify the industry, and provides a universal meeting place for a great majority of designers, officials and those directly responsible for the success of the industry.

We are further inclined to believe that if the national shows are dispensed with, local shows will take the place, and will not afford the opportunity for the interchange of opinions and social intercourse that is made permissible by the national shows.

If, as a substitute, one national show could be held either in Michigan or Ohio, thereby affording a central location, it would seem a very acceptable substitute for the New York, Chicago and Boston shows. A show in a central location, however, and substituting this show for all others, would of necessity continue for a greater length of time than any of the national shows now being held.

Replying to your first question, we believe that our interests are best served by national shows, such as held at New York and Chicago.

Second, we believe it is not possible nor commercially feasible to exhibit at all the local shows throughout the country, and until some better plan has been devised, we favor the continuance of the two national shows.

Respectfully yours,
PERFECTION SPRING COMPANY,
By CHRISTIAN GIRL, Manager.
Cleveland, O., Feb. 15.

Dealer's Shows a Valuable Stimulant.

We are glad to note your early interest in the important subject. There is no question but that the national shows have largely served their purpose except that they give an excellent chance for newer lines to be introduced, and we believe that instead of combining as is at present done, there will be a much larger national showing of new models and accessories, allowing a longer season of selling goods, instead of holding up for months products awaiting winter shows.

The writer has attended bicycle and automobile shows for 20 consecutive years, and I believe is qualified to opine that the national shows are held too late, but that from Jan. 1 on, dealer's shows in all cities of any size above 50,000, will prove a valuable stimulant to the business and favorable to the trade, and that local agents and representatives will see to it that their factories give them some support in showing wares.

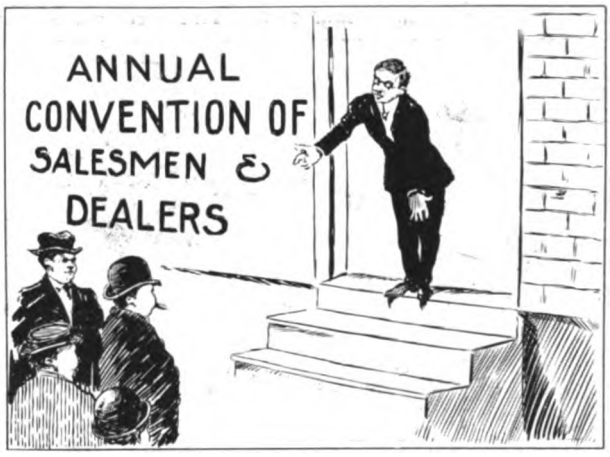
The whole problem, of course, is open to argument, fitting various cases, as it is now held. We sell only to manufacturers and jobbers and the season in which all shows are held is far too late for us to find either class open for business.

We hope to see much earlier shows in Chicago or Detroit and then later, dealer's local shows.

Yours very truly,
SMALLEY DANIELS.
Detroit, Mich., Feb. 14.

Trade Comes to Manufacturer.

We are well satisfied with the present rule of the association restricting its members to exhibits at the national shows at New York and Chicago and the local dealer's show at Boston.



A Trip to the Factory Would Give More Points to the Dealer—E. A. Kruse.

While we have usually secured good results from our exhibit at the Boston show, we would be in favor of limiting the exhibits to the national shows were the Boston show to be used as a precedent to influence the association to countenance exhibits by its members at other local shows.

We do not doubt that any jobber of accessories would be very glad to have as many as possible of the manufacturers of the goods he distributes exhibit at the local shows in the territory he covers. Experience has proven to our satisfaction, however, that the expense entailed by the manufacturer in endeavoring to go to the local trade by exhibiting at local shows is in no way commensurate with the returns.

On the other hand, at the national shows the trade from all over the United States, as well as from numerous foreign countries, comes to the manufacturer.

There is also a dignity and enthusiasm connected with the national shows which we believe has been an important factor in the rapid advancement of the automobile and allied industries.

The dignity and enthusiasm of the national shows is a great contrast to the conditions which prevail at most of the local shows, many of which are so poorly managed and so deficient in nearly every respect that they

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are far from being either a credit or a benefit to the manufacturer displaying his goods, or the industry in general.

Very truly yours,
C. A. SHALER COMPANY,
By ROBERT B. DUNLAP.

Waupun, Wis., Feb. 13

Local Shows More Satisfactory.

Replying to yours regarding national automobile shows in New York and Chicago, would say that as this is our first year in business, we naturally are not in position to express an opinion regarding value of these shows from a business standpoint.

From the writer's personal experience he is inclined to believe that local shows under the auspices of dealers' associations will be as productive of business as the larger affairs; in fact, will be more satisfactory from every standpoint.

Yours very truly,
MARATHON TIRE & RUBBER COMPANY,
By F. KESSER, Sales Manager.

Cuyahoga Falls, O., Feb. 14.

Have Outlived Their Usefulness.

Would say that we are heartily in accord with Mr. Pope's ideas. We believe that the national shows have outlived their usefulness and according to our opinion there is not a single exhibitor at these shows, except possibly some who have a radically new article to present, who can obtain benefit anywhere near in proportion to the cost of exhibiting.

Before we heard from you, and in fact before we heard of Mr. Pope's letter, we were considering the advisability of discontinuing our exhibit at the shows next season, and we were very much pleased to find that there are others



Co-Operation of Manufacturer and Dealer Would Result in Better Returns—T. O. Probey.

besides ourselves realizing the conditions. We feel that there can be no question that the shows which do not bring immediate sales are unprofitable and we think that almost every exhibitor at these shows will admit that he cannot make any great number of sales there, and that what sales are made would in all probability be made even if he were not an exhibitor at the show.

When automobiles were new and there were many new features and accessories pertaining to them, an automobile show was valuable, but at the present time when practically everything exhibited there has been exhibited many times before and has been advertised and called to the attention of the buyer for a very long time, the shows have no usefulness.

It is possible that the shows held later in the season when the public is ready to buy, and conducted by the dealers themselves, might be worth while, but we think that if the exhibitors would put the same amount of money and energy into advertising from their own stores they would probably get more business out of it.

In conclusion would say that it is our opinion that Mr. Pope is right in believing that the shows are an unnecessary drain on the automobile industry and we are heartily in favor of abandoning them.

Yours very truly,
LEATHER TIRE GOODS COMPANY,
By C. B. WOODWORTH.

Niagara Falls, N. Y., Feb. 15.

Cartage Only Local Show Expense.

We would give our opinion that for our benefit only the holding of national shows as heretofore has not been of great benefit to ourselves as wheel manufacturers. Nor do we think the holding of local shows would be of much benefit to us. The situation between the accessory man and the automobile manufacturer is very different.

They have their local branches, and all expense they would need to have would be the transfer of stock of the local branch to the building in which the local show would be held—all the expense being a matter of cartage. The benefit so derived by the local branch would be to the benefit of the manufacturer.

Yours truly,
PHINEAS JONES & CO.,
By HENRY P. JONES, President.

Newark, N. J., Feb. 12.

Willing to Stop Exhibiting.

If the automobile shows, at which members of the Motor & Accessory Manufacturers exhibit, were discontinued entirely, we would be very glad to stop exhibiting. We do, however, think that they are a benefit in a great many ways to the parts maker, but they are a great expense and the expense is hardly justified from our point of view.

Yours very truly,
ROSS GEAR & TOOL COMPANY,
By EDWARD A. ROSS, Secretary.

LaFayette, Ind., Feb. 17.

Glad to Have Them Discontinued.

Would say the nature of our business does not require us to exhibit at auto shows, either national or local. We have only taken part in the New York and Chicago shows, simply because the others have done so, and we would be glad to have them discontinued. We have never exhibited at local shows at all.

Yours very truly,
BROWN-LIPE GEAR COMPANY,
By H. W. CHAPIN, General Manager.

Syracuse, N. Y., Feb. 12.

Local Shows Cost More Money.

I always believed in advertising and exhibiting the products which you make. Of course I do not believe that holding local shows similar to the ones in Boston, New York and Chicago, would be a great advantage to the manufacturer. However, I think in my judgment, it would be almost impossible for any manufacturer to be represented in every local show.

In the first place the expense would be enormous to the manufacturer, and another reason, while we sell largely to jobbers, we would be under obligations to all of them to help them out by paying part of their expense at every local show where they would represent, therefore, I think it would be a great disadvantage to us, while it would be a big advantage to the local dealers.

Furthermore, if they would abandon the shows in Boston, Chicago and New York, we ourselves would not exhibit at all in local towns for the reason stated above. We would simply send our own catalogue to our trade to avoid the enormous expense of exhibiting at local shows.

Respectfully yours,
B & L AUTO LAMP COMPANY,
By N. BROWN, President.

New York City, Feb. 13.

No Additional Business Gained.

The writer is very much of the same opinion as Mr. Albert L. Pope and Mr. Chas. E. Miller relative to the advisability of continuing our exhibit yearly at the national automobile shows at New York City and Chicago. For a fact, we do not gain any notoriety, nor do we secure any additional business other than we get through our regular sales department.

We sincerely wish you hearty co-operation in the matter which you are handling at present.

Yours truly,
MUNCIE GEAR WORKS,
By L. J. STEWART, General Manager.

Muncie, Ind., Feb. 13.

Satisfied with National Shows.

On the show circuit of 1912 we covered nearly all the national and dealer's shows about the country, and were

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convinced that for our product we could not profitably use any but the New York and Chicago national shows. Consequently, for 1913 we have exhibited at New York and Chicago during the national shows and have limited our exhibits to that extent. We believe that the dealer's shows about the country are fine in their ability to enthuse local interest in automobiles and accessories, but for our part are satisfied with exhibiting at the two national shows above mentioned.

Yours truly,
IGNITION STARTER COMPANY,
By GEO. P. SWEET, Secretary.
Detroit, Mich., Feb. 13.

Exhibitors Secure Practically No Return.

As to the value of the automobile shows to the exhibitors, would say that we agree with everything that Mr. Pope has said on this subject. We have exhibited at the national shows regularly for nearly 10 years and are convinced that, as far as direct results go, the exhibitors secure practically no return whatever for their tremendous outlay of time and cash, a part of which represents profit to the show promoters. Notwithstanding all stories circulated by the press agents, there is practically no business done at the automobile shows, and if the shows possess any value whatever to the trade it is simply to hold the interest of the general public. We shall be glad to see the shows abolished altogether.

Yours truly,
RUSHMORE DYNAMO WORKS,
By S. W. RUSHMORE.
Plainfield, N. J., Feb. 14.

National Show More Satisfactory.

We have found that both the New York and Chicago shows are very beneficial from our point of view, and the present method of holding the shows is, in our opinion, much more satisfactory than that of local shows, such as are held in Boston.

Yours very truly,
BUDA COMPANY,
By L. M. VILES, Treasurer.
Harvey, Ill., Feb. 13.

It will be admitted that the managers of the local shows are in a position to throw some light upon the situation, and here again there appears to be a difference of opinion. Some of the letters received from these men are appended:

Local Show Not as Productive.

In reply to your inquiry as to the relative merit of a national show or a local dealer's show in either New York or Chicago, would say that it is quite probable that a local dealer's show in either of these large cities would not be as big an affair nor one that would be as productive from a publicity or general advertising standpoint for the industry as the present shows have been.

Yours very truly,
NEW JERSEY AUTOMOBILE EXHIBITION CO.,
By C. E. HOLGATE, Assistant Manager.
Newark, N. J., Feb. 17.

Put All Cities on Uniform Basis.

My candid opinion is that national automobile shows should be abandoned, inasmuch as it is discrimination on the part of the manufacturer to select certain cities in which to hold their national shows, leaving the local dealers in the other cities to hold their own local shows at their own expense. I therefore feel that it is of far greater benefit to the industry as a whole to put all cities on a uniform basis.

Very truly yours,
BALTIMORE AUTOMOBILE DEALERS' ASSOC., Inc.,
By H. M. LUZIUS, General Manager.
Baltimore, Md., Feb. 15.

Public Would Be Benefited.

I believe that co-operation of the manufacturers with their local dealers in holding shows throughout the country would result in much better returns from all standpoints. My reason for such a movement is because I believe the dealer and his agents know the line, or should know it, thoroughly. Such being the case the public would be benefited by the broader scope offered with the manufacturer acting in concert with his local representative.

Very truly yours,
WASHINGTON AUTOMOBILE DEALERS' ASSOC.,
By T. OLIVER PROBEY, President.
Washington, D. C., Feb. 18.

Prefers State Shows.

Would say that the New York national show is of little benefit to the dealers in this far-off country, held at such a late date after the yearly models are in the hands of agents. I do believe, however, that there should be some way of bringing the manufacturer and dealer closer together.

In regard to the local shows, I believe they stimulate interest and enthusiasm that could not be obtained in any other way, but there should not be a show held in every small town, as they are doing this year. If the manufacturers would help support local shows, one in each state, held at about the same date, we would get better service. If these shows are not held at about the same time prospective purchasers would go to these shows and be inclined to wait until the last show before placing their orders, expecting to see something new or improvements.

Yours truly,
W. B. THOMBS,
(Manager Portland Show.)
Portland, Me., Feb. 14.

Suggests Dealer's Trip to Factory.

The writer is very much in favor of the local show project as he fully believes that more benefit is derived from the local show for the reason that our own customers and prospects come directly in contact with us and the factory men who are here, and will gladly come to a local show while they would not think of making a trip to New York or Chicago, unless they happen to feel in the humor.

Regarding the dealer's project, would say that we believe a trip to the factory would gain more points for the dealer than any automobile show could offer.

Therefore, we are of the opinion that if the manufacturers would lend more aid to all legitimate dealers, or in other words, those dealers who have handled their cars successfully for a number of years, it would be of great value to both the manufacturer and the dealer.

Very truly yours,
E. A. KRUSE,
(Of the Cincinnati Show Committee.)
Cincinnati, O., Feb. 18.

Local Sales Make Local Advertising.

In reference to the national show question—namely, New York and Chicago—the writer personally has attended every show that has ever been held in Madison Square Garden. We have watched its growth and have noted from a personal observation the amount of business attained from same, and the writer firmly believes that if the manufacturers would abandon national shows and would proportion the same amount of money that they stand at the national shows, which has developed into more of a get together than a business proposition, we are positive that the representatives of all the principal cities would be greatly benefited.

Taking Hartford as an example, the writer has given eight shows in the past eight years and in every instance the dealers or exhibitors have made a great many sales, and it is the means of securing hundreds of prospects who are in the market for cars. The bigger shows simply line up a few agents, who are slow in placing their orders, and dealers from all over the country attending them secure possibly one or two sales from their territory, but these same sales would be received at their own show, and would do them more good through local advertising.

Very truly yours,
F. W. DART,
(Chairman Show Committee.)
Hartford, Conn., Feb. 19.

Lack of space does not permit of reproducing all of the letters received, but those presented are sufficient to indicate the opinions of the industry. The subject of horse drawn vehicle shows is taken up on the following pages.

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EXPERIENCE WITH HORSE DRAWN VEHICLE.

THERE is a suggestion, on the part of some car and accessory manufacturers, that the present situation with reference to shows is somewhat analogous to that which obtained in the horse drawn vehicle industry at one time. Probably few men are better able to give accurate information concerning this latter industry and its relation to the show problem than Herbert Longendyke, Troy, N. Y., treasurer of the Journal Company of Troy, publisher of the Carriage Dealers' Journal, the official organ of the National Carriage Dealers' Association. At the request of The Automobile Journal, Mr. Longendyke has prepared an interesting resume of the subject, which is presented below:

Horse Drawn Vehicle Shows.

The national horse drawn vehicle shows, unlike the national automobile shows, were strictly trade affairs, or market places, where manufacturers and dealers got together. Inasmuch as the vehicle industry itself was a staple one, with an ever increasing market, there was not that need for educating the public, through shows, that was very apparent in the automobile field with the advent of those machines.

It may interest you to know, however, that the manufacturing of horse drawn vehicles (especially in the pleasure class, such as buggies, surreys and the more luxurious types) in a wholesale way, in large factories, is of comparatively recent date. Speaking broadly, the years from 1870 to 1875 saw the development of the original, or pioneer, big factories. Prior to that time every city and town had its local "Brewster," who built mostly to order and sometimes took a chance on manufacturing a few vehicles ahead in anticipation of demand.

At first the big factories encountered a very strong prejudice against "factory work," which was supposed to be of inferior quality as compared with the built-to-order product of the smaller builders. The writer, who was formerly engaged in the wholesale carriage manufacturing business, remembers distinctly that such prejudice existed, in some degree, as late even as 1890.

Need for Dealers.

The large wholesale factories were immediately confronted with the problem of creating dealers, of whom there were none at first, since the trade had previously been in the hands of local or custom builders. Little by little, men with the instincts and abilities of merchants, were induced to become dealers in horse drawn vehicles. Some entered the business as dealers in nothing but vehicles, harness and the allied or accessory articles; others added vehicles, etc., as a department to their already established business.

These dealers not only had to overcome the prejudice against factory made work, and at the same time compete with the local builder of established trade and reputation, but were also confronted with another serious condition, which, by the way, has found a replica in the automobile trade; namely, the increase in the large wholesale factories resulting in the demand for more really bona fide dealers than existed, and compelling many of the factories to resort to the marketing of their goods as best they could. In consequence of this condition, many "curbstone" dealers were created and much selling direct to consumers at, or near, wholesale prices resulted. The inevitable consequence was that the bona fide dealers suffered keenly from the situation described.

National Association Formed.

Matters went along in this way for several years until the retail dealers found themselves conducting their business at an insufficient profit, and in 1889 a number of large dealers got together and formed the National Carriage Dealers' Association, the object of which was to secure the aid and assistance of the wholesale factories in abolishing trade evils, which were equally as detrimental to the manufacturers as to the dealers. The writer was at that time engaged in the manufacturing business and knows from experience what a detriment to the entire industry those conditions were.

The National Carriage Dealers' Association held annual conventions, which aroused a great deal of interest and a large increase in membership. The dealers saw opportunities for the betterment of conditions, and, in the main, were heartily supported by the manufacturers.

One of the first results of these annual conventions, which were at that time held in different cities, was that the travelling salesmen of the larger factories would be in attendance for the purpose of furthering their trade interests among the many dealers who were assembled. Almost immediately the brighter and more energetic salesmen began having samples, or specimens, of their goods shipped to the convention city and placed on exhibit in hotel lobbies, and in vacant stores near the convention hall.

Frequently, if these exhibited goods were not purchased by the retail dealers in the town where the convention was held, sales were made direct to consumers at, or near, wholesale prices so as to avoid the labor and expense of reshipping and recrating. It soon became apparent that dealers in the towns where conventions were held suffered from the facts related above, and the officers of the dealers' association soon saw that they must take steps to remedy that evil also.

Trade Convention and Exhibit.

They decided, therefore, that they must in some way control the exhibition of specimen goods, which was growing in volume every year. This led to an arrangement whereby in connection with the annual trade convention a trade exhibit was conducted under the auspices of the national association. Our publication, The Carriage Dealers' Journal, was then, as now, the organ of the National Carriage Dealers' Association, and the writer and his partner, Mr. C. C. Conant, were made managers of the details of the annual exhibition.

Immediately subsequent to that action of the national association the attendance at the annual conventions increased rapidly, as did the volume of exhibits. The attendance of dealers represented every state in the Union, and even foreign countries, and practically the entire wholesale manufacturing trade exhibited specimens of their products.

These affairs grew to such magnitude that in 1897 the dealers' association selected New York City as a permanent place for holding conventions, because it was the only city, at that time, with a building sufficiently large to hold all the exhibits. On two occasions the national association held its convention and exhibition in Philadelphia, and on two other occasions in Chicago, but New York City was usually the place selected.

Other affairs of like nature, though not so national in scope, were soon projected and carried to successful conclusions by local associations in Cincinnati and Kansas City.

At the annual shows, held at New York City, the attendance of dealers from long distances naturally represented the larger and more important dealers of large purchasing capacity. The smaller dealers, in the Middle and Far West, could hardly be expected to attend. When the carriage shows started in Cincinnati and Kansas City, these small dealers, who had not attended the New York shows, took advantage of the opportunity presented in these two other cities with great satisfaction to themselves and to the exhibitors. As a natural consequence the New York show became less national, and more of an eastern show, since the large dealers from long distances who previously attended the New York shows could attend the market presented by the Cincinnati and Kansas City shows.

Advent of the Automobile.

The advent of the automobile brought about a change of conditions in the East long before its effect was felt in the Middle West and Far West. For a few years the number of horse drawn vehicles consumed in the East diminished to a considerable extent, though, even now, the volume of horse drawn vehicles in the East is far greater than many people suppose or imagine. But there was a sufficient diminution in the number of dealers in horse drawn vehicles, as well as in the volume of business which each of them did, to make the national car-

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riage shows at New York City no longer a business necessity and they were, therefore, discontinued.

Those held at Cincinnati and Kansas City are still running successfully.

Inasmuch as these carriage shows were primarily market places, and were held at a time when dealers were ready to place orders for the ensuing season, you will perceive that there is not an exact parallel between them and the automobile shows. There have never been any local shows of horse drawn vehicles, as the term is understood in the auto trade.

It is our belief, based on observation and experience, that the automobile shows have been a leading and potent factor in the development of the automobile industry. It is probable that the increase in the number of local auto shows may have lessened the value, or effectiveness of the national shows by reason of the lesser attendance of people from long distances. It is also possible that as a natural evolution the national shows may eventually become local shows, representing the cities where the national shows are now held and the territory immediately tributary thereto.

Carriage Shows of Great Value.

The carriage shows were unquestionably of great value and benefit to the trade, and proved to be an incentive to progress to the manufacturers, and a stimulus, as well as an educational feature to dealers. From years of close and intimate touch with dealers, and their own statements to us, both personally and in writing, we can say, unqualifiedly, that the carriage shows made the dealers more efficient as merchants, and gave a fillip and zest to them in their business, resulting in their marketing more goods and extending their business radius. This was due, not wholly to the shows, but also to their mingling at convention time with other dealers and exchanging ideas and views of business experiences.

The question of shows is one which will never receive a unanimous answer. In any line of trade there will be found many manufacturers who deny the value of shows and call them a useless expense. Still others will be found who admit their value and benefit, but question whether the results compensate for the cost and time. Still others take the view that shows are necessary evils, like certain other overhead expenses.

Our experience of over 15 years in conducting carriage shows, was that about 10 per cent. of the exhibitors were always big winners, and we found usually that those who made shows profitable were the ones who looked upon them as profit making opportunities, and planned and organized to that end.

The Trade Show Next.

If we might venture an opinion, we would say that it seems to us the next logical step in the automobile trade is a dealers' show, or trade show, held at a time of year which would be most satisfactory to both manufacturers and dealers. The co-operation of the dealers should be secured by making them, or their organizations, participants in the management and conduct of such trade shows.

The writer has on innumerable occasions heard automobile dealers express dissatisfaction at their inability to get the undivided attention of exhibitors at the present public shows. They realize, of course, that attention must be given to the public who are in attendance, but they do feel that a show where only manufacturers and dealers would be together would be much more satisfactory, especially if held at a time of year coincident with the buying or contracting season.

It is, of course, axiomatic that no industry can stand on a solid foundation unless the retail dealers are prosperous and making progress in a financial way. The most unfortunate condition in the automobile trade is that so few dealers are making money, or, to put it bluntly, that such a large percentage of them have "gone broke," or become dissatisfied through the realization of the fact that they are only about three jumps ahead of the sheriff.

Much of this is unquestionably due to conditions similar to those that once were prevalent in the horse drawn vehicle trade; namely, abundance of "curbstone" dealers who have little or no overhead expenses, and who form the most frightful sort of competiton for dealers with established places of business and organizations which necessitate certain fixed charges.

I speak from actual knowledge and not from theory. There is, of course, an inevitable annual weeding out of dealers who are among the less fit, but even the fittest could hardly survive under conditions which exist in the auto trade at present.

Very truly yours,
JOURNAL COMPANY OF TROY,
By HERBERT LONGENDYKE, Treasurer.
Troy, N. Y., Feb. 17.

RAY HARROUN'S CARBURETOR.

Company Organized in Indianapolis to Place New Device in the Market.

Ray Harroun, the well known racing driver, is the designer and manufacturer of a new carburetor which promises to bring him additional fame. A company has been incorporated and a plant that has already produced a number of the new carburetors is in operation in the Industrial building at Indianapolis, Ind., which will be the home of the industry. The equipment is designed to meet the new conditions faced at present by motor car manufacturers, especially as applied to the low-grade fuels.

The Harroun carburetor does not incorporate a water jacket. Air, heated by contact with the exhaust manifold is carried through the air jacket around, and then through the carburetor. This practically eliminates cold weather troubles, it is claimed, and makes possible the production of a good mixture with a very inferior grade of fuel. Mr. Harroun has closed a contract to furnish the carburetor to the Nordyke & Marmon Company, Indianapolis, who will use it on all Marmon cars in future. Other similar contracts are said to be pending.

Many persons have gained the impression that the new factory at Torrance, Cal., being erected at a cost of $100,000 for the manufacture of traction plows and motor trucks, is to be used by the Union Tool Company, near whose plant the new building is being erected. It is stated, however, by the Pacific Metal Products Company, which is already operating a $100,000 factory in addition to its other interests, that the new plant is building for that company's convenience in the manufacture of its new line of traction plows and motor trucks.

Since the announcement that the Speedwell Motor Car Company, Dayton, O., would give an option of its new rotary valve or a poppet valve motor in its 1913 Speedwell cars, orders have been received which necessitate the operation of the factory with day and night shifts.

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MORE ABOUT THE NEW TIRE GUARANTEE.

SUPPLEMENTING the statements made in the last issue of The Automobile Journal by leading tire manufacturers with reference to the new tire guarantee adopted recently by the Motor & Accessory Manufacturers, additional letters are presented below. Owners have been particularly interested in the wording of the new guarantee, and the producers were asked to explain its effect upon the user. There seems to be difference of opinion regarding the matter, and while some clearly disapprove of a definite mileage guarantee others state that their understanding of the matter is such that change will be made in their past policy in this respect. In order that the continued discussion may be understood clearly the new guarantee is reproduced herewith:

We guarantee all pneumatic motor car tires, bearing our name and serial number, to be free from imperfections in material and workmanship. Tires returned for consideration under this guarantee will be accepted only when all transportation charges are prepaid. If, upon examination, it is our judgment that tires are defective, they will be repaired or replaced at our option.

When tires are replaced by us, charges will be made to owners at the time new tires are delivered, for such amounts as in our judgment will compensate for the service rendered by such replaced tires.

Tires worn out in usual or unusual service, abused knowingly or unknowingly, misused, used on rims not bearing these stamps (———) injured through accident or design, are not covered by this guarantee.

(Name of tire) pneumatic motor car tires are not guaranteed to give any definite miles of service, and any and all guarantees are expressly waived by any purchaser of these tires who uses therein any substitute for air; or who uses them under weights in excess of those for which the various tires are recommended, or who does not keep tires inflated to the pressure recommended by us.

It is understood that the Motor & Accessory Manufacturers contemplate making a more exhaustive statement of the situation in the near future, and some of the manufacturers, particularly those who are members of that association, prefer to await its appearance before discussing the matter for publication. Among the letters received are the following:

We wish to call your attention to the fact that there has been no change in the guarantee, with the exception that the guarantee does not apply, as in the case of our own tires, when any of the numerous substitutes for air are used, or when our pneumatic tires are applied to rims which do not bear the mark used for the protection mutually of ourselves, the car builder and the car owner.

There has evidently been a misunderstanding on the part of the car owning public as to mileage guarantee. While it is true that some tire manufacturers for their own convenience have taken in the abstract 3500 miles of service as a basis, there has been no guarantee that such a mileage would be given by the majority of manufacturers. It is true that one tire manufacturer openly advertises a guaranteed mileage of much greater than the above mentioned figure. That, however, is the individual policy of that concern, but speaking broadly, there has been no mileage guarantee on the majority of makes of tires, and the action taken was simply for the purpose of disabusing the minds of car owners of the misunderstanding existing on their part.

Yours very truly,

UNITED STATES TIRE COMPANY.

By J. D. ANDERSON, General Sales Manager.

New York City, Feb. 10.

We believe removing the mileage guarantee from pneumatic tires will be a good step in the right direction, as it will protect the manufacturer against misrepresentations which often occur. We believe it would help the user and operator of his car, and eventually mean that the manufacturer would produce a better tire.

Under present conditions it seems to be the aim of the manufacturer to produce a tire that will give a certain amount of mileage at a given value, where on the other hand a tire would have to be made that would stand on its merit alone.

Yours very truly,

FALLS RUBBER COMPANY,

By F. NOLTE, Secretary.

We have for the past eight years given a written guarantee for 5000 miles on Ajax tires and we shall continue to do so.

There is no denying that some of our users have taken advantage of us in making false claims of mileage obtained and thus securing adjustments which probably they may not have been justly entitled to. Yet our experience has convinced us that making a tire of the best materials, compounded scientifically and manufactured with the greatest of care, has justified the liberal guarantee that we have always offered.

Our determination to offer the highest quality tire manufactured, carries with it the further determination on our part to continue our written guarantee of 5000 miles, which accompanies every Ajax tire we sell.

Our claim for existence is quality and our proof of it is our guarantee.

Yours very truly,

AJAX-GRIEB RUBBER COMPANY,

By J. C. MATLACK, Secretary,

New York City, Feb. 17.

As we understand the guarantee adopted by the Motor & Accessory Manufacturers, each company is left free to make adjustments on such basis as it sees fit. The guarantee adopted is merely an ordinary commercial one. Any reputable manufacturer in any line usually stands ready to make good his product which is actually defective in material or workmanship. The trouble has been that the mileage guarantee on automobile tires has been abused by consumer and dealer alike. The experience of the larger tire companies in this connection has been somewhat expensive, so that it is not surprising that they should attempt to protect themselves against further loss.

Yours very truly,

MARATHON TIRE & RUBBER COMPANY.

By F. KESSER, Sales Manager.

Cuyahoga Falls, O., Feb. 13.

Death of President Cowham—Announcement is made by the Cutting Motor Car Company, Jackson, Mich., of the death in that city, Jan. 13, of William F. Cowham, president of the company. Mr. Cowham had been for a number of years a prominent figure in the automobile industry, and the loss to the Cutting company is one which will be felt personally by a large number of friends and acquaintances in all sections of the country.

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MANY SALES ON LOCAL SHOW CIRCUIT.

Larger Attendance Than Ever Before Indicates Continued Interest in Automobile Industry---Splendid Success Follows New Plan at Hartford, Conn.

WHAT is claimed by the show committee to have been the only successful 50-cent local show in the country came to a close in the state armory at Hartford, Conn., Feb. 15. The management goes on to explain that the price of admission always had been 25 cents in the past and the advance was made this year in an effort to make an appeal only to those who would be interested in the cars and accessories on display. The result was far beyond the most hopeful expectation, the attendance for the week totalling more than 45,000. The first two days of the show there was some dissatisfaction among the dealers, but before the week was out most, if not all, of the exhibitors were convinced that the committee's judgment was correct.

An accompanying illustration gives a very faint conception of the beauty of the interior of the building. The setting was typical of famous East Indian scenes with the celebrated Taj-Mahal as the central figure. This is shown at the rear of the picture, and the canvass contained no less than 14,499 square feet. The weight was 4000 pounds, and it is said to be the largest drop curtain ever produced. In addition, 5000 incandescent lamps of four candlepower and 40 200 candlepower tungsten lamps were utilized in the decorations. Following the practise adopted two years ago, the official programme was in cut-out form, this time presenting the head of an Indian potentate.



Interior of the State Armory, Hartford, Conn., During Recent Display in That City, Showing the East Indian Setting Employed.

The show was under the joint management of the Hartford Automobile Dealers' Association and the First Infantry, C. N. G. The former was represented by F. W. Dart, William L. Ledger and E. C. Biddle, who have acted as show committee for this organization for some few years. The militia committee was composed of Col. John J. Hickey, Lieut.-Col. R. J. Goodwin and Capt. Earl D. Church. The list of exhibitors follows:

Pleasure Cars—Capitol City Auto Company, Mitchell; H. D. Graves, Lozier; Electric Auto Station, Baker electric; Fred T. Reid, National; Palace Auto Service Station, Hudson, Studebaker, Waverley electric; Charles Yetter, Stutz; Stevens-Duryea Company, Stevens-Duryea; L. H. Elmer, Ford; J. I. Case Manufacturing Company, Case; E. H. Harris, Overland; Miner Garage Company, Pierce-Arrow; Columbia Motor Car Company, Columbia; Philip Corbin, Fiat; New England Garage Company, Cutting; Skinner Bros., Stearns-Knight, Woods electric, Chalmers; Brown, Thomson & Co., Cadillac, Rauch & Lang electric; S. A. Foster, Rambler, Regal; Buick Garage Company, Buick, Locomobile, Alco, Little, Chevrolet; Packard Motor Car Company, Packard; Russell P. Taber, Reo; Edward Clark, Paige; R. M. Spencer, KisselKar; R. B. & C. O. Britton Company, Maxwell, Flanders electric; Magna Automobile Company, Detroit electric; Pope Manufacturing Company, Pope-Hartford; George D. Knox, Peerless; Winton Motor Car Company, Winton; Hartford Electric Light Company, Standard electric.

Commercial Vehicles—S. A. Foster, White; Brown, Thomson & Co., Lippard-Stewart; Buick Garage Company, Alco; S. A. Miner, Pierce-Arrow; Packard Motor Car Company, Packard; Russel P. Taber, Reo; Edward Clark, Paige; Pope Manufacturing Company, Pope-Hartford; George D. Knox, Peerless; R. M. Spencer, Kissel-Kar; Hartford Electric Light Company, G. V. electric; R. D. & C. O. Britton Company, Federal; Magna Automobile Company, Adams.

Miscellaneous—Indian Refining Company, H. W. Yeager, Philadelphia Grease Manufacturing Company, Finch & Hayes, Post & Lester, Perry Motor Supply

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Company, W. M. Apperson, Chas. E. Miller, George S. Maslen, Universal Auto Company, C. A. Carroll Company, Auto Equipment Company, Geo. W. Fuller & Co., Harvey & Lewis, A. L. Holdstock, A. J. Broadrib, Cullen & Atkinson, H. B. Munchow, Springfield Manufacturing Company, Auto Tire Company, E. R. Clark, Spencer Turbine Cleaner Company, E. J. Todd Rubber Company, Ernst Flentje, S. Hart, Samuel Kanner, Meyer Bros.

MANY SALES AT NEWARK.

Jersey People Had Considered New York Display and Were Ready to Buy.

More than 300 pleasure cars and business wagons, representing 70 different makes were in place in the First Regiment armory, Newark, N. J., when Augustus V. Hamburg, president of the Newark Board of Trade, opened the sixth annual show of the Newark dealers, Feb. 15, for one week. The event was under the direct management of Horace A. Bonnell, assisted by Claude E. Holgate and a number of men representing the local agencies.

It transpired that although many Jersey people attended the national show in New York City in January, this was largely for the purpose of making a cursory examination of the machines and to secure catalogues of the various products, which were considered in private. With the opening of the Newark show there was every disposition to make purchases, and the business transacted throughout the week was highly gratifying to the exhibitors. In attendance it is claimed by the committee that the Newark show will rank fourth in the entire country, precedence being given only to Boston, Chicago and New York.

The decorative scheme was "Jersey-American," which is a coined term originated by Manager Bonnell. The main floor presented a country estate, the pergolas being reproduced from George Gould's famous Lakewood estate, Georgian Court. Vines of smilax and flowers served to carry out the rustic setting, and a huge flower mound in the centre added a decidedly pleasing effect.

The two classes of machines, pleasure and commercial, were so arranged under one roof that ample opportunity was afforded for those who were interested in either type to make the best possible study and comparison. The list of exhibitors follows:

Pleasure Cars—J. W. Mason, Velie, Maxwell; H. J. Koehler S. G. Company, Hupmobile; R. M. Owen & Co., Reo, Premier; E. D. Carlough, Franklin, Marion; J. J. Meyer, Auburn; Lozier-Stutz Sales Company, Lozier, Stutz; Ellis Motor Car Company, Pierce-Arrow; Greene Motor Car Company, Locomobile; J. M. Quinby & Co., Simplex, S. G. V.; Wilson Motor Car Company, Moline; Edwards Motor Car Company, Pathfinder; Packard Motor Car Company of New York, Packard; Detroit-Cadillac Motor Car Company, Cadillac; Paddock Zust Motor Car Company, Chalmers; Van Deman & Wainwright, Pullman; A. Elliott Ranney Company, Hudson; A. G. Spaulding & Bros., Stevens-Duryea; Oldsmobile Company of New York, Oldsmobile; Newton-Humphreville Company, Studebaker; Service Motor Car Company, Henderson, American, Abbott-Detroit; Buick Motor Company, Buick; Central Motor Car Company, Regal; Peerless Motor Car Company of New York, Peerless; W. C. D. Motor Car Company, Flanders; Michigan Motor Sales Company, Michigan; Wallace Motor Car Company, Cole; Haynes Automobile Company, Haynes; J. W. Ward, Little, Chevrolet; Oakland Motor Sales Company, Oakland; Alexander Brunner, Kline-Kar; W. H. Linkroum, Winton; North Jersey Motor Vehicle Company, National; Rickey Machine Company, Marmon; Nyberg Auto Company of New Jersey, Nyberg; Aymar & Bradley Company, Stearns-Knight; Fairchild Electric Vehicle Company, Standard electric; R. & L. Company; Garford; Norwalk Motor Car Company, Norwalk.

Commercial Vehicles—J. W. Mason, Velie; Edward McK. Hunt, Stewart; Abendroth & Root Manufacturing Company, A. & R.; Peerless Motor Car Company of New York, Peerless; Buick Motor Company, Buick; Lansden Company, Lansden electric; Hoagland-Thayer, Inc., Adams; Greene Motor Car Company, Locomobile; Ellis Motor Car Company, Pierce-Arrow; Packard Motor Car Company of New York, Packard; International Motor Company, Mack, Saurer, Hewitt; Nonpareil Motor Truck Company, Nonpareil; Universal Motor Truck Company, Universal; A. G. Spaulding & Bros., Chase; Charles R. Zacharias, Croce; H. J. Koehler S. G. Company, Koehler; Nyberg Auto Company of New Jersey, Nyberg; J. B. Furber, International.

Accessories—Newark Rubber Tire Company, Hardman tires; Chas. E. Ball, Inc., supplies; Norben Oil & Supply Company, oils and greases; Frank E. Delano, tire filler; Van Deman & Wainwright, tires; Economy Auto Supply Company, supplies; W. S. Sheppard, oils and greases; E. W. Hirsch, fire extinguishers; Overman Tire Company, cushion tires; National Oil & Supply Company, oils and greases; Essex Storage Battery & Supply Company, supplies; Y. M. C. A. Auto School; Standard Oil Company of New Jersey, oils and greases; Joseph B. Ballantine, tops; D. B. Dunham & Son, bodies; Maxi Company, carburetors; Tire Trading Company, tires and pumps; Chas. E. Miller, full line; S. B. R. Specialty Company, supplies; Millar Supply Company, tire filler; Coffin Rubber Company; Auto Safety Signal Lamp Company; Robinson-Lewis Company; Electric Repair & Motor Company; Commercial Casualty Company, insurance; A. H. Van Deman, tire treads.

FOREST SETTING FOR CARS.

Minneapolis Dealers Make Sixth Annual Display Among Natural Tree Trunks.

The national circuit show in Minneapolis, Minn., which was the sixth annual event for the dealers of that city, was held Feb. 10-15. The interior of the state armory was transformed into a forest, the cars being displayed among natural tree trunks, and an immense painting of Minnehaha falls at the end of the main hall carrying out the effect in a pleasing manner.

The show was held under the management of Walter L. Wilmot and special trains brought large delegations from all sections of the state. As a result there can be little doubt as to the effect of the display in a business way. The list of cars shown is given below:

American, Stutz, Premier, Paterson, R-C-H, Hudson, Speedwell, Cutting, Jackson, Stanley steam, Packard.

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Imperial, Luverne, Richmond, McIntyre, Marathon, Mercer, McFarlan, Franklin, Knox, Cartercar, Chevrolet, Little, Henderson, Pathfinder, Hupmobile, Mitchell, Paige, Apperson, Stoddard-Dayton, Cadillac, Lozier, Stearns-Knight, Buick, Nyberg, Regal, Stevens-Duryea, Fiat, Inter-State, Moon, Flanders, Auburn, Pierce-Arrow, White, Penn, Overland, National, Garford, Firestone-Columbus, Colby, Case, Velie, Ford, Locomobile, Lambert, Moline, K-R-I-T, Cole, KisselKar, Oakland, Oldsmobile, Studebaker, Maxwell, Winton, Abbott-Detroit, Herreshoff, Peerless, Westcott, Chalmers, King, Detroiter, Empire, Havers, Marion, Rambler, Metz, Staver, Reo, Marmon.

BINGHAMTON ADOPTS INNOVATION.

Visitors Encouraged to Inspect Accessory Display Before Car Exhibit Is Opened.

The Binghamton Automobile Dealers' Association, Binghamton, N. Y., has attempted to inaugurate some interesting innovations at each of its annual exhibitions, of which that which opened in the state armory Feb. 11 was the fourth. This time there was effort to secure added interest in the accessory division by opening the doors to the balconies, etc., in advance of those leading to the main floor. Mayor John J. Irving presided at the formal exercises, after which the visitors were free to inspect the cars as well.

Binghamton has an enviable reputation in southern New York State for its interest in motor cars and motoring. The Binghamton Automobile Club has aided the local dealers materially in fostering annual touring events, etc. It is not surprising, therefore, to note that the attendance at this year's show, which closed Feb. 15, was much larger than heretofore, and that the business transacted was of satisfactory proportions.

The decorative scheme was simple yet effective. Electric lights played an important part, these hanging in festoons from the balcony front to the chandeliers and girders and outlining the anchor, crescent and star on the side walls. The complete list of exhibitors follows:

Pleasure Cars—Binghamton Motor Car Company, Buick, Pope-Hartford, Lozier, Oakland, Stevens-Duryea; June Automobile Company, Mitchell, Chalmers, Regal; New York Sales Company, Hudson, Cole, Paige, Little; Binghamton Cadillac Company, Cadillac; R. H. Martindale, Michigan; Knickerbocker Motor Car Company, Henderson; Binghamton Ford Sales Company, Ford; H. H. Young Automobile Company, Imperial, Empire; Lowell & Hammond, Stutz, Marmon, Overland; J. M. Davidge, Pierce-Arrow; S. H. Lewis Company, Franklin, Abbott-Detroit, Maxwell; Palmer-Singer Distributing Company, Palmer-Singer; Lewis & Noblette, K-R-I-T, Marion; C. H. Worden, Studebaker; R. W. Whipple, Packard; W. A. Crandall, White, Detroit electric; Prentice & Hoadley, Hupmobile, Metz.

Commercial Vehicles—S. H. Lewis, Chase; L. W. Gillespie, Brockway; Tiona Oil Company, Atterbury; George S. Storrs, International; R. W. Whipple, Packard; Binghamton Motor Car Company, Buick, Detroit electric, Federal.

Motorcycles—George S. Carver, Dayton; H. Hutchins, Monarch; Frank S. Bump Company, Merkel, Indian; B. E. Jewell, Excelsior; W. J. Lyon, Henderson, Yale; Turner's Bicycle Store, Harley-Davidson.

Accessories—N. H. Snow, tops and fittings; E. Q. Williams, spark plugs; R. W. Whipple, supplies; Fred P. Carter, clocks; Myers Bros., novelties; Tuec Company of Binghamton, vacuum cleaners; O. K. Vulcanizing Company, tires and repairs; Whipple-Davis Agency, insurance.



Attractive Decorative Scheme Utilized by Rochester Automobile Dealers for the Accessory Division of Recent Show.

RICHMOND'S SECOND EXHIBITION.

Old Horse Show Building Selected for Display in the Historic Virginia City.

Perhaps no more appropriate location could have been selected for the second annual exhibition of the dealers in Richmond, Va., Feb. 17-22, than the old Horse Show building, where in former days the members of the first Virginia families assembled to inspect the best horses of the country. The show was one calculated to impress the visitor with the fact that the driving

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horse of the past has been superseded in every way by the automobile of the present.

The event was under the management of Thomas R. Hutcheson, who was ably supported by the members of the local association. The interior of the building was transformed into a garden, beautifully illuminated by thousands of electric lights. The attendance was even larger than last year, and the dealers are confident that the business transacted and in prospect more than repays them for their efforts. Among those who made display were:

Ford Auto Company, W. C. Smith & Co., Overland Sales Company, Jones Motor Company, Foster Motor Company, Lloyd Motor Company, D. A. Pretiss & Co., Kaufman & Co., B. A. Blenner, Haviland Oil Company, International Harvester Company, Alsop Motor Company, Broad Rock Lithia Water Company, Eastern Motor Sales Company, Gordon Motor Company, Coleman Cuthins, Shafer Manufacturing Company, Shenandoah Motor Company, Worth Electric Company, Chicago Pneumatic Tool Company, Baker & Hatke.

MANY EXHIBIT AT BALTIMORE.

Good Business Results Despite Big Shows Previously Held in Nearby Cities.

Under the able management of H. M. Luzius the Baltimore Automobile Dealers' Association held its annual show under the joint auspices of the Automobile Club of Baltimore in the Fifth Regiment armory, Feb. 18-22. Despite the fact that a number of shows have been held within easy access of Baltimore within the past two months, the attendance was so large as to give indication that the people of that city and vicinity had been awaiting the annual local exhibition before making up their minds with reference to the season's models.

The decorations were quite in keeping with the previous shows held under the same management. The business transacted was such as to indicate to the local dealers that it is wise to continue the local show, insofar as that city is concerned at least. The list of car and accessory exhibitors is given below:

Pleasure Cars—Auto Outing Company, Buick; Beehler & Ogden, K-R-I-T; Carter Auto Company, Havers; Chesapeake Garage, Rambler; Chesapeake Motor Car Company, Hupmobile; Colonial Motor Company, Studebaker; J. S. Ditch & Co., Detroit electric; Ford Auto Company; Ford; Foss-Hughes Company, Pierce-Arrow; Franklin Motor Car Company, Franklin; Lambert Automobile Company, Hudson, Church-Field electric; Locomobile Company of America, Locomobile; Mar-Del Mobile Company, Packard; Michigan Garage Company, Michigan; Model Automobile Company, Apperson; Motor Car Company, Stevens-Duryea, Overland; Mt. Vernon Motor Car Company, KisselKar; Neely & Ensor, Alco, Kline-Kar; Norwalk Motor Sales Company, Norwalk; Oakland Motor Company, Oakland; Pullman Motor Car Company, Pullman; Rice Bros. Company, S. G. V.; Rittenhouse-Winterson Auto Company, Cartercar; F. W. Sandruck, American; Schacht Motor Company, Schacht; Schall & Crouch Auto Company, Lozier, Paige; Stoddard-Dayton Auto Company, Stoddard-Dayton; Walter Scott, Marmon, Premier; Carl Spoerer's Sons Company, Spoerer; Square Deal Auto Company, Empire, Maxwell; Standard Motor Company, Cadillac; L. M. Vordemberge Motor Company, Pathfinder; D. C. Walker Auto Company, Stearns-Knight, Mitchell; White Motor Company, White; Winton Motor Car Company, Winton; Zell Motor Car Company, Peerless, Chalmers, Rauch & Lang electric.

Commercial Vehicles—C. B. B. Motor Company, Kelly-Springfield, Modern; Chase Motor Truck Company, Chase; Colonial Motor Company, Universal; Consolidated Gas Electric Light & Power Company, G. V. electric; Foss-Hughes Company, Pierce-Arrow; International Harvester Company, International; International Motor Company, Mack, Saurer; Locomobile Company of America, Locomobile; Lord Baltimore Motor Car Company, Lord Baltimore; Mar-Del Mobile Company, Packard; Neely & Ensor, Alco, Lippard-Stewart; Oakland Motor Company, Federal; Rittenhouse-Winterson Auto Company, Seitz, Commerce, Baker electric; Schacht Motor Company, Schacht; White Motor Company, White; Zell Motor Car Company, Peerless, Chalmers.

Accessories—Auto Air Appliance Company, Auto Supply Company, Autogenous Welding & Equipment Company, Baltimore Buggy Top Company, J. M. Brian, 3rd., Brooks-Ward Supply Company, George R. Curtis, Dahl Punctureless Tire Filler Company, Elastic Wheel Company, Essenkay Sales Company of Maryland, Howard A. French & Co., French-Schutz Company, Gauer-Blaylock & Co., T. J. Gallagher, August Gross' Sons, Heinz Motor Company, Holofcener Gas & Electric Fixture Company, Indian Refining Company, International Manufacturing Company, Keystone Lubricating Company, Little Joe Weisenfeld Company, Maryland Auto Supply Company, Maryland Electric Supply Company, Maryland Motor Car Insurance Company, Merryman & Robinson, R. W. Norris & Sons, Norwood & Schenuit, Philadelphia Motor Tire Company, Eldred B. Quarles & Co., Randall Manufacturing Company, Red C Oil Manufacturing Company, William C. Robinson & Son Company, P. W. Sandruck, R. M. Stein Company, W. T. Shackelford & Co., Carl Spoerer's Sons Company, Standard Oil Company, R. W. Thompson.

ALBANY'S FOURTH DISPLAY.

More Than 22,000 People View the Exhibition of Pleasure Cars and Trucks.

The fourth annual show of the Albany Automobile Dealers' Association was held in the state armory, Albany, N. Y., Feb. 15-22, under the management of C. A. Simmons. The attendance for the week was over 22,000, the largest number that has ever been present at a motor car show in Albany. Practically every dealer reported more sales than at previous displays.

It was the largest Albany show in every way. A third more exhibition space was provided by a rearrangement of the aisles, and the list of machines was complete in all respects. Pleasure cars were disposed about the main drill hall, while the commercial vehicles were seen in the basement. The increasing interest in the mechanical transport was reflected by the fact that it was customary to find large crowds in that section throughout the entire week.

Manager Simmons was assisted by the following committee of the dealers' association: Chairman, C. D. Hakes; treasurer and secretary,

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J. B. Wood; E. V. Stratton, C. F. Weeber, W. J. Sutherland, J. S. Kingsbury, W. B. Mason.

PRESIDENT TAFT OFFICIATES.

Presses Button Which Formally Opens Dealer's Show in Washington, D. C.

The annual show of the Washington Automobile Dealers' Association, which came to an end in Convention hall, Washington, D. C., Feb. 8, was marked by the fact that for the first time in the history of the industry an exhibition of this character was formally opened by the President of the United States. In his office at the White House, President Taft pushed a button which turned on the 15,000 electric lights and unfurled a large American flag in the centre of the exposition building. The display included a wide representation of the pleasure cars, commercial vehicles and accessories carried by dealers and agents in that city.

The event was in charge of a show committee, of which President T. O. Probey was chairman and general manager. The other members were: J. H. Miller, F. W. Robartes, Arthur Foraker, W. Bruce Emerson, Charles W. Semmes, E. A. Garlock, I. J. Henderson, F. C. Sibbaid, J. H. Duryea, J. Edward Chapman and A. D. Loeffler. To these men belongs a large share of the credit for the successful outcome of the venture. The attendance throughout the week was particularly pleasing and the amount of business transacted was thoroughly in keeping with the importance of the event. The list of exhibitors follows:

Pleasure Cars—Berryman & Williams, Pathfinder; A. D. V. Burr, Winton; G. H. Cowle Company, Cole; J. H. Earle Company, Oakland; Emerson & Orme, Detroit electric, Apperson; Henderson-Rowe Company, Chevrolet, Little, Pullman; T. Lamar Jackson, Stevens-Duryea; Locomobile Company of America, Locomobile; A. Loeffler Company, Speedwell, Regal; Matheson Motor Company, Premier, Henderson, Michigan; Miller Company, Stutz; Norwalk Motor Company, Norwalk; Washington Auto Service Company, Hupmobile; White Automobile Company, White.

Commercial Vehicles—Congressional Garage, Wilcox; Henderson-Rowe Company, Pullman; International Harvester Company, International; Knox Truck Company, Knox Martin tractor; Locomobile Company of America, Locomobile; A. Loeffler Company, Speedwell, Commerce, Lippard-Stewart; White Automobile Company, White.

Motorcycles—Berryman & Williams, Harley-Davidson; Haverford Cycle Company, Haverford; Osborne & Leishear, Excelsior, Henderson, Baxter sidecar.

Miscellaneous—Barber & Ross, accessories; Irvin T. Donohoe, accessories; Metal Shelter Company, garages; Edwards Manufacturing Company, garages; Keystone Lubricating Company, oils and greases; Meyer Bros., ivory novelties; Leroy Mark, insurance; Sin-Ti Rubber Company, tire preserver; Vacuum Sales Company, vacuum cleaners.

ONE SHOW FOR PITTSBURG.

All Danger of Competition with Exposition Display Seems to Have Disappeared.

While for some time there has been a movement on foot in Pittsburg, Penn., to hold a rival exhibition of motor cars during the week of March 1-8, when the display in the Exposition building under the management of Thomas I. Cochran will be held, at present there does not appear to be any danger of such competition. Announcement is made that the second show has been postponed until a later date.

The display space at the Exposition building measures 350 by 165 feet, and this is maintained to be larger than that afforded in Madison Square Garden in New York City. The 1913 show will be the third under the auspices of the Pittsburg Auto Show Association, and the experience of Manager Cochran has been such as to warrant the advance assumption that it will be larger and better than before. Every step has been taken to make it one of the motoring classics of the year. Pleasure vehicles and commercial cars will be shown and a line of accessories and supplies.



Poster Utilized to Announce Forthcoming Pittsburg Show.

DEALERS HOLD OWN SHOW.

This Year's Event in Portland, Me., Differs from Those Held in the Past.

Although the dealers in Portland, Me., have held a number of shows, these have been managed heretofore by outside parties. This year the Portland Automobile Dealers' Association decided to hold its own display, which was conducted by W. B. Thombs and an able committee in the new City Hall auditorium, Feb. 10-12. It afforded an excellent opportunity for the people of Maine to inspect the new models, many of

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which were exhibited in that state for the first time.

The attendance was decidedly satisfactory, and from a business standpoint there was a large number of closed sales and an unusually long list of prospects. The decorations were simple, but effective. There is little doubt that the plan adopted this year will be continued in other years. The list of exhibitors was as follows:

Automobiles—W. B. Thombs, Buick, Chevrolet, Little; Spear Auto Company, Ford, Detroiter, Flanders; A. F. Talbot, American; E. E. Wentworth, Marion; Stoughton-Folkins Company, Oakland; Portland Company, Knox, Cole; Morrill & Higgins, G. M. C. truck; F. A. Nickerson, Pierce-Arrow, National; Maine Motor Car Company, Chalmers, Peerless, Pope-Hartford, Paige, Stevens-Duryea; T. B. Jefferies, Rambler; R. D. Milliken, Imperial; Miles B. Mank Motor Company, Cadillac; W. E. Hackett, Stearns-Knight; Harmon Auto Company, Hudson; W. M. Chellis, Franklin; L. C. Gilson Company, Mitchell, K-R-I-T; Darling Auto Company, Reo.

Accessories—Portland Garage Company, York & Boothby, Kendall & Whitney, Wayne Oil Tank & Pump Company, Darling Auto Company, Cressey & Allen, Talbot, Brooks & Ayer, Little-Coffin Company, Gulf Refining Company, Standard Oil Company, Maine Motor Car Company, L. W. Cleveland Company, James Bailey Company.

BROOKLYN'S BIG DISPLAY.

Splendid Line of Cars and Satisfactory Business Follows Opening of Third Exhibit.

The attendance on the opening night and the experience of previous displays was such as to indicate to the members of the Brooklyn Motor Vehicle Dealers' Association that the third annual display in the Twenty-third Regiment armory, Brooklyn, N. Y., Feb. 22-March 1, would prove by far the most successful yet held. The proximity of this section to the national exhibition in New York City is held to be a help rather than a deterrent to satisfactory sales. The people of Brooklyn and Long Island apparently attend the larger show, and after making decision in their own homes come to the Brooklyn display prepared to make purchases.

The armory was transformed into a garden setting. From the high roof a large silk canopy hung in long wavy folds. Natural flowers and growing plants helped to make the scene one long to be remembered. The electric lighting effect was particularly pleasing, and the cars and accessories were so disposed as to take utmost advantage of the illumination provided.

The management of the event was in the hands of Harry A. Cochrane, who has had ample experience in the matter of staging shows of this character. His plan of providing room for all makes of pleasure and commercial vehicles, as well as accessories and supplies, in one building, proved of decided value with those who were anxious to learn of the merits of the respective productions. The list of exhibitors is presented below:

Pleasure Cars—Joseph D. Rourke, Haynes; Central Motor Car Company, R-C-H, Henderson; Central Garage, Jackson; Detroit Cadillac Company, Cadillac; A. Elliott Ranney Company, Hudson; Fairchild Electric Vehicle Company, Baker and Standard electrics; Gotham Motor Car Company, S. G. V.; Harrolds Motor Car Company, Pierce-Arrow; Mitchell Motor Company, Mitchell; E. I. Montigney, Stutz; C. H. McCausland, KisselKar; R. M. Owen & Co., Reo, Premier; Packard Motor Car Company of New York, Packard; Poertner Motor Car Company, National, Herreshoff; Peerless Motor Car Company of New York, Peerless; Prospect Park South Garage, Crawford; White Company, White; I. S. Remson Manufacturing Company, Locomobile, Abbott-Detroit; Buick Motor Company, Buick; Simplex Automobile Company, Simplex; Winton Motor Car Company, Winton; M. I. Wolfe, Flanders, Oldsmobile, Knox; Bishop, McCormick & Bishop, Ford, Cole, Paige; Cumberland Garage Company, Velie; Woods Garage & Sales Company, Oakland; I. M. Allen Company, Stevens-Duryea; Parry Auto Sales Company, Hupmobile and Pathfinder; Rambler Motor Car Company, Rambler; Dunham Auto Company, Lozier, Moon; Carpenter Motor Vehicle Company, Studebaker; Montauk Motor Company, Pope-Hartford; Pastre's Garage, Inc., Columbus electric, Firestone-Columbus; Farrell Auto Company, Apperson; Charles S. Tate, Regal; Bruns Auto Company, Chalmers; Ackerman & Baird, Mercer; Stewart Auto Company, Pullman; Drouet & Paige, Inc., Palmer-Singer; I. C. Kirkham, American; Church-Field Electric Company, Church-Field electric; Benz Auto Import Company, Benz; Norwalk Motor Car Company, Norwalk.

Commercial Vehicles—White Star Motor & Engineering Company, White Star; International Motor Company, Saurer, Mack, Hewitt; R. & L. Company, Garford; Wholesale Supply Company, Lansden electric, Maccarr; Universal Motor Truck Company, Universal; Harrolds Motor Car Company, Pierce-Arrow; C. H. McCausland, KisselKar; R. M. Owen & Co., Reo; Packard Motor Car Company of New York, Packard; Peerless Motor Car Company of New York, Peerless; White Company, White; I. S. Remsen Manufacturing Company, Locomobile; Buick Motor Company, Buick; M. I. Wolfe, Knox; Bishop, McCormick & Bishop, Ford; Cumberland Garage Company, Velie; Parry Auto Sales Company, Hupmobile; Montauk Motor Company, Pope-Hartford; Farrell Auto Company, Cass; Autocar Company, Autocar.

Accessories—Chas. E. Miller, Long Island Auto Club, Powell-Elliott Auto Repair Company, Martin-Evans Company, Paul L. Marko & Co., Julius Bindrim, Ernest Flentje, Newmastic Company, Pullman Tire Company, Carron & Co., Inc., Oriental Rubber & Supply Company, Aristos Company, A. H. Kegenhard, Schaap Flame Welding System, Owen-Rollman, Metal Shelter Company.

BOSTON'S ANNUAL EXPOSITION.

Chester I. Campbell, Veteran Show Manager, Plans Bigger and Better Than Ever.

Although the task has been made somewhat more difficult by reason of the large number of shows throughout the country this year, Chester I. Campbell, the man who has managed every automobile, motor boat and aeroplane display that Boston has had, believes he has succeeded in arranging a bigger and better Boston show than ever before. As was true last year the exhibition will be conducted in two sections, that for pleasure cars and their accessories, March 8-15, and

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that for commercial vehicles and their accessories, March 19-26.

Advance announcements indicate that there will be a much larger representation of both pleasure cars and trucks than at either New York or Chicago, and this despite the fact that the Boston display will be held under one roof in the Mechanics' building, instead of two or four as was true of the two national exhibitions. Boston, by the way, is on the national circuit this year, although still classed as a dealer's show, the first section being under the auspices of the Boston Automobile Dealers' Association and the second in charge of the Boston Commercial Motor Vehicle Association.

The Boston show is recognized as the leading display in the country, and this applies in every respect. Concerning the decorative treatment, while no detailed announcement has been made concerning it, it is promised that no trade exhibition in the country ever has had a more beautiful setting.

SYRACUSE PLANS COMPLETE.

More Exhibitors Than Ever Before for Fifth Annual Dealer's Show.

Everything is in readiness for the opening of the fifth annual show of the Syracuse Automobile Dealers' Association in the state armory, Syracuse, N. Y., Feb. 25, for one week. A study of the list of exhibitors indicates that there will be 92 pleasure vehicle displays, 30 of commercial cars, six of motorcycles and 30 of accessories.

The show is under the management of Henry T. Gardner, who has planned an elaborate setting representing an Italian garden, in which southern smilax and artificial blossoms will assist in carrying out the idea with 24 classic busts. Cars ranging in value from $475 to $5000 will be on display, and present indications are that the event will be by far the most successful held in that section.

HAVOLINE OIL EXHIBIT.

Special Display Arranged by Indian Refining Company for Use at Local Shows.

Being represented by a large number of distributing stations throughout the country, the Indian Refining Company, 17 Battery place, New York City, maker of Havoline oils, has taken advantage of the opportunity afforded by local shows to bring its product more directly to the attention of the motoring public. An accompanying illustration presents the exhibit prepared for this purpose, and it may be added that the large can and the name Havoline are transparent and illuminated, making a decidedly attractive display.

Havoline oils are made from the best grade of crude, which is carefully filtered by a special process to remove the free carbon and carbon producing elements. Particular care is taken in this branch of the work so that the resulting product is held to be one which will burn up cleanly and perform its function of lubricating the motor without undesirable carbon deposits.



Havoline Oil Display Utilized by Indian Refining Company at Local Shows Throughout the Country.

In addition to the Havoline oils for motor lubrication, which are produced in three densities for pleasure vehicles—heavy, medium and light—there are special oils for different motors, motorcycles, marine engines, motor trucks, gears, transmissions, etc., and Havoline greases, compounds and soaps. The same high grade materials and careful attention to the preparation are noted in all the products.

At the various displays the Indian Pathfinder, or Havoline oil book of tours, each volume covering a certain section or state, is distributed as well, or these may be secured by addressing the company, in which event the applicant should make clear the section in which he is interested.

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MANAGES PREST-O-LITE BRANCH.

Well Known Boston Man Heads New England Organization in That City.

A. N. Dodge, who on Feb. 1 took charge of the Boston branch of the Prest-O-Lite Company, Indianapolis, Ind., is one of the best known men in the motor car industry in and around Boston. He first became identified with the business in March, 1907, connecting himself with Chester I. Campbell in the management of the Boston Automobile Dealers' Association shows. He continued in this position until September, 1908, when he resigned to become New England manager for the Truscott Boat Manufacturing Company.

In 1911 he resumed his work with Mr. Campbell, with whom he remained until he assumed charge of the Prest-O-Lite Company's Boston branch Feb. 1. Mr. Dodge's many friends in the industry in Boston and vicinity have given him their warmest congratulations, while hundreds of well known motorists have called at his office to wish him the best of success in his new venture. His experience has been such as to warrant the prediction that the business done by this branch will show a marked increase under his management.



Arthur N. Dodge, Manager, Prest-O-Lite Boston Branch.

MILLER ADOPTS PARCEL POST.

Pioneer Accessory Dealer First to Announce Free Delivery by This Method.

Chas. E. Miller, 97-103 Reade street, New York City, the pioneer accessory house in America, is the first to make announcement of the intention to utilize parcel post for making free delivery of the products handled anywhere in the United States. This is strictly in line with the Miller policy, and in effect places a Miller branch in every locality in the country.

In addition to the New York headquarters, which has built up a splendid business during the past 15 years, branch houses are located in New York City, Brooklyn, Buffalo and Albany, N. Y.; Boston and Springfield, Mass.; Hartford, Conn.; Philadelphia, Penn.; Newark, N. J.; Detroit, Mich.; Cleveland, O.; Atlanta, Ga., and New Orleans, La. The big Miller catalogue, which is free to anyone at request, places the individual motorist, no matter where located, in direct touch with any of these stores, and parcel post makes it possible to take advantage of New York prices or special quotations.

NEW MOTOR FUEL COMING.

Standard Oil Company Said to Be Prepared to Introduce Motor Spirit.

According to information from Chicago, the Standard Oil Company is prepared to market a new fuel for automobiles to be known as motor spirit. This is said to be a by-product of petroleum, with a gravity of 52-55 degrees, Baume, as compared with 58-60 for the present grades of gasoline. It is expected to sell for three cents a gallon less and to give at least 25 per cent. more mileage.

Motor spirit is said to have existed for some time, but with a color and odor which made it unsuitable for use. W. M. Burton is held to have perfected a process of refinement upon which patents only recently were granted. Experiments are said to have shown that a slight adjustment of the carburetor becomes necessary because of the need for more air.

SPLITDORF'S FOREIGN POLICY.

Will Locate Branch and Service Station in London for European Users.

Another step in the Splitdorf policy to secure absolute service for users of its ignition devices was taken when O. J. Rohde, treasurer and general manager of the Splitdorf Electrical Company, Newark, N. J., sailed for Europe on the Kaiserin Augusta Victoria, taking with him a corps of experts on magnetos, coils and ignition in general. They will be established in London to attend to the wants of users of American cars.

Mr. Rohde has systematized the New York service station of the company to such a degree of perfection that his ideas will prevail in the working out of the details for the accommodation of Europeans and visitors alike. He will establish the service stations abroad with practical men in charge and when the system is thoroughly organized he will return to New York.

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DETROIT BRANCH FACTORY.

Philadelphia Body Building Concern Locates Additional Plant in the Heart of the Industry.

The Edward G. Budd Manufacturing Company, Philadelphia, Penn., maker of automobile bodies, has decided to establish a branch factory in Detroit. The advantages of being in the heart of the automobile industry became apparent when an opportunity presented itself to purchase the buildings formerly occupied by the Grabowsky Power Wagon Company, which recently went into bankruptcy, and the Budd company has taken possession of this plant.

The property consists of 8.5 acres of land with buildings and the price paid was $110,000. The appraised valuation of the property is said to be $140,000. Contained in the purchase is a modern reinforced concrete building, four stories high, with 72,000 square feet of floor area, and a modern power building. There are also several sheds which the Grabowsky company utilized for storage purposes.

The Budd plant in Philadelphia will be operated to supply the trade in the East and south of Toledo, O., while the Detroit branch will handle the Michigan business and part of the West. By next May it is anticipated the production will total 30 completed bodies a day. The Edward G. Budd company was organized in June, 1912, with capital of $500,000 all paid in, and manufactures pressed steel bodies for commercial and pleasure cars.

THE CHANDLER ORGANIZATION.

Additional Details Concerning Company Which Will Produce New Six-Cylinder Car.

Following the announcement of the Chandler six-cylinder car during the progress of the Chicago pleasure vehicle show, comes the information that the Chandler Motor Car Company is located temporarily at 982 Woodward avenue, Detroit, although it is not anticipated that the machine will be produced commercially in that city. The officials of the company are: President, F. C. Chandler; vice president and sales manager, Charles A. Emise; treasurer, Samuel Regar; secretary, M. S. Mead; designer, J. V. Whitbeck; superintendent, J. R. Hall.

It is learned that in August of last year Mr. Chandler resigned as general manager and Mr. Regar as treasurer of the Lozier Motor Company, Detroit. They employed Mr. Whitbeck, who severed his connection with the Lozier engineering department at the same time, to design the new car. The other officials of the Chandler concern tendered their resignation with the Lozier company about the same time, but continued in their connections until released. In the meantime work has been underway on the new model in a temporary shop and it was given its first road trials several weeks ago.

JOINS LOZIER COMPANY.

Paul H. Smith Will Head Sales Department in Charge of Dealers and Agents.

President Harry M. Jewett of the Lozier Motor Company, Detroit, maker of Lozier cars, who has been building up his organization since he assumed the presidency of the company four months ago, has completed what he believes to be one of the most efficient executive forces in the industry. The latest addition to the Lozier staff is Paul Smith, who becomes sales manager with full charge of all branches, dealers and agents.

The association of Mr. Smith with the Lozier company will no doubt largely increase the distribution of Lozier cars. Four years ago he became assistant sales manager and for the past three years has headed the sales force of a company where he made an exceedingly strong reputation for doing business in a large way. During this time the production of this concern increased from 12,000 cars a year to 50,000. Mr. Smith has been identified with both high and medium priced machines and his knowledge of and personal acquaintance with over 4000 dealers will be of decided value to the Lozier company.

NEW STEEL CONCERN.

Pittsburg Men to Locate Plant to Produce Automobile Material in Canal Dover, O.

A new concern, capitalized at $1,200,000, to be known as the Dover Superior Steel Company, has closed negotiations to locate its plant at Canal Dover, O., and will employ 600 men. The promoters of the company are all well known and practical steel men of Pittsburg, Penn., including W. M. Parkin, H. T. Myer, Archie Smith and M. S. Young.

The firm is to manufacture steel bar for automobile chassis and steel furniture. The metal will be received at its plant direct from the Canal Dover furnace and in its molten state. Thirty-

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five acres of ground adjoining the furnaces have been secured for the erection of the plant.

INCREASES CAPITAL STOCK.

Maker of Midland Cars Prepares for Enlarged Production Facilities in Present Quarters.

The capital stock of the Midland Motor Company, Moline, Ill., maker of Midland cars, has been increased from $100,000 to $300,000. Decision to vote the increase was reached at a special meeting of the stockholders and the entire additional issue of stock has been subscribed.

The purpose of the increase is to enlarge the output of the plant. No additional buildings will be erected at present, the size of the plant being such that it can accommodate a comfortable growth in the Midland production. It was made known at the stockholders' meeting that during the present year 1000 cars will be built and placed on the market.

UNDERWRITERS' ORGANIZATION.

Western Insurance Men Meet at Chicago, Formulate Plans and Elect Officers.

The Western Automobile Underwriters' Association was organized at a meeting of companies writing that class of insurance, held at Chicago recently. P. D. McGregor of the Queen Company presided and F. J. Sauter of the A. D. Baker Agency, was elected secretary. William S. Warren, who has been active in the organization work, reported on the previous meetings and the negotiations which have been carried on with the eastern interests, together with the plan for co-operation between the New York and Chicago conferences, providing for an interlocking board of directors.

The constitution, bylaws and rules of practise were submitted and adopted. The following officers were elected: President, P. D. McGregor, Queen; vice president, Thomas E. Gallagher, Aetna; secretary and treasurer, F. J. Sauter, A. D. Baker General Agency; executive committee, T. E. Gallagher, William S. Warren, Liverpool & London & Globe; H. C. Eddy, Commercial Union; C. E. Dox, London & Lancashire & Orient; A. D. Baker, Michigan Commercial & Old Colony; F. H. Osborn, Federal Union; F. R. Bigelow, St. Paul F. & M.; Marshall & McElhone, Fireman's Fund, and S. K. Crawford, American Automobile Company.

TO DOUBLE ITS CAPACITY.

Universal Motor Truck Company Secures Additional Capital and Will Increase Plant.

Fred K. Parke, secretary, treasurer and general manager of the Universal Motor Truck Company, Detroit, maker of Universal trucks, has announced that the company has been incorporated under the laws of Delaware, the capital stock being $1,200,000, of which $500,000 is preferred stock and $700,000 is common. All stock has been sold and work will be begun at once on the erection of a factory quite as large as the present plant.

The new building will adjoin the old one, the company having owned the entire square block of property since its organization. It will cost $250,000 without the machinery. According to Mr. Parke the Universal company will soon be one of the largest concerns in the world producing commercial vehicles and as the business increases other additions will be made.

FORM CREDIT ASSOCIATION.

Omaha Jobbers and Dealers Organize to Further Their Mutual Interests.

A meeting of the jobbers of automobile supplies and the local representatives of tire factories was held in Omaha, Neb., during the recent show to perfect arrangements for forming a credit association and a constitution and bylaws were adopted. The name of the new organization will be the Automobile Supply Jobbers' Credit Association of Omaha.

This association was formed for the protection of its members in matters of credit and for the betterment of trade conditions in its territory. The following officers were elected: President, C. G. Powell; vice president, Arthur Storz; secretary and treasurer, L. C. Cohen. These three officers, together with T. V. Graves of the Goodyear Tire & Rubber Company, and F. H. Waldman of the Omaha Rubber Company, will conduct the affairs of the organization.

Robert Burman, the racing driver, has signed a contract to drive a Keeton car, made by the Keeton Motor Company, Detroit, in the 500-mile race at Indianapolis, Ind., May 30. Burman will superintend the construction of the car himself at the factory of the company.

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NEW TRUCK MODELS AT CHICAGO.

Twenty-Four Makes Not Seen at New York Display Are Represented at Show in Western Metropolis--Some of the Construction Features Revealed.

TWENTY-FOUR makes of commercial motor vehicles which were not seen at New York City were shown by the manufacturers exhibiting during the second week of the Chicago show in the Coliseum, Annex, First Regiment armory and Wilson building, Feb. 8-15. Eight of these were produced in Chicago and practically all of the others in the Middle West. It must not be understood that all of the 24 were entirely new, although it is true that some of them had never before been exhibited at a national show, either in New York or Chicago.



General View of the Coliseum Main Floor During the Progress of the Commercial Vehicle Display in Chicago.

The business done at Chicago was quite in keeping with that which had been anticipated. This was in a measure due to the plan adopted by the management under Samuel A. Miles, two years ago, of sending personal invitations to business men, municipal authorities and others at all likely to be interested in the display. The setting was the same as that which attracted the attention of the visitors during the first, or pleasure vehicle section.

The 24 makes shown for the first time this year were: Adams, Avery, Buffalo electric, Clark, Commerce, Diamond T, Four Wheel Drive, Harder, Harvey, Hercules, Ideal, Jeffery, Litttle Giant, Menominee, Mercury, Mogul, Moon, Moore, Natco, Old Reliable, Sampson, Urban electric, United States and Walker electric. While each was of special interest, it follows that not all were of equal importance from the standpoint of those who were searching for features that could be regarded strictly in the light of radical departures from standard construction.

For instance, there is little doubt that the product of the Four Wheel Drive Auto Company, Clintonville, Wis., which made its initial appearance at any national show, attracted unusual attention. As its name implies it is driven by all four wheels, both axles being operated by shaft and bevel gears. The motor drives in the usual way to a gearset in which the gears always are in mesh, the different speeds being engaged by individual friction clutches.

Back of the change gear casing is a sub-transmission in a separate compartment, which con-

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sists of differential and gears in the 1.5-ton truck and differential, silent chain and gears in the three-ton model. This sub-transmission transfers the power from the centre line to the left side of the truck. Inside the driven gear in the sub-transmission is placed a differential from which extend the drive shafts to the axles. This is held to keep the power and strain equally divided between the front and rear axles, also to permit turning of corners without stresses upon any of the shafts, axles, tires or other parts of the truck.

Both axles are of the full floating type. Close to the wheel hubs on the forward member are placed the patented ball and socket steering joints, which enclose special universal joints, permitting the axle to drive either in a straight line or at an angle. The braking system comprises one set of external band members secured to the universal joints on the drive shafts leading to both front and rear axles, and another acting on drums on the rear wheels.



One Corner of the Chicago Truck Show with the Adams Line in the Foreground.

Another distinctive design is that of the Diamond T, made by the Diamond T Motor Car Company, Chicago, which is worm driven. That is, there are three models produced, two of which are worm driven, these being rated at 1.5 and three tons. A five-ton model has final drive by double side chains. It may be well to add that the three-ton model was not shown. The smaller chassis is fitted with a block motor employing fixed ignition and enclosed valves. In this the gearset case is a unit with the motor. In the five-ton chassis the motor and transmission are separate.

The Ideal, made by the Ideal Automobile Company, Fort Wayne, Ind., differs from conventional practise in the use of the Wayne gearless differential in the rear axle. In the casing usually occupied by the gears is a pair of friction clutches actuated by cams. The application of the driving power throws the cams slightly and expands and engages the clutches. When one wheel moves faster than the other as on a curve, the clutch of that wheel shaft becomes disengaged, leaving the wheel to run free, while the other takes the drive. So long as both are moving together the driving power is held to be equally distributed. The car is made in two models of one and two tons capacity.

Another new form of transmission is found in the Menominee, made by the D. F. Poyer Company, Menominee, Mich. The motor and transmission are a unit, and instead of driving direct from the mainshaft to the propeller shaft, there is a pinion on the mainshaft which drives a gear located directly beneath it. The shaft that carries this gear drives the propeller shaft, and as a result the latter starts from a position several inches lower than would be possible with the motor unit located as it is to insure the maximum of accessibility.

The Commerce, produced by the Commerce Motor Car Company, Detroit, is the only one of the new models to use the friction drive. Practically the only difference in the line is the addition of a 1250-pound delivery wagon which has slightly heavier construction and an engine of more power than the 1000-pound wagon.

The Harvey, produced by the Harvey Motor Truck Works, Harvey, Ill., is a new model. It is made in but one capacity, being rated at one

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ton. Standard construction is utilized in the main, although a departure is to be noted in the use of cast steel wheels. If memory serves correctly, this is the first vehicle of light capacity to be equipped in this manner, although several makers of heavy duty machines are utilizing them. The motor is of the L head type and has four cylinders. The transmission is selective and affords three speeds forward and reverse. Final drive is by side chains.

Another new design is the Moon, although a light delivery wagon was displayed by the Moon Motor Car Company, St. Louis, Mo., at a show in that city about a year ago. The model shown at Chicago may be regarded as new, however, since it has a rated capacity of 1.5 tons, against 1500 pounds for the older machine. It follows standard practise throughout, utilizing a four-cylinder, L head motor, three-speed selective transmission and live rear axle.

The Moore, made by the Palmer-Moore Company, Syracuse, N. Y., is the only representative of the two-cycle type among the 24 new machines. The motor has three cylinders, with four-inch bore and stroke, and is air-cooled, being fitted with shutters in the intake and exhaust ports which are under the control of the driver for throttling purposes. Aside from the motor the chassis follows standard practise and does not differ materially from the first vehicles which were brought out by this concern about a year ago.

The Avery Company, Peoria, Ill., has a new Avery farm tractor, which differs from the two-ton machine previously produced, largely in the matter of carrying capacity. It is rated at three tons. Four other models were shown, these being trucks of one, two, three and five tons. Some of these are new, in that motors of new design have been incorporated, but the construction may be regarded as following standard practise.

The Adams Bros. Company, Findlay, O., presented its new two-ton truck, which was described at some length in a recent issue. The line is particularly interesting because of the use of block motors, on which the oil pump, water pump and magneto are driven by a worm drive transverse shaft at the front of the crankcase. The hinged, sloping hood, with radiator behind it, is still retained.

The Clark, made by the Clark Delivery Car Company, Chicago, has adopted the automatically advanced Eisemann magneto for ignition on its block motors. The gearset is of the individual clutch type, the gears always being in mesh. Motor positions vary in the different models, being under the seat with some and under a hood in others. The two-cylinder horizontal engines have been discontinued.

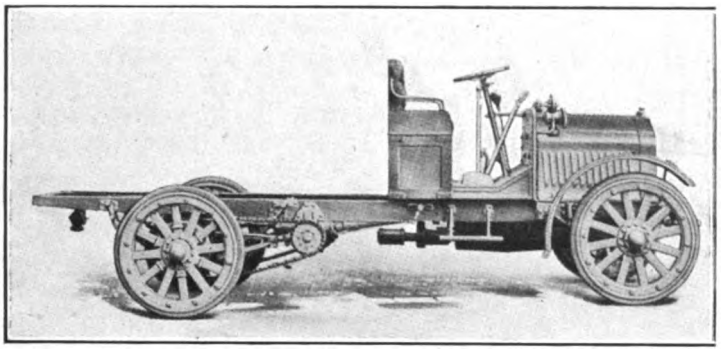


Another View of the Individual Exhibits, Taken in Front of the Gramm Stand.

The Little Giant, made by the Chicago Pneumatic Tool Company, Chicago, continues the two-cylinder engines in two models, one of these being supplied with a planetary gearset and the other with a sliding gear transmission. A new model has a four-cylinder motor and three-speed selective transmission.

The chief feature of interest, aside from the substantial construction which follows standard practise in the main, on the six-ton Mogul trucks, made by the Mogul Motor Truck Company, Chicago, is to be found in the tire equipment. This consists of rubber cushions and a series of steel

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Side View of the First Selden One-Ton Model.

blocks forming the tread. It is contended that the metal resists wear by reason of its hardness and that the sharp edges grip the road and hold the truck in line should there be any tendency toward side slip.

The Old Reliable, made by the Old Reliable Motor Truck Company, Chicago, shows a change in its braking system. On the four-ton model the countershaft brake is a Kline, in which the brake is actuated through an eccentric instead of a toggle arrangement.

There does not appear to have been decided change in the following: Harder, Harder Auto Truck Company, Chicago; Natco, National Motor Truck Company, Bay City, Mich.; Jeffery, Thos. B. Jeffery Company, Kenosha, Wis.; United States, U. S. Motor Truck Company, Cincinnati, O., and Mercury, Mercury Manufacturing Company, Chicago. The last named is fitted with high wheels, and the motor is a two-cylinder opposed unit, air cooled.

The Sampson is a continuation of the older machine of that make, assumedly to be produced by the new Maxwell Motor Company. The Hercules is a new product of the Flanders Manufacturing Company, which also is now a part of the Maxwell concern. It is a one-ton wagon, following standard practise, although a departure is noted in the use of square spokes in the wheels. This is held to make for greater strength.

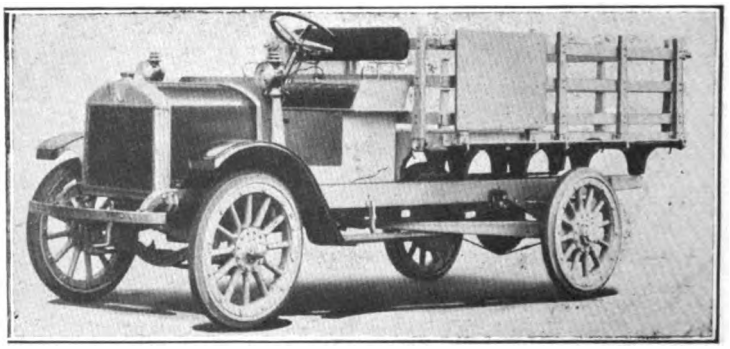
The three electrics shown for the first time this year at Chicago are not new in the strict use of the term. The Walker, made by the Walker Vehicle Company, Chicago, is notable for its balance drive mechanism, which was first revealed a year ago. The Buffalo, produced by the Buffalo Electric Vehicle Company, Buffalo, N. Y., virtually is the old Babcock, which was continued by the new concern after the incorporation of the larger company last year. The Urban is made by the Kentucky Wagon Manufacturing Company, Louisville, Ky.

In addition to the vehicles already mentioned a number of machines shown for the first time at the recent New York show also were displayed at Chicago and attracted unusual attention. Among these was the one-ton Selden, marketed by the Selden Truck Sales Company, Rochester, N. Y. Because of the prominence of the Selden in the pleasure vehicle field this is of special interest, although it follows standard practise very closely. The motor is a four-cylinder, water-cooled, L head unit with bore of 3.75 inches and stroke of 5.25. The clutch is a multiple disc. The transmission is selective. Final drive is by side chains. The driver is located on the left with control in the centre.

Another new model this year is the worm driven Universal, made by the Universal Motor Truck Company, Detroit, and rated at one ton. Except for the worm, the construction is in every way conventional. This is assembled with the differential in the full floating rear axle. A unit power plant is employed, this being suspended at three points. The driver is at the left with centre control.

Last year the A. O. Smith Company, Milwaukee, Wis., exhibited a five-ton worm driven model at Chicago. This year it presents the Smith-Milwaukee six-ton vehicle, which is held to be the largest machine equipped with the worm drive yet produced in this country. It offers other features of construction which are distinctive.

The transmission gearset, the driving shaft and the rear axle are a unit. The large torque tube is enlarged at the forward end and joined with the gearcase, the tractive effort being ex-



One-Ton Worm Driven Universal Truck.

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tended through this tube against the heavy frame cross member that supports the forward end of the transmission case. The relation of the torque tube is preserved by large radius rods that extend to it from the ends of the rear axle housing.

The individual clutch type of selective gearset is unusually heavy and has constantly meshed herringbone gears. The shafts of each are mounted on three large bearings and the entire mechanism is suspended from the cover of the case, so that it may be removed by taking out the cover retaining bolts.

A pressed steel housing is used for the rear axle, instead of a casting. The chassis also is noticeable for the use of steel cored wheels, with the brake drums cast integral, the spokes being semi-circular in section, united by heavy webs. Another feature is the skeleton radiator frame, which is designed to increase radiation. The motor has a bore of 5.25 inches and stroke of 5.75.

NEW MARMON CATALOGUE.

Radical Departure from Usual Treatment of the Subject in Text and Drawings.

A catalogue which makes its appeal to those who are interested in the artistic treatment of motor car subjects is that describing the Marmon line for 1913, just issued by the Nordyke & Marmon Company, Indianapolis, Ind. Particular attention must be drawn to the illustrations, which include a number of drawings by a well known eastern artist, depicting the Marmon in various scenes of interest in this country and abroad. The frontispiece discloses the New York Central station in New York City. Other views include: The bathing beach at Atlantic City, one of the shopping districts at Newport, Fifth avenue, Imperial valley in southern California, quaint street in the Netherlands, etc.

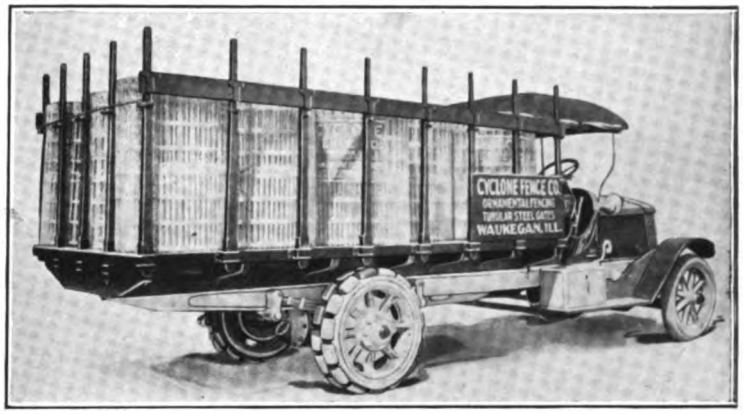
The chief value of the book lies in its unusual treatment of the text, which is made entertaining to those not fully versed in the technical points of automobiles. It may be added that an effort has been made not to confine the argument to any one make of car, but to give a description of automobile building that is of practical and lasting benefit.

PABST TROPHY RACE.

Milwaukee Planning to Hold Big Meet Without Vanderbilt and Grand Prize Events.

Undaunted by the failure to secure a hearing before the Motor Cup Holding Company to set forth claims for the Vanderbilt and Grand Prize races, which will this year be held at Savannah, Ga., the Milwaukee, Wis., men who are behind the racing forces in that city, are making plans to stage a big race meet in Milwaukee in which the Pabst Trophy will be featured. Large cash prizes will be offered to induce racing drivers and their machines to enter the contest.

After the recent Motor Cups Holding Company's meeting at which the 1913 races controlled by the organization were awarded to Savannah, it was believed that Milwaukee would join the newly formed Western Automobile Association and secede from the American Automobile Association. L. E. Meyer, secretary of the Milwaukee Auto Dealers' Club, disclaims any such intention, as he says it is realized that the A. A. A. had nothing to do with the award of the races to the Georgians. Milwaukee has had a costly experience in road race promotion, he stated, but with this experience and many months' time to formulate and put in operation plans for the Pabst Trophy race, he believes the city will more than demonstrate its ability to hold a successful meet.



Six-Ton Smith-Milwaukee Worm Driven Machine.

Bars Criminals as Chauffeurs—The Bussey bill in the New York legislature provides that no license shall be issued to a chauffeur who has been convicted of a felony, and authorizes the secretary of state to revoke the license of a chauffeur upon the report of a conviction, and no license shall be granted to the chauffeur in the future unless the conviction should become reversed by the courts.

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NEW AND NOVEL ACCESSORIES THAT APPEAL TO MOTORISTS

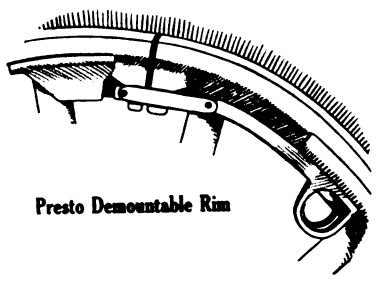
The Presto Demountable Rim, manufactured by the Presto Inter-Rim Company, Boston, is constructed in standard sizes and will fit all straight side, clincher or solid tires. A feature of the rim is the contracting locking ring utilized in conjunction with a safety locking device or toggle, and it is held by the maker that one motion securely locks and holds in position both the rim and shoe. To remove the rim a lever is moved downward, expanding and forcing it off. To replace the new rim and shoe, the tire is mounted on the wheel in the usual manner and with the valve stem placed in its proper position. The wheel is rotated until the stem is at the bottom and the lever at the top. The lever is then moved upward to its normal position where it locks automatically.

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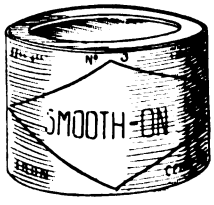
Danver Priming Cocks are fitted by A. C. Danver, Hospital and Borden streets, Providence, R. I., to model T Ford automobiles. They are screwed into the cylinder head on the left hand side of the motor and their openings communicate directly into the combustion chamber. The cocks are of the conventional type, having liberal sized cups, and are fitted with a spring retained handle. Their function is to provide means for priming the motor without removing the spark plugs and by their use it is possible to locate missing cylinders, introduce kerosene and remove carbon deposits. The priming cocks are moderately priced.

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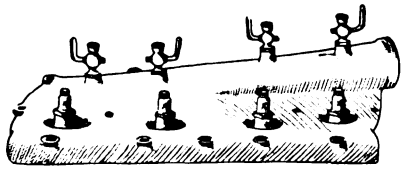
Smooth-On Iron Cement is marketed by the S. B. R. Specialty Company, East Orange, N. J., and is included in a repair outfit which also comprises an elastic cement, a roll tape and an instruction book. The iron cement is held to be very efficient for repairing cracked water jackets and leaky radiators. It is claimed that the work may be completed quickly, involving no other labor than cleaning the parts, applying and heating the material. A quality emphasized with the cement is that it is easily worked and completely fills the opening, which may be smoothed over to make a neat appearing job. The two cements are utilized separately or together, depending upon the nature of the repair to be made.



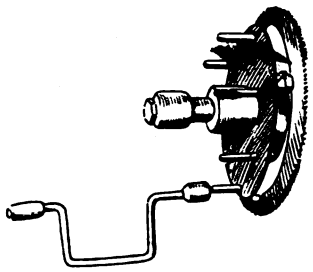
Presto Demountable Rim



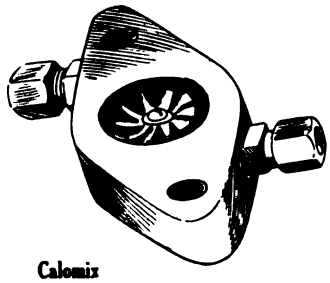
Smooth On Iron Cement



Danver Priming Cocks



Angier Ford Spare Wheel



Calomix

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The Angier Spare Wheel, made by Angier's, Streator, Ill., is designed for Ford cars and is of the demountable type. It comprises an extra wheel for models N R S or T and will fit either front or rear axles. It is removed by displacing the nuts retaining the hub flanges and this is made possible by replacing the old bolts in the hub with studs having finished nuts. When the latter are removed by a special bit stock the wheel can be displaced quickly and without affecting the bearings, speedometer gear, etc. The equipment comprises an extra wheel, studs, nuts and the wrench member. It is moderately priced and provides demountable features not fitted to Ford cars.

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The Calomix, produced by the Calomix Manufacturing Company, Troy, N. Y., differs from those devices employed for converting a raw mixture into a vapor in that provision is made for heating it. It com-

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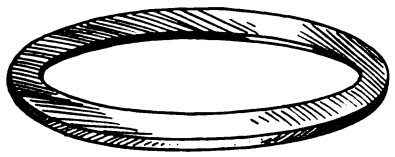
prises a brass gasket about .5 inch thick, conforming to the shape of the flanges utilized on the carburetor and intake manifold, and is placed between these members. In addition to a small fan wheel which rotates and breaks up the raw fuel, the Calomix is provided with passages through which the exhaust gases pass, warming it. Suitable connections are included for fitting to the manifold and various sizes are manufactured to meet carburetor requirements. It is installed easily and is not expensive.

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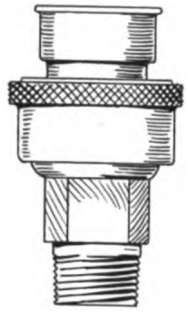
Victor Gaskets are produced by the Victor Manufacturing & Gasket Company, Chicago, in standard forms for a variety of purposes in connection with the motor car. That shown is for fitting between the spark plug and cylinder to prevent leakage and is made in two types, open and closed. Copper and asbestos are employed and when these materials are compressed they make for a perfectly tight joint between the parts. They are made in various sizes and are inexpensive. The company also manufactures special gaskets and issues an illustrated catalogue which will be mailed free of charge upon request.

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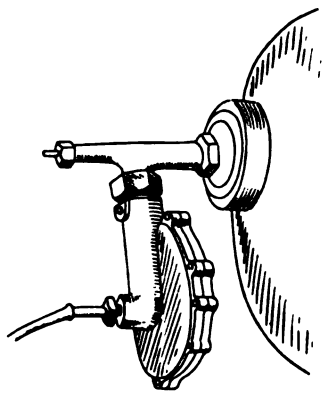
The Tucker Grease Cup, manufactured by W. W. & C. F. Tucker, Hartford, Conn., is a positive lock compression type and is made for service on motor cars and machinery where vibration tends to loosen the head. The locking device is free from ratchets and all parts are enclosed, preventing the entrance of dust or dirt. The maker points out that it may be refilled easily and that the parts requiring lubrication are cared for properly in that the grease flows freely when required by the bearing, etc. The cup is no higher or larger than the ordinary member and is constructed in various sizes, taps for each being carried in stock.



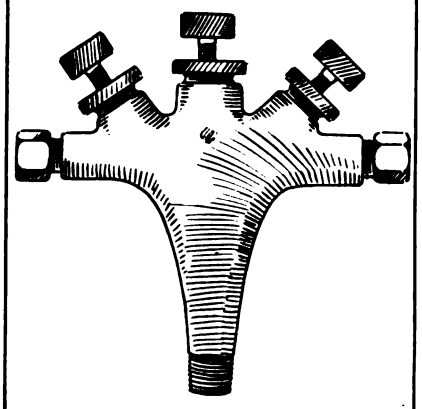
Victor Gasket



Tucker's Grease Cup



Prest-O-Lite Reducing Valve



Bingham Compensator

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The Prest-O-Lite automatic reducing valve is manufactured by Prest-O-Lite Company, Indianapolis, Ind., and is attached easily and quickly to the gas tank made by this company. Its function is to maintain the correct pressure at all times and this is secured regardless of whether the tank is full, half empty or nearly so. It makes for convenience in that the head or other lamps may be lighted without the usual adjustment of the pressure and that the blaze is such that maximum efficiency is secured. Economy is effected through preventing a waste of gas. The automatic reducing valve is moderately priced.

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The Bingham Compensator is made by the Bingham Manufacturing Company, Cleveland, O., and as the name implies, is designed to regulate or compensate the pressure in the float chamber to which it is attached. It is held by the maker that at high and low speeds there is a differing pressure at the spraying nozzle, but not in proportion to the amount of fuel, making for waste. The Bingham device compensates by reducing the pressure in the float chamber proportionately to the reduction of that at the spraying nozzle. It is provided with two speed adjustments, also a fuel control, and is inexpensive.

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The Peerless Radiator is designed for heating motor cars and is located in the floor of the machine. It utilizes the

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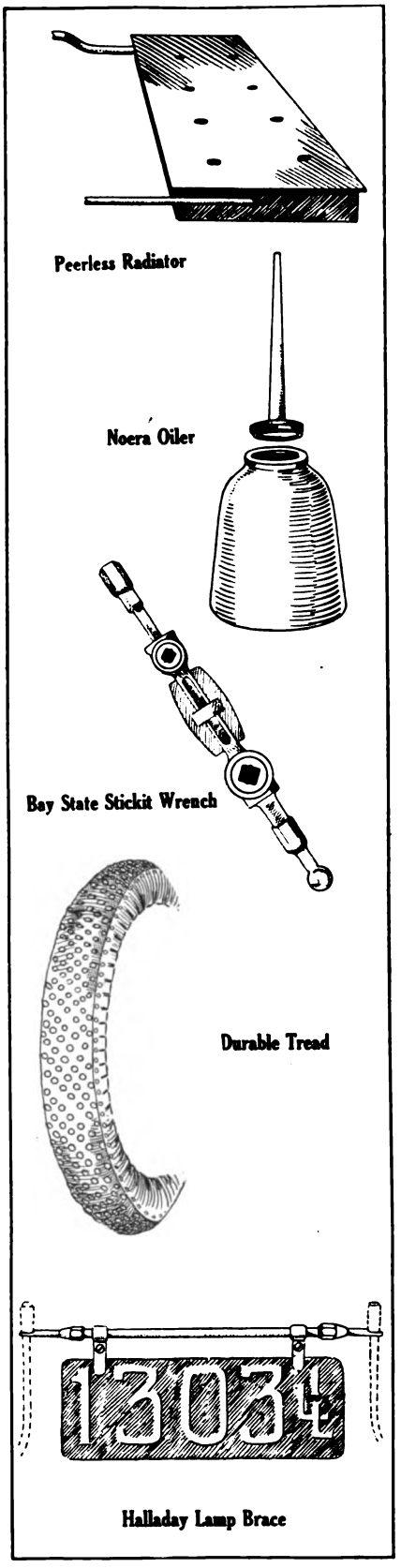
hot water from the circulation system of the power plant and is applicable with both thermo-syphon and pump systems of cooling. When the former is employed a connection is made between the pump and the cooler and a second lead attached to top of the water jacket. With the thermo-syphon system one pipe is led to the lower water manifold. It is held that it increases circulation capacity, keeping the motor cooler, especially when an alcohol anti-freezing solution is employed. The home office of the maker is at Gibbs, Idaho, while the New York office is at 275 West 23rd street.

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The Noera Oiler is the product of the Noera Manufacturing Company, Waterbury, Conn., and a feature is the diameter of the mouth, it being 1.25 inches, as against the usual .875 inch or less. This makes it a simple matter to replenish the supply of lubricant. The oiler is practically a one-piece construction, the bottom being of clock spring steel pressed against the shoulder of the dome, the seam being double turned. The spout and breech lock are similarly constructed, no solder or brazing being employed. It is made in 10 sizes, from three ounces to one pint in capacity, and is finished either in copper plated steel, polished steel, polished brass, nickel plated brass, or steel.

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The Bay State Sticket wrench set is marketed by G. A. Cutter, sales agent, Taunton, Mass., and comprises a double ended ratchet wrench, strapped to seven strong stamped steel sockets strung on a square steel shank. One end of the wrench fits the shank and the other the sockets. The wrench also fits four sizes of nuts, and with the sockets 11 different sizes of nuts and cap screws. The reversible ratchet wrench is secured to the shank by a substantial leather strap and with the use of a washer prevents rattling. An 1.25-inch ball is fitted to one end of the shank, but may be removed if desired, allowing the sockets to be displaced. The other end of the shank has a ball stop and spring ball for holding the socket in position. It is a compact, practical set and in addition to being adapted for a large variety of work, may be carried easily in the tool roll. Extra sockets are supplied.



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Durable Treads are marketed by the Durable Tread Sales Company, 524 West 34th street, New York City. They are constructed of two layers of tanned leather between which are placed five thicknesses of fibre fabric. The tread is thickly studded with steel rivets having large solid heads. The treads are secured to the rim by means of patented nickel steel rim hooks which are formed to the exact shape of the bead of the shoe. It is held by the maker that skidding is prevented and that the use of chains is not necessary. It is also claimed that blow-outs are eliminated as the rim anchorage reinforces any weak spot in the casing.

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The Halladay Lamp Brace and number holder is manufactured by the L. P. Halladay Company, Streator, Ill., and not only eliminates vibration of the lamps, but serves to carry the license number. It is adjusted easily to any car having lamp irons, a form of turnbuckle being employed. The license tag is secured to it by

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a special clamp and a quality claimed for the device is freedom from motion. It is finished in black japan, brass or nickel and is moderately priced.

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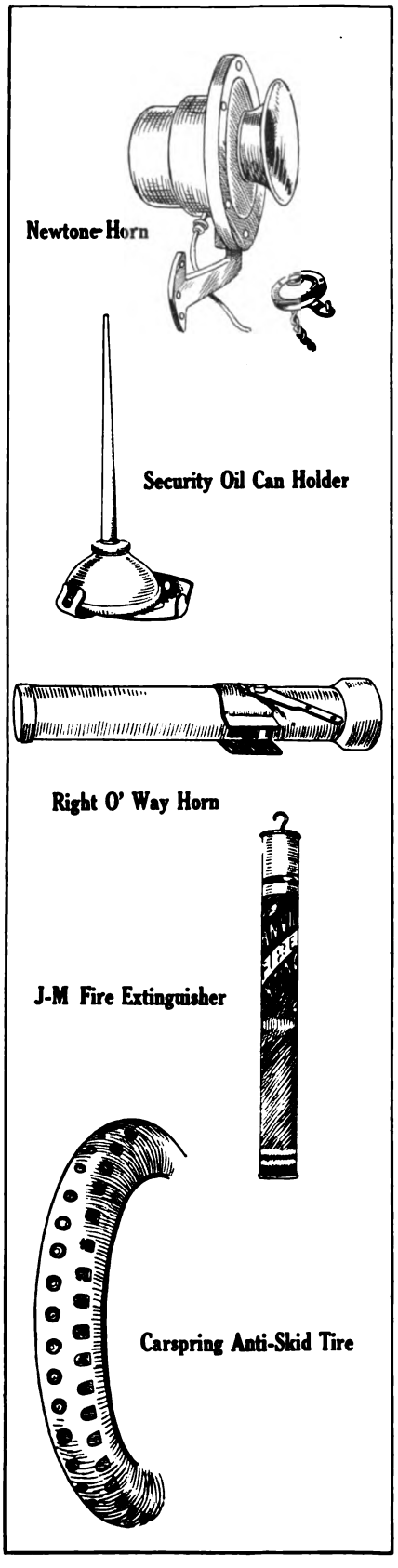
The Newtone Type N Horn, produced by the Automobile Supply Manufacturing Company, Brooklyn, N. Y., is designed for those who desire a compact, high grade, efficient signal. It operates on a six-volt storage battery or five dry cells and a quality emphasized is the small amount of current required and consumed. The motor shaft rotates on Hess-Bright ball bearings and requires no oiling or adjustment. It is finished in black enamel, nickel or gun metal and comes complete with push button and cable.

★

The Security Oil Can Holder is marketed by the Mayo Manufacturing Company, Chicago, and is designed for retaining the oiler under the hood. The clamp is so constructed that the can may be removed easily by tipping it, and it may be replaced in a similar manner. It will hold cans from three to 3.5 inches in diameter and is finished in copper.

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The Right O' Way Horn is produced by the Davies-Bach Manufacturing Company, Cleveland, O., and is actuated by the exhaust of the motor. It is operated in the conventional manner, by a pedal or lever, and a clear, penetrating, as well as pleasing, tone is claimed for the signal. It is made in two styles. A being a combined horn and cut-out, while B is for service in states where the cut-out is prohibited. It is held that the horn will not clog, is constructed of high grade material and is attached easily. It is moderately priced.



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The J-M Fire Extinguisher, marketed by the H. W. Johns-Manville Company, New York City, is a compact metal tube filled with a dry powder which is guaranteed to put out any fire in its first stage, arising from gasoline, benzine, calcium carbide, etc., if employed according to directions. It is also warranted not to injure the paint or upholstery of a car and not to freeze or cake in the container. It is constructed in a special size for motor cars, although it is produced for garages and motor boats.

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The Carspring Anti-Skid Tire is manufactured by the New Jersey Car Spring & Rubber Company, Jersey City, N. J., and is a one-cure wrapped tread shoe having depressions instead of projections. Cups having a convex base at the apex of the tread are employed with semi-circular cups on either side which grade off as the tire rounds out. It is held that this construction prevents side slip and increases traction through the cup forming a vacuum which is broken as the tire revolves.

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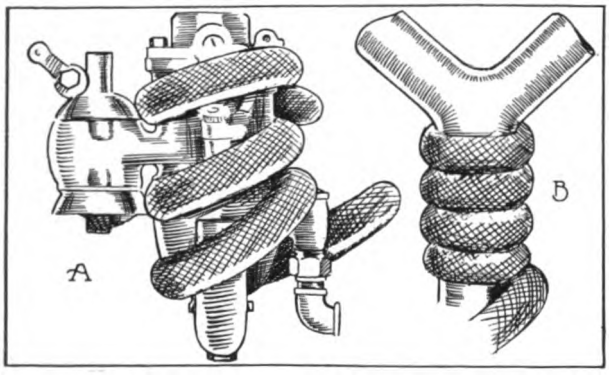
The Holtzer-Cabot Electric Company, Boston and Chicago, maker of the Holtzer-Cabot dynamo system of electric lighting, has established a department at the factory in Brookline, Mass., installing its dynamo on private cars. The company is prepared to equip any type of gasoline vehicle and a large number of owners have taken advantage of the opportunity to install electric lighting systems on machines not thus fitted. Estimates will be furnished upon application.

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HEATING THE CARBURETOR.

More or less difficulty is experienced in starting a cold motor at this time of the year. The heavy grade of fuel, coupled with freezing weather, brings about a condition that makes cranking anything but a pleasure. The motor starter has reduced starting troubles only to a certain extent. It is misunderstood by some in that they believe the engine will respond even when it has been exposed for hours to exceedingly low temperatures and without priming or assistance. Under such conditions, however, the engine is not likely to start any easier than if it were cranked in the conventional manner.



Depicting Method of Heating Carburetor:. A, Utilizing Bag of Heated Sand; B, Wrapping Same Around Intake Pipe.

This contention has been borne out in several instances noted by the writer when machines fitted with motor starters failed to start, although the device performed its function of revolving the crankshaft. In two of these the carburetor was primed or flooded without success and both machines were 1913 models. Both motors, however, were started after priming the cylinders. It should be explained that the weather was exceedingly cold and that the cars had been exposed for several hours. Other owners of machines fitted with motor starters state they have not experienced any difficulty, while a few admit that they prime the cylinders with gasoline, which practise is to be commended.

There is a large number of motorists whose cars are not equipped with motor starters and when the machine has seen considerable service the starting of the motor becomes troublesome, especially if the engine is fitted with an old type of carburetor. The manufacturer of vaporizers has made considerable improvement in his product, such as priming devices and attachments for enriching the mixture from the seat, and with these conveniences on a new motor, starting should not be difficult even with a heavy grade of fuel now utilized.

Although the majority of makers provide means for priming the cylinders in the shape of petcocks, there are motors not thus equipped. Under these conditions it becomes necessary to remove the spark plugs and inject the gasoline, but this method requires time and is not convenient especially if one is in a hurry. While the difficulty may be overcome by fitting special plugs having priming attachments, this means the outlay of from $4 to $6, depending upon the make.

It is well known that low temperatures prevent vaporization of the fuel and this is aggravated when the carburetor and intake pipe or manifold are very cold. Even if a partial amount of vapor is created by the air passing over the spraying nozzle, the mixture is likely to become condensed by coming in contact with the chilled walls of the intake pipe, much in the same manner as steam is turned into water when chilled.

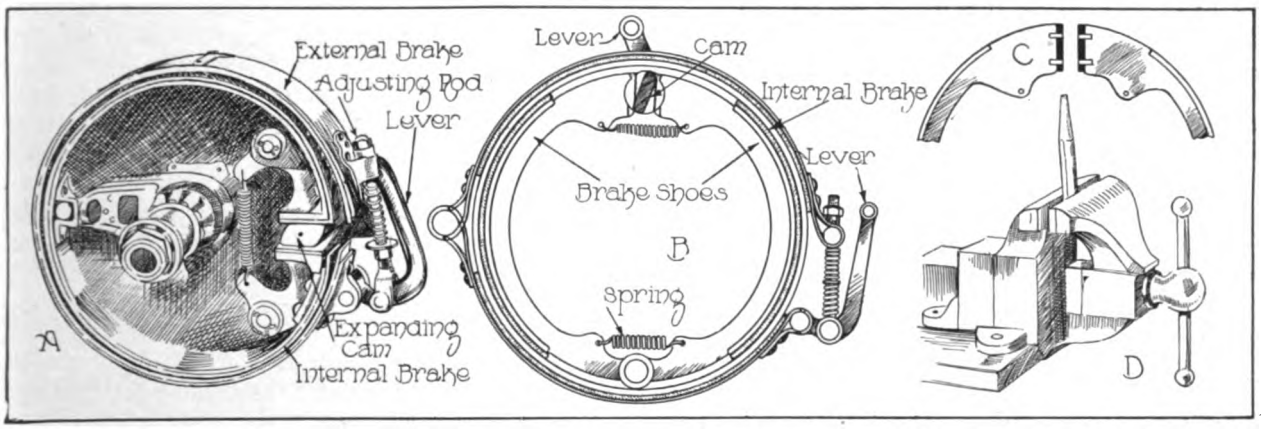
If the carburetor be heated the fuel will be vaporized easily and it will be possible to start the coldest of motors. It is not practical to utilize a naked flame, owing to the danger of igniting the fuel or producing suitable conditions for combustion, but the carburetor and intake manifold as well can be heated easily and without much effort by using hot sand.

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It is a simple matter to make a sand bag which when filled will be about an inch or more in diameter. The length will depend upon the size of the carburetor and manifold, but it should be of sufficient length to permit of making several wraps around the carburetor and the intake manifold. The manner of applying the sand bag is depicted herewith.

Of course the sand will have to be heated and this may be accomplished by placing it in the oven or on a radiator. It should be heated very hot and this will not require any great length of time. The sand will retain the heat for a considerable period and it is surprising how quickly and easily the carburetor and intake pipe may be warmed by it.

The suggestion is not necessarily confined to the motorist who garages his car upon his premises, as the sand bag could be carried in the car and placed upon a radiator while the owner was making a call and with the machine exposed to the cold. The device can be made in a few minutes, will cost practically nothing and will solve the motor starting problem.



Illustrating Types of Brakes: A, Showing Components of External Contracting and Internal Expanding Design; B, Those Utilized on a Well Known Make; C, Method of Repairing Worn Faces with Metal Strips Retained by Machine Screws; D, Depicting Use of Punch When Riveting New Linings to Shoes.

CARE AND REPAIR OF BRAKES.

With the manufacturer providing more liberal surface, brakes do not require the attention that formerly was true when the bands were narrow. With the large diameter drums and ample face, brakes give maximum efficiency and aside from an occasional adjustment do not give trouble. In time, however, the linings will wear, the amount depending upon their service and the driver. There are a number of conditions that will arise, however, and if the owner is familiar with the principle of brake construction he should be able to make minor repairs as well as adjustments.

Brakes may be divided into two classes, the external contracting and internal expanding types, although these forms may be applied in a different manner; that is to say, the brake drum may be so constructed as to enclose the contracting band. The principle, however, is similar to the external design.

While it would appear a simple matter to adjust either type when they do not grip properly, the novice is apt to so alter the positions of the contracting or expanding mechanism that although the bands grip as desired they frequently drag. This should be avoided as the least friction set up between the linings and the drums not only unduly wears the materials, but wastes power.

When brakes do not hold it does not necessarily mean that the bands need readjusting. It is possible that the friction faces may be covered with oil or grease, a condition that is frequently taken as an indication that new linings are required. When adjustments fail to give the desired results the wheels should be removed and if the facings are impregnated with lubricant they may be cleaned by washing with gasoline. If the grease or oil is working out from the differential into the brake drums, the felt washers should be displaced and new members fitted. Because the lubricant does not work out between the brakes and wheel drum is no assurance that the facings are not greasy.

An accompanying illustration shows two types of brakes, that at A being of conventional design. As the parts are clearly marked the reader should be able to understand their operation. It will be seen that the outer or external contracting band is actuated by a lever and tog-

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gle joint arrangement and that means are provided for lengthening or shortening the rod opening and closing the brake proper. By shortening the rod the area of the gripping band is restricted.

The internal expanding brakes are operated by a double cam and as these are generally employed for the emergency brakes, there is but little wear of the expanding mechanism. Where they are employed for the service members, the cams will wear in time. When badly worn it may be necessary to fit new parts, but a repair may be effected as outlined at C, this consisting of building up the faces of the brake member. In making this repair care should be exercised not to increase the normal diameter of the shoe and due allowance should be made for the brake lining, else the brakes will drag.

In relining brakes the first step is to ascertain the original thickness of the lining and the material employed. The same width should be secured and the drum measured to obtain the correct length. This is a case of mathematics or the drum may be measured with a string. Brake linings come in varying thicknesses, ranging from .125 to .25 inch. There are several excellent materials for this work and a list will be found in the Classified Buyers' Guide, elsewhere in this issue.

The shoes will have to be removed and this is not a difficult operation. Before attempting to remove the rivets securing the lining to the shoes the latter should be thoroughly washed in gasoline. Some employ a torch to burn off the old lubricant, but the writer prefers the washing process. The shoe is next clamped in the vise and the peined-over rivets cut off with a sharp cold chisel and a hammer. The rivets can then be driven out with a punch.

Next clean the shoe and secure one end of the new lining to it by clamping the parts in the vise, taking care that the facing is even or flush with the edge of the shoe. In attempting his first operation the novice is apt to fit the lining unevenly, but by observing caution the band should be free from wrinkles and be true.

With the shoe and lining held securely in the vise the drill is run through the rivet hole in the shoe and lining and the latter well countersunk so that the head will be well below the contacting surface of the lining. After drilling a number of holes and inserting the copper rivets the shoe is removed from the vise and a punch gripped in the jaws as shown in the drawing. The shoe is then held on the punch so that the head of the rivet is in contact with the top of the punch. The small end of the rivet may then be peined over. Care should be taken to have the heads well countersunk in the lining when the work is completed.

In reassembling the brakes all springs should be tested to note if they have proper tension so that the linings will not drag. If they have lost their elasticity new ones should be fitted. After adjusting the brakes, jack up the wheels and note if they drag. A simple method is to place a hand on the brake drums after a short run and note if they are warm. If so the adjustments should be altered as this is a good indication that there is undue friction.

GENERATORS AND COLD WEATHER.

Some owners take precautions to prevent the water in the circulation system from freezing, but forget the generator. The fluid in these members will not freeze when the car is in motion or the device is generating gas, particularly in the latter instance, as considerable heat is developed. If the generator is water jacketed, the fluid should be replaced with anti-freezing solution. If the car be exposed for any length of time and the lights are not left burning, remove the water chamber member and place it where it is warm. It takes but a few seconds and may save considerable expense as well as annoyance.

At the first meeting of the officers and board of directors of the Motor Dealers' Contest Association of New York City, the principal thing accomplished was the appointment of the chairmen of the various committees which will have to do with the managing of the organization. Following are the appointments announced: Executive committee, Inglis M. Uppercu; exhibition, C. H. Larson; entertainment, Arthur J. Inderrieden; publicity, John C. Wetmore; racing, George Robertson; membership, Edward F. Korbel; house, S. S. Toback; grievance, H. M. Bonner; finance, James C. Nichols; road contests, William J. Morgan; auditing, A. B. Cordner; touring, Emanuel Lascaris.

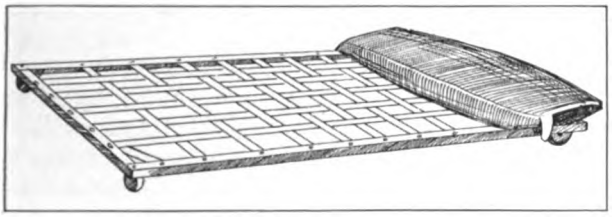
Joseph Seymour, the former automobile racing driver, has returned to the automobile business from the field of aviation and has joined the selling force of the New York City branch of the White Company, Cleveland, O., maker of White pleasure cars and trucks. Seymour raced in two Vanderbilts, the Grand Prize, the Briarcliff and Lowell events and one of the 24-hour contests at Brighton.

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EQUIPPING THE PRIVATE GARAGE.

Part IV.

Some owners do not care to go to the expense of building a pit and while it is a decided con-



A Creeper Is of Value When the Garage Is Not Equipped with a Pit.

venience it may be dispensed with and a creeper employed. This is practically a bed or rest, in that the workman may lie upon it when under the chassis making an adjustment. It is of value in that the wearing apparel is kept from contact with the greasy floor and the operator is not as likely to catch cold through lying upon the cement, etc.

Creepers are not expensive and in an accompanying illustration is presented a serviceable type marketed by the Milwaukee Auto Specialty Company, Milwaukee, Wis. It is constructed in two styles, one having roller casters and the other a countersunk ball caster. With either design the workman may roll under and out from beneath the chassis with little effort and the device is a considerable improvement over the old mat or coat employed by some.

The creeper is constructed from one-inch angle iron with the corners turned and riveted and the network is one-inch flat band steel, riveted to the frame. Being flexible it conforms readily to the shape of the body, making for comfort. The head rest is of enamelled duck, filled with a suitable material. The frame is of aluminum, neatly enamelled and the entire construction is very light and durable. The dimensions are 36 inches long by 15 wide, and this style is 2.5 inches from the floor. The other design is two inches from the floor. A creeper may be constructed by one handy with carpentering tools, but the cost of the ready made article is such that it is more advantageous.

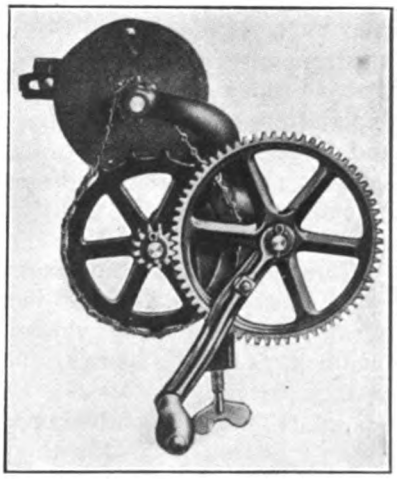
Selecting the Tools.

As previously pointed out it is more advisable to purchase a small number of high grade tools than a large quantity of inferior make. A practical equipment may be secured by buying one or two at a time and if not familiar with the makes one may consult a friend who is experienced mechanically. While there always are bargain sales of tools, the novice will do well to make sure the tools are made by a reliable firm and are not defective.

In the matter of monkey wrenches the writer favors, as do most repairmen, an all metal tool such as the Coes. It is constructed to withstand severe service and comes in varying sizes to meet individual requirements. Two or more of these will be invaluable and one should be at least six or eight inches, and if possible a much larger one for heavy work. The number of S wrenches may be limited if the box or socket wrench outfit previously mentioned is to be included in the equipment. If not, a complete set of S members will be necessary. They may be purchased in sets of one or two at a time as required. As the majority of cars provide a number of these tools and special members, it may be possible that only a few extra ones will be needed to complete the set. A Stillson also will prove serviceable.

Good Pliers Necessary.

At least two pliers will be necessary, one of the ordinary type and the other for cutting purposes. These should be of good quality and it is not economy to select cheap ones as they are generally useful. A breast or hand drill should be included and a two-speed member is preferable. While one may be purchased for about $1, it will be found that the chuck capacity is limited. It is advisable to select one of good construction, having a chuck capable of taking at least a .5-inch drill. The drills may be purchased with the tool or picked up a few at a time. They are not expensive and by buying them singly a complete set can be accumulated in a short time.



The Luther Dimo-Grit Grinder.

Screw drivers are called upon to do really hard work and one should be secured at least 10 inches long and of the metal forging type—one

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in which the central shank extends through the handle formed of two wooden pieces. A smaller member can be included for lighter work, and one having an all wood handle is best as it will be of service in testing out the ignition, the handle preventing shocks to the operator.

A grinder is a valuable addition to the equipment of the garage, especially when the owner effects his own repairs. Drills and cold chisels become dull and require resharpening, and frequently a part must be reduced slightly to make a fit. Making special sized bolts or taper pins are necessary in some overhauls. With a grinder the work is made easy and considerable time, as well as stock, is saved.

The Luther Grinder Manufacturing Company, Milwaukee, Wis., produces a large variety of grinders and in an accompanying illustration is shown the No. 46 tool. It is heavy enough to take care of all ordinary work and will handle fine edged tools. It is designed to be clamped to the bench or other convenient place and is operated by hand, energy to the wheel member being transmitted by a chain. The gearing is such that a proper grinding speed is assured at little expenditure of muscle. The bearings are wide and fitted with dust caps, and parts subject to stresses are constructed of malleable iron. An extended and threaded shaft permits of the use of several wheels at one time if desired.

The equipment comprises a medium grit grinding wheel, six by 1.5 inches, a felt polishing and a cloth buffing wheel. A foot power attachment is listed as extra. The grinder is moderately priced.

Files and Hammers.

In selecting files only those of good quality should be purchased. A large coarse file will be needed for rough cuts, while flat, half-round and square mill files about eight or 10 inches long will be of service generally. The three-cornered and "rat tail" members also will be useful.

If possible include three hammers. Two should be of the machinist ball pein type, a light and a heavy member. Some prefer the latter to weigh about 12 ounces, while others may desire a heavier tool, or one weighing 1.5 or two pounds. The third hammer should have a head of copper, lead or reinforced rawhide for driving out bolts without damaging the threads.

Cold chisels are inexpensive and one is warranted in selecting at least three, these including those with a .25, .5 and .75-inch cutting edge. The diamond point and round nose may be added if desired. In purchasing a hacksaw it is advisable to buy one having an adjustable frame so that different sized blades may be fitted. A few extra blades will be required until one has mastered the use of this tool and at least one should have fine teeth for cutting light tubing.

Miscellaneous Tools.

A centre punch is useful and a set of drifts or closed punches may be obtained at a slight cost.

Tool Equipment.		Supplies.	
Coes Wrenches	Cutting Pliers	Soldering Flux	Friction Tape
Breast Drill	Centre Punch	Dixon's Graphite	Shellac
Hacksaw	Solid Punch	Brush and Can	Waste
Stillson Wrenches	Adj. End Wrench	Cotter Pins	Taper Pins
Screw Drivers	Lead Hammer	Hex. Cap Screw	Hex. Nuts
Gasoline Torch	Tin Snips	Emery Cloth	Lock Washers
Bearing Scrapers	Wheel Puller	Oil Cans	Abrasive
Soldering Iron	Carbon Scrapers	Solder	Hand Soap
Machinist's Hammer	Steel Rule	Grease Gun	Oil Gun
Pliers	Valve Lifter	Copper Wire	Iron Wire
Socket Wrench Set	Spring Spreader	Prussian Blue	Packing
Files	Cotter Pin Extractor	Cup Grease	Gasket Material
Cold Chisels	Hacksaw Blades	Light Oil	Kerosene

A Complete Set of Tools and Line of Supplies May Be Secured by Purchasing a Few at One Time.

The small ends should measure .0625, .125, .25, .375 and .4375 inch. A steel rule, tin snips, cotter pin extractor, bearing and carbon scrapers and a valve lifter may be included in the equipment, although some of these members may be made.

A gasoline torch, solder and flux are handy in the garage and there are a number of useful purposes to which the torch may be put. While the list may appear rather formidable to the novice, and the entire equipment involve the expenditure of a considerable sum, many of the tools listed may be secured at very reasonable prices. A number of supply houses issue catalogues, illustrating and describing the parts as well as giving the cost of each tool. Among the houses mailing complete data upon tool equipment are Chas. E. Miller, 97-103 Reade street, New York City; the Bi-Motor Equipment Company, 177 Portland street, Boston, and the Waite Auto Supply Company, Providence, R. I.

(To Be Continued.)

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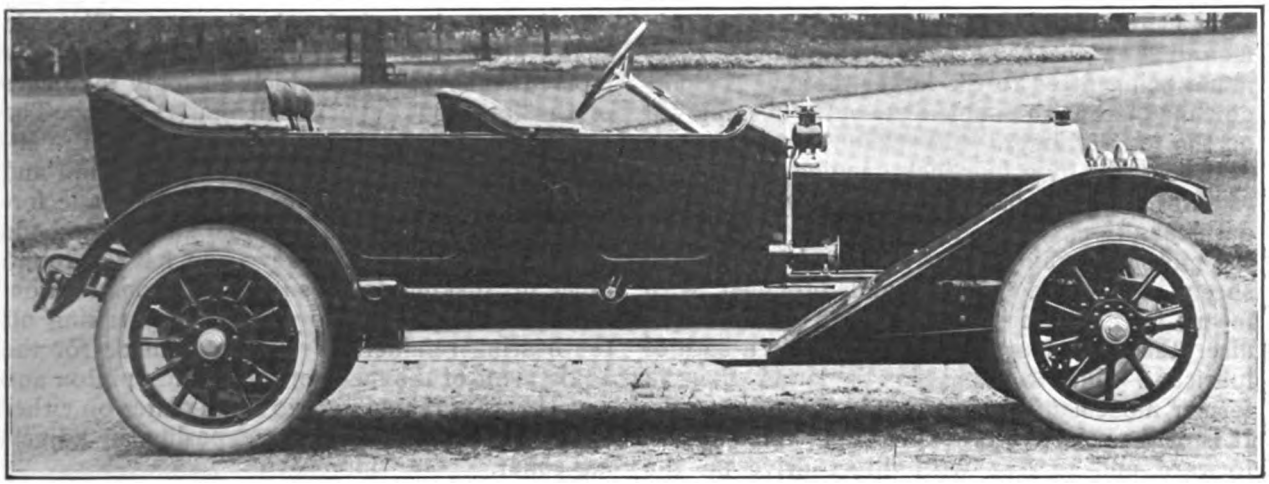
STUTZ LINE INCLUDES NEW SIX CYLINDER.

THE Ideal Motor Car Company, Indianapolis, Ind., maker of the Stutz car, is manufacturing a six-cylinder chassis in addition to a four-cylinder, and the new models will be known as series B. To each chassis will be fitted a four and six-passenger touring body and a two-passenger roadster. While the design is the same as the series A, minor changes have been made, these being in the nature of refinements. Among the improvements are a larger capacity radiator and heavier rear axle and transmission. Electric lighting is now standard equipment on all models and throughout attention has been paid to those details of construction that make for economy in upkeep and convenience in operation.

The new six-cylinder power plant is of the same general design as the four produced last year and with the exception of bore and stroke, wheelbase and ignition, the description of the larger machine will apply to the new four-cylinder car. The efficiency and durability of the Stutz construction has been amply demonstrated in speed and endurance contests during the past two seasons and the machines have made a very favorable impression among their owners.

Both motors are of the T head type with cylinders cast in pairs and water jackets integral. The bore and stroke of the six-cylinder unit is 4.25 by five inches, that of the smaller motor 4.75 by 5.5. A fine grade of gray iron is employed and special attention is given to the machining and grinding process as well as the fitting of the pistons and rings. It is stated that the four-cylinder motor has developed 60 horsepower on a block test at 1500 revolutions a minute. The cylinders are offset .75 inch.

The crankshaft is hollow, two inches in diameter and constructed of 40 point carbon steel. It rotates in three large bearings of ample length and the seats and bearings are carefully scraped in. The connecting rods are of the I beam section type and are bushed with Parsons' white bronze. The bearings are two inches in diameter, 3.5 long, and the caps are retained by four bolts. The wristpins are of hollow tool steel, ground and hardened. The camshafts are of high grade steel and rotate in large white bronze bearings. The pushrods are ample in size, of the roller type, have extra long bearings and actuate nickel steel headed valves 2.5 inches in diameter. All valve mechanism is enclosed by an aluminum housing split in the centre and retained by a simple spring device.

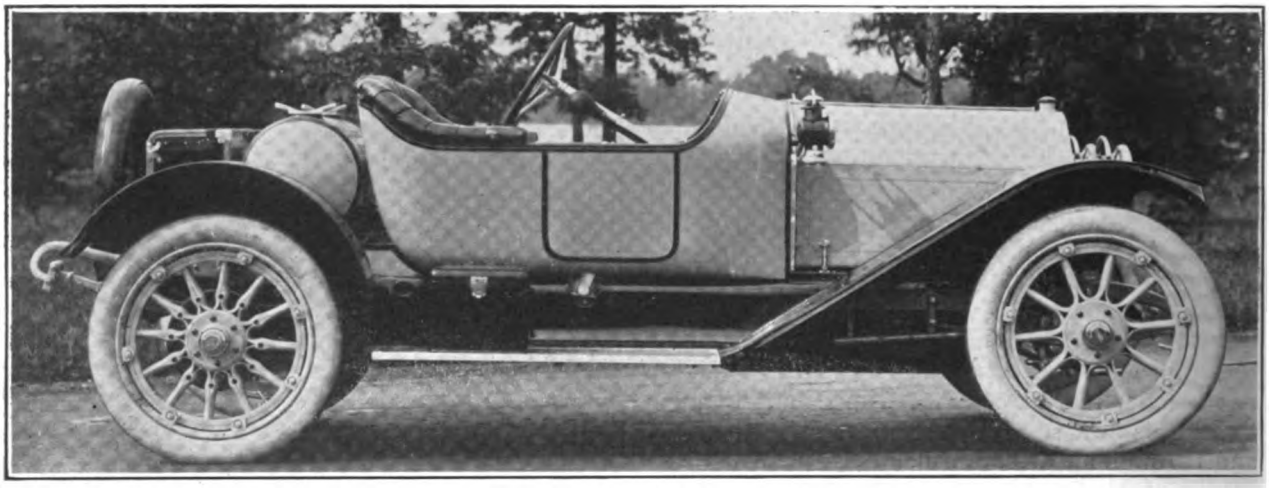


Stutz Six-Cylinder, Six-Passenger Touring Car Having Straight Line Body—A Two-Passenger Roadster and Four-Passenger Touring Body Also Are Fitted to This Chassis.

The crankcase is of aluminum, the upper half supporting the crankshaft bearings with heavy webs extending through the entire centre depth of the case, insuring rigidity. The timing gears are of the spiral type with extra wide face and rotate in a bath of lubricant.

The oiling system is of the circulating type. The lubricant is pumped from the sump in the lower half of the crankcase through a main duct cast integral with the crankcase to ducts leading to each crankshaft bearing, thence through the hollow crankshaft to each connecting rod bearing. The overflow returns to the sump, where it is filtered and used again. The oil capacity is seven quarts and a glass gauge on top of the

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Four-Cylinder Stutz Roadster, Having Attractive Lines and Low Centre of Gravity.

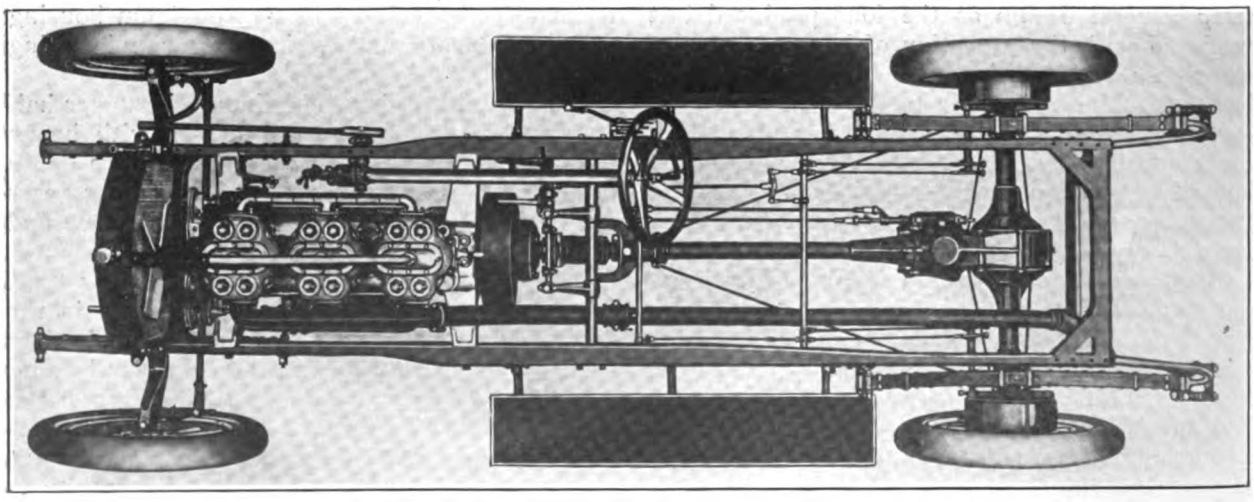
crankcase denotes the amount in the reservoir.

Carburetion is by a Stromberg located on the right hand side of the motor and the magneto is mounted on the same side, an improved Eisemann being fitted to the larger motor. A Splitdorf magneto with double distributor is employed on the four-cylinder.

Cooling is by a four-inch genuine honeycomb radiator, the fluid being circulated by a centrifugal gear driven pump located on the left side of the motor. Cooling is further aided by a fan of special design, belt driven and provided with means for adjustment. The clutch is a multiple disc, steel against steel, and operates in a bath of lubricant. The transmission is larger than in former models and is integral with the rear axle. It is of the selective type, providing three speeds forward and reverse with direct drive on the third speed. The shafts are of a high grade steel and large annular bearings are employed.

The semi-floating Stutz special rear axle is larger than formerly, the differential case having been increased two inches in diameter. The axle shafts are supported at the differential end by tapered roller bearings which not only take care of the load, but take up all end thrusts. The outer ends of the axles are supported in large annular bearings, these being similar in design and construction to those utilized on high grade foreign cars. The axles have squared ends and the wheels instead of being keyed on have a round taper fit, making for a substantial construction. The axles may be removed easily by taking off the bearing retainer. Provision is made for the adjustment of the mesh of the driving pinion and bevel gear by removing two small plates on either side of the differential case exposing an adjusting collar.

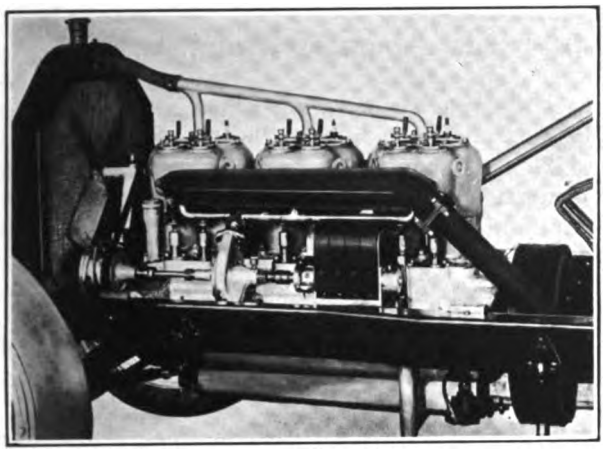
The drive is a straight line by shaft and a double knuckle universal joint is fitted back of



Plan View of Series B Stutz Chassis—Note the Straight Line Drive and Accessibility of Components.

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the clutch. The drive is through a torsion tube and fork attached to a torsion bracket on a cross member of the frame. The springs are semi-el-



Exhaust Side of Stutz Six, Showing Method of Driving Lighting Dynamo Through Water Pump.

liptic with graduated leaves and are held by double shackles with hardened and ground spring bolts, bored for lubrication by grease cups. The frame is of pressed steel with channel of 4.5 inches and width of section three inches in the centre. There is a kick-up of 2.5 inches at the rear and the frame is in-swept three inches in front, providing for a short turning radius. It is well braced by three cross members.

A Timken drop forged I beam section front axle is employed and is designed to have 100 per cent. overload capacity. The steering knuckles are very large and roller bearings make for durability as well as for easy steering. The brakes are of the internal expanding twin type with drums 14 inches in diameter and 4.5 wide, faced with an asbestos lining. Equalizers are provided and all braking mechanism is enclosed.

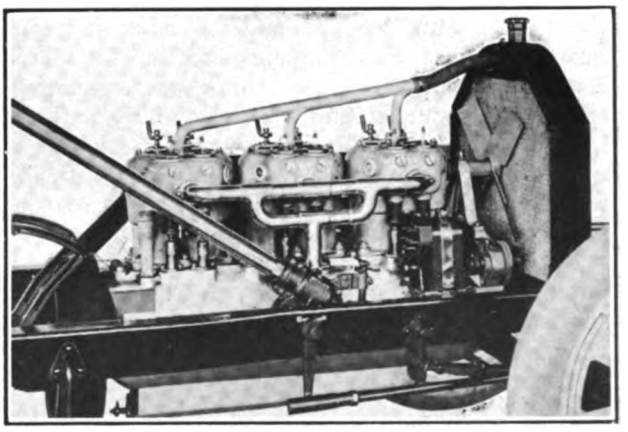
The wheels are sturdy, having 10 1.75-inch spokes in the front and 12 in the rear, the last named being bolted to the brake drums. Tires are 34 by 4.5 inches on both chassis and Baker demountable rims with one extra member are standard equipment. The steering gear is a Gemmer worm and gear type having thrust bearings at the top and bottom of the worm gear. All parts are bushed. The steering post is two inches in diameter with an 18-inch wheel having an aluminum spider and rim cast in one piece. The wheel proper is of English walnut. The spark and throttle levers are located on top of the wheel and have an extra wide quadrant.

The driver is placed at the right and the control levers are inside the body on all models. The clutch pedal is at the left with brake at the right, the accelerator being placed between these members. The gear shift lever operates in the conventional H quadrant. The wheelbase on the four-cylinder chassis is 120 inches for the roadster and 124 for the touring types. That on the larger chassis is 130 inches for the touring cars and 124 for the roadster. The tread is standard, 56 inches.

The Esterline electric lighting system is fitted to each model and the dynamo is driven by the shaft actuating the water pump. The Esterline system has been fully described in these columns. The headlights are straight electrical units, but the side and tail light are combination electric and oil. All lamps are finished in nickel and black.

The passenger capacity of the Stutz bodies differs from conventional practise in that they are two, four or six-passenger types, the company holding that this design makes for a more even distribution of weight and maximum tire service. The bodies are noticeable for rich upholstery and attractive straight lines. Ample room is provided in all models, both in the front and tonneau. The roadster bodies are particularly striking because of their racy appearance and low centre of gravity. They carry a large combination fuel and oil tank at the rear, also a trunk and tire irons. The standard colors are vermilion and green chassis and Mercedes red, maroon and Napier green bodies.

W. J. McDowell of the General Vehicle Company, Long Island City, N. Y., reports the sale of a five-ton truck with Edison batteries to the Man-



Intake Side of New Stutz Six-Cylinder Motor Noticeable for Its Compactness and Quiet Operation.

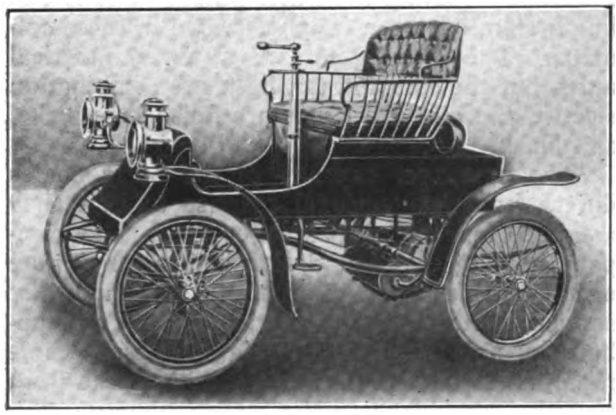
hattan Brewing Company of Chicago. This is the first five-ton electric truck purchased by a Chicago brewery.

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FEATURES OF WIRE WHEEL CONSTRUCTION.

Some Advantages Claimed for this Type of Suspension--Reasons Advanced by Its Advocates for Expected Popularity with American Motorists.

SINCE 20 per cent. of the motor car manufacturers exhibiting at the recent shows announced they were prepared to furnish wire



An Early Type of Wire Wheel Utilized on American Cars.

wheels either as regular equipment, at an option or at an extra cost, it will not be denied, perhaps, that the subject contains something of interest to the automobile owner. The wire wheel enthusiast predicts that in 1914 a majority of the new American machines will be fitted with these members. There must be some reason for this apparent change in sentiment, if it be true that it exists in such proportions.

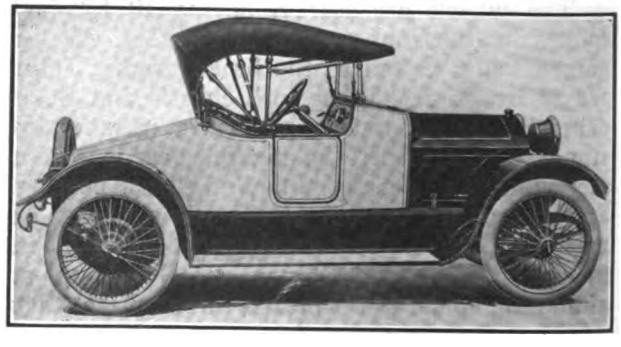
The first practical automobiles produced in this country utilized wire wheels, but in many instances these were bicycle wheels. There followed an attempt to adapt this type of construction to the peculiar conditions prevailing with the heavier vehicles. The result was not such as to compare at all favorably with the possibilities of wood wheels, at least insofar as American road service was concerned.

Wire wheels have continued to enjoy wide popularity abroad, particularly in England, where several conditions combine to create a situation very different from that which has existed in this country. In the first place English wood is lacking in structural strength when compared with American hickory, and the other woods available—French cypress, for example—are lacking in other desirable qualities, and while it may be contended that the wire wheel in England was the result of necessity rather than choice, there is little question that the superior road surfaces in Great Britain have afforded its use under the best possible conditions.

There does not appear to be any need for securing a change in wheel material in America, unless it can be demonstrated that the new possesses advantages not contained in the old. Contrary to an opinion which has been gaining ground more or less during the past two years, it is stated by those who should be in a position to know that the supply of hickory stock is still far from being exhausted.

The superiority of the American wheel has hitherto depended largely upon the quality of the stock, and hickory of proper quality is not a standard commercial article, but a specialty. It cannot be purchased in the open market. Wheel makers send their inspectors into the forests to select the timber, and to the mills to sort just such stock as is suitable for automobile wheels. John Kelsey, a man who has been engaged in the hardwood lumber business for several years, states that the hickory used in making 200,000 cars a year—12,000,000 spokes and 2,000,000 felloe rims—is simply a drop in the bucket compared with the vast amount of timber in the South, where hard woods predominate, and where there always will be found a liberal percentage of hickory.

If, then, there is no reason for fearing a shortage, and it is conceded that automobile wheels made from American hickory are the best wood wheels to be found, why should the industry re-



An American Machine Equipped with 1913 Model Wire Wheels.

vert to a type which virtually had been abandoned as unsuitable? Simply because the wire wheel of today bears very little resemblance to

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that of the earlier period. It is maintained that the British constructors found that even under the superior conditions for its use in that country, the older types of wire wheels failed to give proper service. One of the greatest troubles was the loosening of the spokes, while another was the tendency toward rusting. Both of these difficulties are held to have been entirely eliminated through a complete redesigning of the construction, and the special treatment of the material. In other words, the development of the wire wheel has been along lines very similar to those which have governed the other components of the automobile.

Among the advantages claimed for wire wheels are the following: Increased tire mileage, reduction in weight with resulting increase in fuel mileage, increased strength, improved riding and driving qualities, improved car appearance and superior demountable features. Some of these must be considered a matter of personal opinion, reference being had particularly to the item of improved car appearance. Others are susceptible to proof, and it is purposed to present such evidence as is available at this time.

In the matter of tire economy, the following letters to the editor of The Motor Car Journal, a British motoring print, are of interest:

While it has been quickly realized by the observant car owner that wire wheels make for greater strength and safety, and at the same time secure a considerable reduction of dead weight, their beneficial effect upon the life of tires is not so generally known, and we therefore trespass upon your space to record the results of certain experiments which have been carried out by our hire department in London. There careful data have been kept of all tire replacements and repairs, and the following figures show the mileage obtained on heavy covered cars from 100 non-skid 935 by 135 mm covers, half of which were fitted to wire, and half to wooden wheels:: Total mileage obtained from 50 non-skid 935 by 135 mm covers taken from wire wheels, 172,731 miles; average, 3454. Total mileage obtained from 50 non-skid 935 by 135 mm covers taken from wood wheels, 102,524 miles; average, 2050. Average miles per cover, 3454 on wire wheels. Average miles per cover, 2050 on artillery wheels. As the cars employed were practically identical, and were run under exactly similar conditions, the results are very instructive.

Yours truly,
THE DAIMLER COMPANY, LTD.

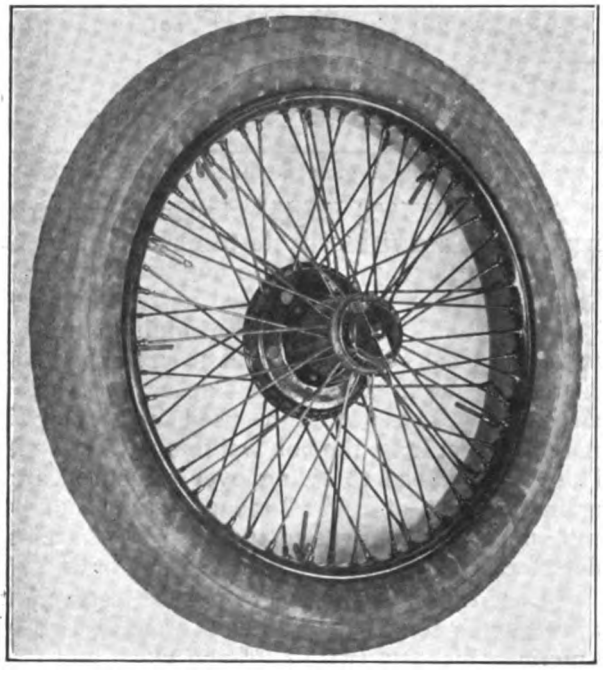
The data furnished by the Daimler Company based on 50 tires on cars with wood wheels and 50 on cars with wire wheels (the cars being otherwise identical) show that wire wheels reduce the tire bill by over 40 per cent., or, put another way, wire wheels save 2¼d. a mile with the size of car and tire used. The net cost of fitting an artillery-wheeled car with Rudge-Whitworth detachable wheels varies from £30 to £40, so that the total cost of the change would be saved in under 4500 miles except in the case of very light cars, where it would probably take just over 6000 miles to save the first cost. The reduction in tire bill would of course continue after the saving had been effected. It is hardly necessary to add that these wheels can be fitted to any make of car.

Yours truly,
JOHN V. PUGH.

Similar installations are not to be found in this country. A few cars fitted with wire wheels have been run hundreds of miles, but practically the sole opportunity to study the tire situation has been in connection with the use of such equipment on racing cars, and this only during the 1912 season. The following letter sets forth the experience of one of these machines with a wire wheel made by the McCue Company, Buffalo, N. Y.:

We wish to inform you that your wire wheels stood up nobly well in both the Vanderbilt and Grand Prize races on the Stutz car.

We found it necessary to only change one rear tire in the Vanderbilt race and one rear tire in the Grand Prize race, the front tires going through both races, the Vanderbilt and Grand Prize, without a change and the two rear tires that we changed in both races were simply on account of worn tread and not due to loss of air. Upon examining the spokes of these wheels, after going



McCue Wire Wheel Used on Stutz Car in Vanderbilt and Grand Prize Races of 1912.

through both races, we did not find one loose spoke or a wheel the least out of true.

This performance has not only converted the writer to wire wheels, but has caused him to give an option of wire wheels on future Stutz cars.

None of the wheel locks loosened a particle, in either race, and were just as secure at the finish as they were in the start.

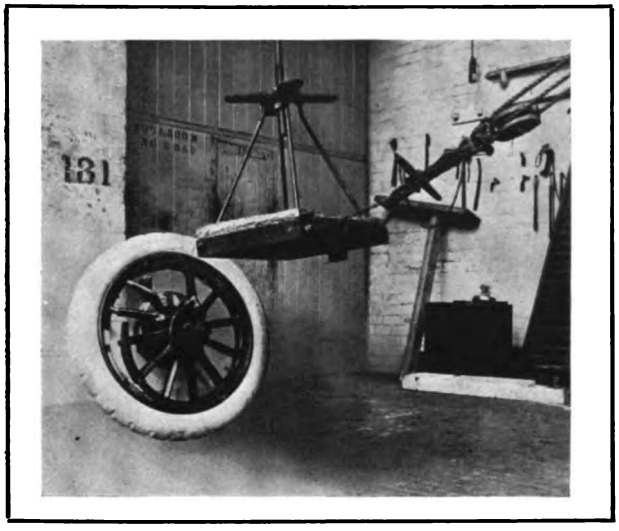
We wish to congratulate you on your wheels from a practical standpoint and wish you every success you deserve.

With best personal regards, beg to remain,
Very truly yours,
IDEAL MOTOR CAR COMPANY,
H. C. STUTZ,
President and General Manager.
Indianapolis, Ind., Oct. 9, 1912.

Engineers contend that the use of a multiplicity of fine spokes creates a large number of air currents, which are deflected about the tires and tend to keep them cool. This is a condition

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that seems to be borne out by statements made in this letter, although the subject of strength is touched upon in a measure as well.



Wood Wheel Undergoing Dynamic Pendulum Test.

As early as 1908 English designers were engaged upon a series of tests to demonstrate the comparative strength of wire and wood wheels. American hickory was selected as the standard for the latter. The dynamic pendulum method was employed, this being held to correspond to the violent termination of a side slip against a curbstone. The pendulum used was approximately 11 feet long, the bob weighing 480 pounds. This was allowed to swing over measured arcs against the rim of a wheel mounted on a dummy hub spindle, which was in turn a part of a massive steel bar secured to a concrete monolith.

In one of the most recent of these tests, eight wheels were selected, two being of wire, two of American hickory, two of French wood and two of steel plates. Five blows were given each wheel, with the results shown in the following table:

Total Permanent Deflection in Inches.*

Type of wheel	Weight in lbs.	Blows 1	2	3	4	5
Wire	29.2	.36	.60	.90	1.16	1.49
Wire	30.0	.31	.55	.82	1.18	2.56
American	46.0	.28	.46	.67	.89	1.17
American	47.0	.21	.32	.84	1.41	2.20
Steel	36.5	.59	1.06	1.60	2.14	2.80
Steel	37.7	.53	1.05	1.60	2.17	2.79
French	38.7	.27	.45	.84	4.88	...
French	39.5	.25	.41	.64	1.07	4.60

*The effect of each blow should be taken into consideration with the above, and was as follows, taking the wheels in the order given:

First wire—No damage.

Second wire—Five spokes broken and two nipples pulled through on fourth blow; two spokes broken and two nipples pulled through on the fifth.

First American—Two spokes cracked on second blow; flange cracked on third; four spokes cracked on fourth; two bolt heads cracked on fifth.

Second American—One spoke cracked on second blow; rim moved on third; rim moved, one-quarter of felloe split and three spokes broken on fourth; felloe smashed on fifth.

First steel—Buckled at hub on second blow; hub badly buckled on fifth.

Second steel—Hub buckled on fifth blow.

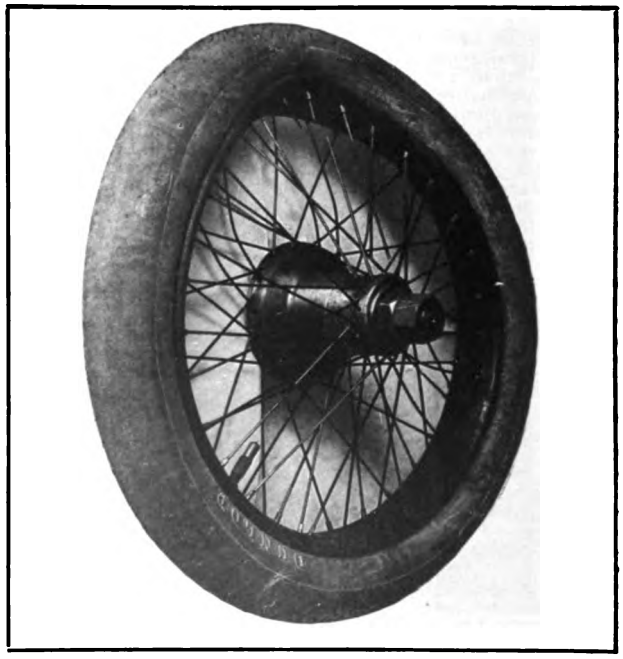
First French—Three spokes split on first blow; six spokes broken on second; one spoke broken on third; wheel smashed on fourth.

Second French—Four spokes cracked on first blow; five spokes cracked on third; seven spokes broken on fourth; wheel smashed on fifth.

An accompanying illustration shows Hugh Hughes in a Mercer car, during the Elgin race of last year. It is stated that the weight of the car was thrown upon this right front wheel in this manner at every round of the circuit, and at the end of the race the wheel showed no ill effects. The following letter to the Standard Roller Bearing Company, 50th street and Lancaster avenue, Philadelphia, maker of Rudge-Whitworth wheels under license from the British manufacturer, indicates in another manner the experience of the Mercer Automobile Company:

You may be interested to learn of a very severe involuntary test to which we subjected a set of 32x4 Rudge-Whitworth wheels recently, owing to an unavoidable accident.

Our Mr. Wishart was driving our "Special" at a speed better than 75 miles an hour, when without warning a small boy on a velocipede ran out in front of him, making it necessary for him to either kill the boy or take to the ditch, and he chose the latter. He encountered a ditch which was about 18 to 20 inches deep, at an angle of about 20 degrees, and both front wheels went clear to the bottom, as inspection showed, and came out again,



Rudge-Whitworth Wire Wheel at Completion of Dynamic Pendulum Test.

plowing, however, very deep furrows in the heavy sod, and when the rear wheels struck the ditch, adding to the momentum already imparted to the car as a result of the front wheels striking the ditch, the car turned over

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sideways and endwise, landing on top of a fence bottom side up with the motor still running.

Examination discloses the fact that there wasn't as much as one spoke bent in either of the wheels, although the front axle was twisted practically a quarter of the way around.

Neither man was hurt in the least, except that Mr. Wishart had a cut near the eye from broken goggles, and I feel sure that their lives were saved by the wire wheels alone. There is no question in my mind but what wooden wheels would have crushed under the weight of the impact, which would have resulted in the car turning abruptly over endways, and owing to the construction of the body, escape would have been impossible. Inspection of the scene of the accident makes it almost impossible to believe that the car and occupants could have escaped so easily, and yet such is the fact.

I write you this knowing you are interested in this particular make of wheels and assure you that my respect for them is beyond expression.

Yours very truly,

FINLEY R. PORTER,

Engineer Mercer Automobile Company.

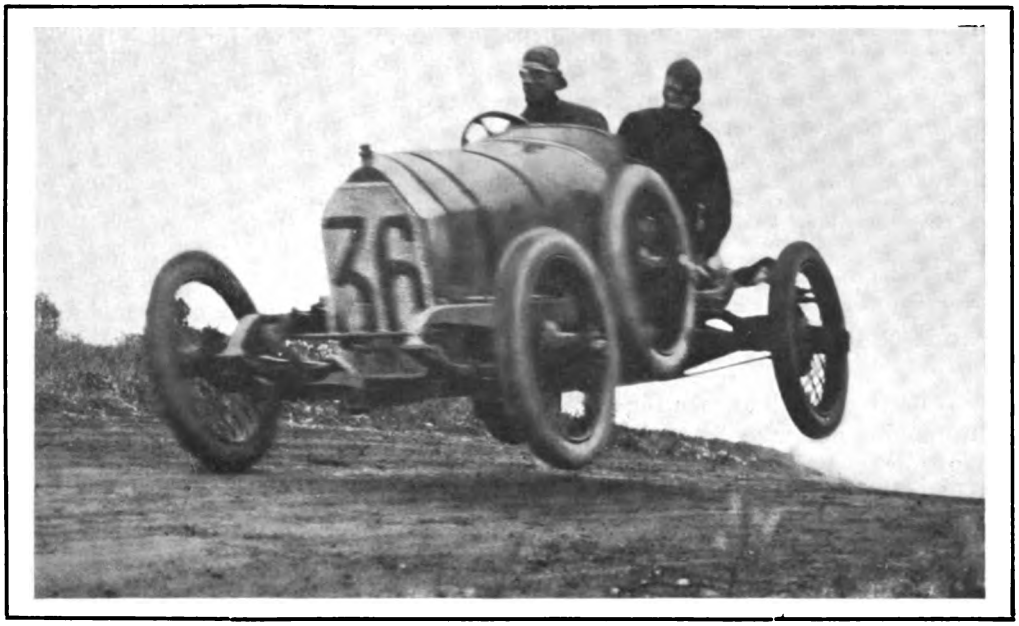
Trenton, N. J., Dec. 2, 1912.

Inasmuch as the average weight of wire wheels is about 30 pounds, while that of American hickory members is at least 45, it is maintained that a set of five weighs about the same as four of the wood. While superior demountable features are claimed for the wire wheels, it may be stated that some manufacturers have solved this problem as applied to wood wheels. And it also is worthy of note that the development of the demountable rim has been carried much further in this country than in Great Britain, where demountable wire wheels have received the most favor heretofore. However, the use of the latter is held to obviate the necessity for the former, with a corresponding decrease in weight.

Superior riding qualities are claimed because the wire wheel is a suspension member. Seventy spokes are employed as against 12 or 14 in the wood wheel. Automobile engineers contend that the American wood wheel is a suspension member, something that cannot be produced abroad with the woods available. The suspension principle with this type is held to have been obtained by cutting the felloe from the whole stock and shaping it under hydraulic pressure.

Little attempt has been made herein to do other than call attention to some of the advantages claimed for the wire wheels, and to present some of the arguments on both sides of the question. There are several engineering problems involved, concerning which there is a diversity of opinion among wheel makers. These are held to be solved by the design and construction of the individual make of wheel. Space does not permit of taking up the detail description of types available, although it is planned to present these in early issues.

There remains one other suggestion in connection with the use of wire wheels, and that is the ease with which repairs may be made. Attention has been called to the demountable feature, by means of which it is a simple matter to replace a wheel and damaged tire with another wheel carrying a fully inflated shoe. Naturally, provision is made for quick detaching of the tire itself, and it may be added that certain rim makers in this country have been devoting their attention to the production of quick detachable and demountable rims for wire wheel service. It is maintained that practically the only need for repairs will be found in the possible necessity for replacing a broken spoke. The process involved is not unlike that which prevailed when bicycle wheels were utilized. With the detachable or demountable rim removed, the ends of the spokes are easy of access and the work of replacement is one which takes but little time or effort.



Hugh Hughes in Mercer Car Fitted with Rudge-Whitworth Wire Wheels Rounding Curve in Elgin Race of 1912.

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MEETING AMERICAN INVASION.

It has been well known for some time that the automobile manufacturers in France and Germany, as well as those in Great Britain, were much disturbed concerning the rapid growth of importations from this country. There has been some disposition, particularly in Great Britain, to ridicule the product of American makers, but the results for the past year have been such as to indicate in no unmistakable terms that this policy is far from satisfactory. A few British producers are now seeking to offset this American influence by marketing cars at less price or by adopting an installment system.

A committee of French manufacturers visited America last year in an effort to study the situation at first hand and learn in what manner it would be possible for them to meet the competition. Apparently, they had difficulty in solving the problem on that basis, as is evidenced by the following notice received by certain American producers:

The French customs regulations prohibit the importation into France or the admission into France in transit of goods bearing the name of a manufacturer or a business firm which is established in France.

This is based on an old law, passed in 1892, but it would appear to offer a substantial barrier to many American cars, either in themselves or because of the accessories used on them, unless the interpretation placed upon it by the French customs officials be found faulty. Not only does it reach the manufacturer, but the tourist as well, and when this last phase of the situation is understood by the French people it is quite possible that another interpretation will be forthcoming.

THE STATE BOUNDARY LINE.

In explanation of the proposed amendment to the Connecticut motoring law, providing that the reciprocity provision shall not apply to non-resident owners of motor trucks except for 10 days in any calendar year, Secretary of State Phillips is quoted as saying: "The business men of Connecticut do not object to competition, but they do object, and reasonably, too, to the advantage to the outsider." This is taken as an indication that the present very liberal motoring law is to be amended, if at all, because mercantile houses outside the state are maintaining motor truck delivery service in towns across the border.

It seems to be difficult to make it understood that the mechanical transport is an economic factor in the world's business history. If, for instance, New York City merchants are able to use motor vehicles to advantage in competing with the business men in Fairfield county, it also is possible for the market gardeners of northern Hartford and Tolland counties to compete in the same manner with Hampden county farmers in the market centring in Springfield, Mass. The same problem arises at every state line in the country.

The Connecticut doctrine, if such it may be termed, is new. New Jersey excluded both pleasure and commercial motor vehicles, but on the ground that visiting cars destroyed the roads toward the construction and maintenance of which they failed to contribute. Experience showed plainly that this was a decided mistake, strictly from an economic viewpoint.

Last summer the village of Bellevue, Ky., undertook to exclude motor truck service from business houses in Cincinnati, O., but within a month has withdrawn the court action it began to enforce its system of registration, ostensibly to pro-

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tect its roads. It needed less than six months in this instance to demonstrate that as an economic proposition the position taken by the Bellevue officials was wrong.

NEW LEGISLATIVE POLICY.

Early in the month the secretary of state for New York invited motorists, automobile organizations, manufacturers, dealers and motoring publications to a conference at his office in Albany, at which were discussed the various measures now before the New York legislature. A short time since the secretary of state for California commissioned the automobile clubs in that state to draw up a bill for a motoring law which should meet with their approval.

This is a decidedly new policy in legislative matters. If it works well in these two states, and there seems no reason why it should not, it may be tried in others. In view of the situation, organized motorists will do well to consider still more carefully the proposition of uniform motoring regulations and other reforms which are needed. There may yet be opportunity to see these enacted into law.

APPORTIONING ROAD MONEY.

Motor car owners have been willing to overlook their constitutional rights in the matter of special taxation, in the form of registration fees, largely because there has been disposition to use this money for road construction and maintenance. There has been need for a long campaign of education in order to demonstrate the value of better highways.

If the motorist must continue to bear more than his just proportion of this expense he should at least be assured that the money thus contributed is used wisely. Americans still have much to learn in the science of road building, and the utmost progress cannot be expected until the American system of politics is eliminated from the application of the funds.

The subject is brought directly to notice by the fact that the levy court of New Castle county, Delaware, on the main line between Philadelphia and Washington, is seeking to change the present motoring law of that state so that registration shall be made with the clerk of the peace in the county of residence instead of with the secretary of state. The evident purpose of the bill is to secure a different apportionment of the automobile road funds.

The Delaware Automobile Association very properly objects to the enactment. The cost of administration of such funds in the various commonwealths is quite sufficient under the plans now in operation without multiplying the sources of expense. There should be some other method of insuring that New Castle county shall secure its proper share of the good roads money.

NATIONAL SHOW SITUATION.

In some respects the present discussion regarding the annual show situation is one of the most important which has engaged the attention of the automobile industry in recent years. That there is lack of unanimity in the opinions as expressed by those most directly concerned is by no means surprising. At least there is abundant evidence that the subject has been given serious consideration.

The national show formerly was held for the purpose of interesting dealers in the new products of the manufacturers. The season's models were withheld for announcement at this time. Its legitimate purpose, as is true of the local show, was to stimulate business. But since makers have adopted a policy of announcing new models so early in the season, the dealer who has not contracted for his supply of cars previous to the holding of his local display has little need of business stimulation.

Were the question simply one of expense, there does not appear to be much reason to doubt that similar results could be secured for less money. The problem involves reaching the greatest number and in the most advantageous manner. Whatever decision is reached must be with a view to benefiting the entire industry.

REDUCING TRANSPORTATION COST.

The main thing, according to the Boston Post, in the question of the high cost of living, is to reduce the cost of transporting farm products to the market. Massachusetts has failed to appreciate this factor if it permits its legislature to enact into law the bill now pending to restrict the size and weight of motor vehicles utilizing the public highways.

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A chassis that presents a number of interesting features is the 100-120 horsepower Isotta Fraschini, made by the Fabbrica Automobili Isotta Fraschini, Milan, Italy. The illustrations herewith are presented by courtesy of Charles H. Fuller, Jr., Pawtucket, R. I., who owns one of these machines, purchased through the Isotta Fraschini Motors Company, 1849 Broadway, New York City, the American representative.

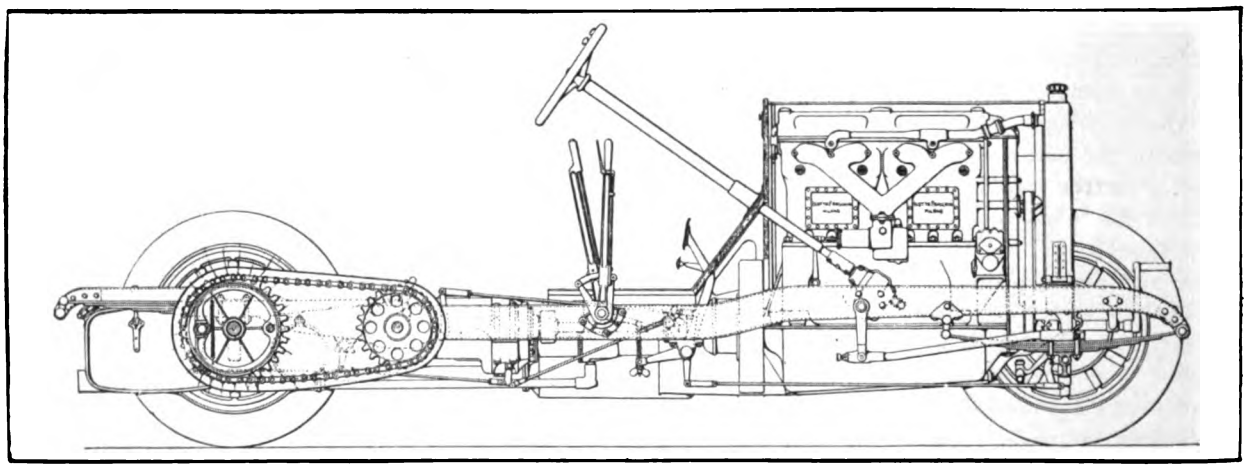
The motor has cylinders cast in pairs, the bore being 5.12 inches and the stroke 7.87. The valves are of the enclosed overhead type, there being four for each cylinder, two on either side. These are operated by overhead enclosed camshaft and rocker arms, running in oil. In fact, all moving parts are enclosed by aluminum covers, thereby making for quiet operation.

Lubrication is by a circulation system, held to be absolutely automatic in operation. A gauge on the dash indicates the rate of circulation which is maintained by a gear driven pump. Suitable drain cocks are provided. The carburetor is a special Zenith and the magneto is a Bosch.

The clutch is a multiple disc member, running in oil. The transmission is of the selective type, affording four speeds forward and reverse, with direct drive on the fourth. The construction is of special design held to permit semi-direct drive on the other speeds, another factor making for silence.

Drive is by double side chain, and these are protected by metal covers, so constructed as to form an integral part of the distance rods. These guards have no hinges or moving joints, and are held to be so simple that they may be removed in a few minutes. The fuel tank is at the rear, feed being by air pressure maintained by a small automatic pump.

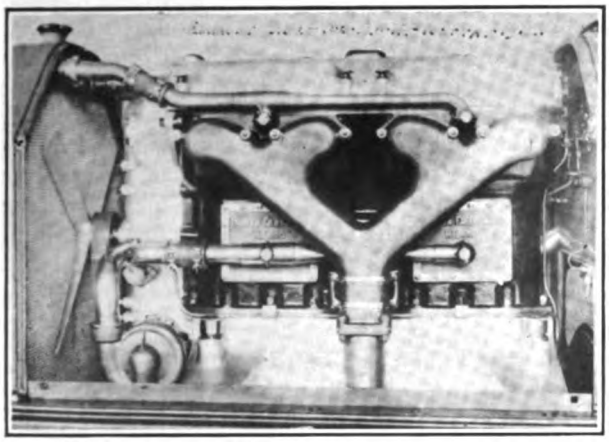
A particular feature is the braking system on all four wheels, this being considered a decided element of safety. One set of emergency brakes operates on rear wheel drums, while a second emergency set comprises the Isotta Fraschini patented front brakes. The latter are operated by lever and may be used in conjunction with the rear members or independently as desired. In addition, the chassis is equipped with two water-cooled service brakes located on the jackshaft.



Side View of 100-120 Horsepower Isotta Fraschini Chassis for 1913 Season, Illustrating General Construction.

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The advantages claimed for the front wheel brakes are as follows: More stability of the chassis at any speed, whether the brakes are ap-



Exhaust Side of Isotta Fraschini 100-120 Horsepower Motor.

plied simultaneously or not; skidding reduced to a minimum; doubled braking power, which makes stopping quicker and safer, without noise or violence; less wear and tear on tires; greater speed on long, steep descents.

Two lengths of wheelbase are offered, one of 124 inches and the other of 130. The tread is 55.87 inches. The tires are 920 by 120 mm or approximately 36 by 4.75 inches.

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Comprehensive tests of solid tires in England, covering the use of 37 British motor trucks ranging in size from one to six tons capacities, have been completed recently with interesting results so far as tire mileage is concerned. The trucks represented six different makes, including some motor omnibuses, and the average of the vehicles was 17,409 miles a set of six tires, based upon the consumption of three sets to each truck. The compiler of the figures, A. E. M. Turner of London, in commenting on the comparative service of tires, stated that with one exception the British tire makers were behind those of European manufacture and that the American tires were as good or better than those produced on the Continent.

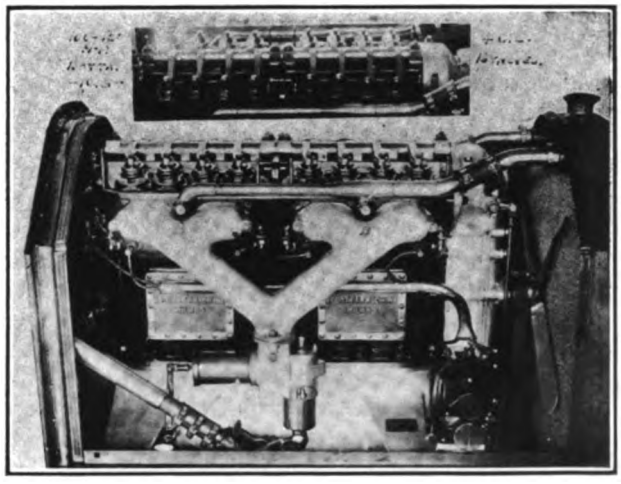
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The recent successful application of a propeller working in the air as a means of propulsion both for a road vehicle and a canal barge has been followed by some interesting experiments by French officers in Algiers with a kind of sledge mounted on six wheels, driven by a 50 horsepower motor and similarly equipped with a propeller. This vehicle, which carries three persons, travels easily over the rolling sand at a speed of 12 to 18 miles an hour and is said to be able to climb gradients of one in five. This vehicle it is believed will solve many of the difficulties of transportation in the Sahara desert, as well as in Turkey-in-Asia, Persia and in northern Africa.

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It appears that France has adopted a novel means to decrease the importation into that country of many of the most prominent foreign cars. An old French customs law of Jan. 11, 1892, which prohibits the importation of all foreign products bearing any mark that might suggest French origin, has been revived for this purpose. The law has been elaborated upon apparently, for notice was recently received at the Detroit factory of the Michelin Tire Company, from the headquarters at Milltown, N. J., to the effect that "the French customs regulations prohibit the importation into France or the admission into France in transit, of goods bearing the name of a manufacturer or a business firm which is established in France." This prohibition would include Michelin tires, Dunlop tires, Goodrich tires, Palmer Cord tires, S. R. O. French bearings, Bosch magnetos, Mea magnetos, Zenith carburetors, Bougie spark plugs, Knight motors, Continental lamps and many other articles.

While no specific reference is made in that law to the customs treatment of American products manufactured by a company having a branch factory in France, such as the B. F. Goodrich Company, Akron, O., it would seem that a strict interpretation of article 15 of the customs law of



Intake Side of Isotta Fraschini Engine, Showing Valve Location, Etc.

1892 would exclude such products from importation into France unless properly marked. The enforcement by France of this law is an almost

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direct bar against American made cars unless they are shipped to France and completed there, because so many articles of French origin or articles made in America and sold through selling agencies in France, or articles made in America originally and now manufactured in French factories established by the American makers, are used in the construction of American made automobiles.

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A French financial newspaper, commenting on the small number of entries of French automobiles in the Grand Prix race for 1913, says: "Only 18 automobiles have been entered to participate in the Grand Prix of the French Automobile Club, which will be run in July next over a course near Amiens. This is very unsatisfactory, especially when one considers that only eight of these cars are French. For when it is remembered that the number of automobile builders in France is greater than in any other country, it is easy to understand that if our constructors had merely done as well as those of other countries the Grand Prix of 1913 would be at least as interesting as the races of recent years. On paying double entrance fees automobile builders can enter their names up to March 1, 1913. One can still hope that they will profit by this occasion that is offered them to change a really regrettable decision." This small entry list and the opportunity offered of late entry on paying double fees may be of interest to American firms desirous of increasing their export trade and of bringing their cars to the attention of a class of buyers to whom their machines are as yet unknown.

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The light in which the invasion of the American automobiles is regarded by the German automobile makers, is told interestingly by Adolph Schreiber, the representative in Germany for the Paige-Detroit Motor Car Company, Detroit, maker of the Paige cars. "No one," he states, "realizes as well as the manufacturers in Germany the fallacy of the argument that the American high priced car can never compete with their products. They know the influx of the cheaper American cars now taking place will educate the people to American products and therein lies the danger. Where will this importation stop? The German government and the manufacturers are working as one against our products. The Motorwagen and the Automobilbetrieb are being 'boycottiert'—that is, no German manufacturer of automobiles and parts will run any advertisement in these journals so long as they accept American copy."

It is estimated by M. S. Friede, Russian representative of the Ford Motor Company, Detroit, that in the whole empire of Russia there are only 6000 cars, or not as many as can be found in many American cities. This is due largely to the fact, he states, that there are no roads, save cart trails, in the country except the highways connecting one or two of the largest cities. There are 1500 Ford machines in use in the empire, these machines being used for the first line of taxicabs ever operated there. However, as Czar Nicholas is a motor enthusiast, his encouragement is bound to increase greatly the number of cars and also lead to road improvements.

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During the past summer it is said that 6500 motor tractors have been breaking new land for crops next year in the Canadian west. Putting their daily average at the extremely low figure of 10 acres a day and allowing them 60 days' work during the season, this would represent 3,900,000 acres of new land for 1913, and to this must be added many more thousands that have been broken by horses and oxen.

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An American now in business in a thriving agricultural and manufacturing province in Europe informs an American consulate that he would like to secure an agency for a cheap runabout that can be converted instantly into a delivery wagon. He saw such a vehicle several years ago in the United States which sold for not more than $500. He is sure that a considerable business can be done with it among the farmers, but will not consider a more expensive car. Information of the Bureau of Commerce and Labor, Washington, D. C., can be had by referring to file No. 10,391.

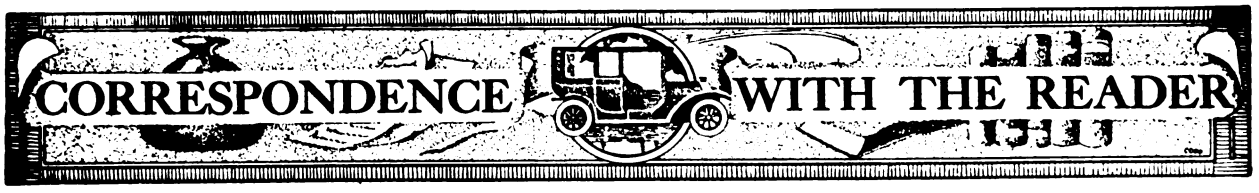
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In 10 years automobile plants in Canada have increased 4559 in number; $798,829,009 in value of capital; 175,106 in number of persons employed; $127,274,301 in earnings of salaries and wages, and $683,722,157 in value of product. Several concerns have entered the commercial field within the past year or two and the future of this branch also is promising.

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P. J. Janssen of Samarang, Java, has opened an agency for R-C-H cars, made by the R-C-H Corporation, Detroit, in Holland's South Sea territory. He states that the last vestige of prejudice against American cars has disappeared, and the perfect boulevards all over the island have done much to encourage touring.

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Inductance.

(1483)—In reading an electrical article I noted the word inductance. What is inductance? CURIOUS.

Peoria, Ill., Feb. 1.

Inductance is that property of an electrical circuit by which it resists a change in the current. A current flowing through a conductor produces a magnetic flux around the conductor. If the current be changed in strength or direction, the flux is also changed, producing in the conductor an electromotive force whose direction is opposed to that of the current in the conductor. This counter e. m. f. is the counter e. m. f. of inductance. It is proportional to the rate of change of current, provided that the permeability of the medium around the conductor remains constant. The unit of inductance has the symbol L. A circuit has an inductance of one henry if a uniform variation of current at the rate of one ampere a second produces a counter e. m. f. of one volt. The effect of inductance on the circuit is to cause the current to lag behind the e. m. f.

Testing Wires.

(1484)—In overhauling our four-cylinder car we had occasion to replace the primary wires, leading from the commutator to the coil, with new. They are carried in a conduit or tube and without thinking we put the wires in without marking the ends. The result was that they had to be removed and each end of each wire tagged so as to make proper connections. Is there not a simple method of testing each wire? INFORMATION.

Newton, Mass., Feb. 4.

There are several methods of locating a wire in a group as mentioned. One is to connect one end to the negative pole of a battery and lead a wire from the positive pole of the battery to the positive of an ammeter if dry cells are employed or to a voltmeter if a storage battery is utilized. By taking the free ends of the wires in the cable and connecting them one at a time to the other pole of the ammeter or voltmeter, the indicating hand of the latter will move when the proper wire is attached because the circuit is closed.

Another plan is to attach one end of any of the wires in the tube to the primary post on the coil, that terminal being utilized to make a connection with the commutator. Then take the free ends at the other extremity of the conduit member and touch one at a time to any metal part of the car. Upon the right wire being placed in contact, the vibrator will make a buzzing noise, denoting that the circuit has been closed.

Still another suggestion is to secure one lead to the zinc terminal of a battery and try the free ends of the wires at the other end of the tube upon the carbon post of the cell. A faint spark will denote when the circuit is closed. A storage battery may be employed in a similar manner.

Heating the Mixing Chamber.

(1485)—I have noticed that a large number of the 1913 cars are being fitted with tubes leading from the exhaust pipe to the vaporizer. I was told by one agent at a show that it makes for easy starting and that considerable more mileage is secured to a gallon of gasoline. Is this correct and if so why? Is it possible to fit the same thing to an old car and how could it be arranged? Who makes the tubing and is it expensive? G. E. B.

East Greenwich, R. I., Feb. 10.

The advantages of hot air in carburetion were fully discussed in the Dec. 25 issue of The Automobile Journal and the various methods of conveying heat from the exhaust pipe to the carburetor were outlined. The utilization of heated air makes for greater economy in fuel in that the more perfect the mixture the quicker it burns and the more complete is the combustion.

The device makes for easy starting to a certain extent. When the motor is cold, however, a certain number of explosions must be secured before the exhaust pipe becomes warm. After it is heated the air is drawn from its surface through the flexible tubing to the air intake of the vaporizer. In this manner it is of value after the first few explosions are obtained. It is held that greater suction is possible, because of the tubing and this should be an essential factor.

It is possible to fit the tubing and hood to any type of motor. This is indicated by the Col-Mac device, manufactured by the Breeze Carburetor Company, Newark, N. J. The hood member is fitted over the exhaust pipe and an attachment is provided for securing the tubing to the intake of the carburetor as shown in the Dec. 25th issue. The outfit is not expensive and is easily fitted as the company manufactures a variety of designs and different sizes to meet requirements. All that is necessary is to forward the model and make of car and size of carburetor.

Testing Wheel Bearings.

(1486)—In my instruction book which came with my car I noticed that it was advised to keep the ball bearings of the wheels adjusted properly. I jacked up the wheel and tightened up the bearings according to instructions, but within a short time there was more play

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than before. I took off the wheels and found that some of the balls were broken and the cones badly cut. I wrote the manufacturer stating that the parts were defective. The company replied that the bearings had not been adjusted properly. I think it is up to the maker. Should like to have your opinion. SATISFACTION.

Taunton, Mass., Feb. 11.

It would be difficult for the writer to give his opinion as to whether the parts were defective without seeing them or the car. If the parts were forwarded to the maker and he stated that the fault was due to the adjustment, not to material or workmanship, his verdict should be accepted as final.

The writer has known of similar cases where the balls, cones and races were badly scored through improper adjustment and lack of lubrication. It is also possible to mistake worn spindles or bushings for lost motion in the bearings, and that the wheel may be moved easily or has

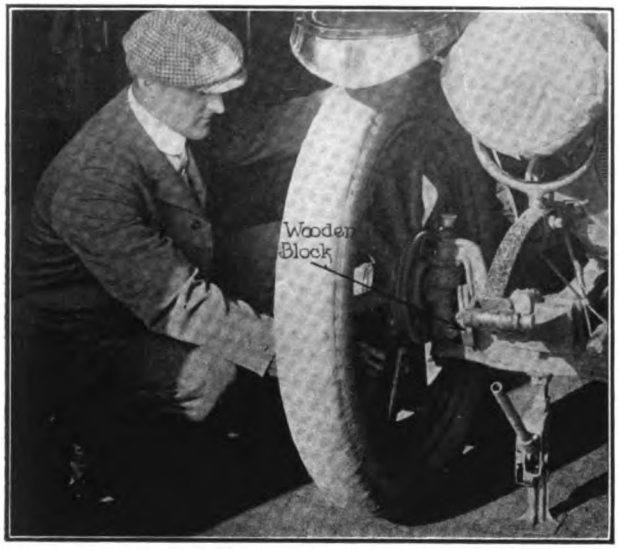


Fig. 1—Showing the Proper Method of Testing Wheel Bearings for Lost Motion.

the appearance of being loose, is not always due to the bearings.

There is a right and wrong way of testing the bearings, and at Fig. 1 is shown the proper method. The wheel should be jacked up free from the ground or floor, and a block of wood inserted between the spindle and axle as shown in the illustration. It should be driven in snugly so that there is no movement to these members.

The wheel should then be grasped as shown and if any play exists in the bearings it will be possible to move or rock it. If loose the lost motion should be removed by screwing up on the adjusting member until snug, then slack off about half a turn and lock. The wheel should be rotated slowly to note if it revolves freely without binding. Sometimes the extension of the spindle, that part on which the wheel is fitted, becomes bent through an accident such as running too close to a curb. If it is bent or out of line the wheel will revolve freely for a certain number of degrees, but bind when turned further. If these conditions exist the part must be removed and straightened by the expert. Otherwise it will be impossible to adjust the bearings.

Focal Adjustment of Electric Lamps.

(1487)—I have fitted a pair of electric lamps to my Ford car, but the light is not satisfactory; that is, it does not cover the road as well as did my acetylene lamps. What is the trouble and how can it be remedied?

ELECTRICITY.

Cincinnati, O., Feb. 17.

The trouble may be due to improper focal adjustment or the design of the lamp. It is possible that the former condition exists and it may be ascertained by changing the position of the lamp provided it is of the adjustable type.

Correct focal adjustment is very necessary for maximum service with electric headlights having parabola reflectors. In a gas lamp the position of the burner is usually fixed by the maker. With the electric units the manufacturer, as a rule, provides means for moving the bulb backward or forward.

Assuming that the point of travel is 1.5 inches; that is, from extreme rear position to the maximum front location. When the bulb is placed in the centre the geometrical focus of the paraboloid, for example, the reflected rays are parallel and a far reaching beam is produced. If the lamp be moved to the extreme rear point, the light rays will diverge and give more light to the side. When at the extreme front position the rays not only diverge, but cross in the process. The usual practise is to locate the focal length between .775 and 1.25 inches. Shorter focal lengths are prohibited because of certain mechanical requirements in the incandescent lamps utilized.

In the case mentioned it would appear that the bulb is located too far forward and by moving it back slightly it may be possible to secure the light desired. One maker suggests the following simple method of adjusting the bulbs on the road: Place a newspaper about 100 yards from the car and adjust the position of the bulbs by means of the mechanism provided for this purpose, until the best illumination is obtained on the paper. Each lamp should be adjusted separately. This is advised as the filament of the bulbs will vary slightly. The moving of the bulb about .125 inch will make a considerable difference in the diffusion of the light.

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Installing Ammeter.

(1488)—In installing an electric lighting system on my machine I attempted to fit an ammeter to the dash so that I could note the action of the system. Upon trying it out I found that the ammeter did not work properly. The maker stated that it was not fitted properly as the instrument was all right and I grounded it. Is this possible? J. de B.

New York City, N. Y., Feb. 19.

If the instrument was fitted to a metal dash care should have been taken to prevent contact between the studs or metal part of the ammeter and the metal of the dash. As the latter is grounded to the frame, etc., it is obvious that it would provide one side of an electrical circuit. When attaching an ammeter to a metal dash the holes drilled in it should be bushed with fibre or some other insulating material to prevent the grounding of the instrument by the studs, etc.

Starting Cold Motor.

(1489)—Can you give me a practical suggestion for starting a cold motor? I keep my car in a small unheated garage on my premises and use the machine to go back and forth to my office in the city. Several mornings I have been very late, owing to difficulty in starting the engine. I have to remove the spark plugs to prime it and this is troublesome. Are the priming plugs advertised practical? OWNER.

Edgewood, R. I., Feb. 20.

A practical suggestion for starting a cold motor will be found elsewhere in this issue and the writer can vouch for the method, having employed it on several occasions. There are several priming plugs in the market and as far as the writer can ascertain they are practical and fulfill the function of the usual priming cock.

Soldering Aluminum.

(1490)—I have a small crack in the intake manifold of my motor and it takes in auxiliary air, causing the motor to miss at low speeds unless I set the carburetor to give a rich mixture. The manifold is of aluminum and I have been unsuccessful in attempting to solder it. I used an ordinary iron, torch and aluminum solder. What is the trouble and how may I remedy it? W. A. K.

Bridgeport, Conn., Feb. 20.

Soldering aluminum may be performed with the proper equipment. The high heat conductivity of aluminum withdraws the heat of the molten solder so rapidly that it "freezes" before it flows, a condition that creates more or less difficulty.

To solder aluminum the parts should be tinned with the iron, using a composition of aluminum and tin. Replace the ordinary soldering iron with an aluminum member. The aluminum solder may be prepared as follows: Fuse the copper, then add the aluminum in very small quantities, stirring the mixture well with a piece of iron. Next add the zinc and a little tallow or benzine at the same time. Once the zinc is added do not heat too hot and avoid the volatilization of the zinc. Take five parts of tin and one of aluminum. Solder with the iron or with the blowpipe, according to the part to be repaired.

As this will involve more or less labor, the writer suggests the use of Simplex aluminum solder manufactured by the Simplex Aluminum Solder Company, Inc., 108 Broadway, Long Island City, N. Y. The company guarantees that aluminum parts may be soldered with its solder and with an ordinary soldering iron. The maker will forward a sample of the material at the cost of a few cents, also complete instructions for its use.

Fitting Magneto to Ford.

(1491)—Is it possible to fit a true high-tension magneto to a model T Ford automobile? I have considerable trouble with the coil and have been advised to install a master vibrator. I can buy a magneto very cheap and it is in good condition. How much work would it be to install the magneto and about how much would it cost? E. L. S.

Boston, Mass., Feb. 11.

A magneto can be installed on the car mentioned and the writer knows of several machines using it for ignition purposes. It is simply a question of driving the magneto at crankshaft speed by a positive drive such as gears or through a shaft and Oldham coupling. It could be located on the right hand side of the motor and driven off the camshaft, fitting the latter with a gear twice the size of that employed on the armature shaft of the magneto. It is desirable to enclose gears and have a pattern and casting made. The cost could be ascertained from a repair shop.

Mixing Acids and Cyanides.

(1492)—In your issue for Dec. 25 you give a formula for hardening cast iron involving the use of vitriol and cyanide of potassium. If by vitriol you mean oil of vitriol or sulphuric acid it should have been pointed out that the mixing of acids with cyanides is a very dangerous proceeding, and should only be carried out in the open air and with every care to avoid inhaling the deadly hydrocyanic acid gas liberated from the cyanide. If you will call this matter to the attention of your readers, and suggest that any operations of this character, both as to the mixing of the solution and subsequent using of it, be performed in the open air, you may be the means of saving human life.

CASPER W. MILLER, M. D.

Wallingford, Penn., Feb. 10.

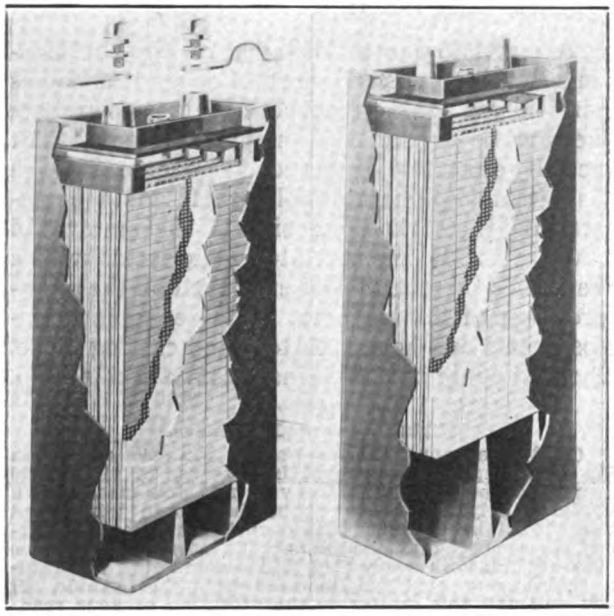
In the office of the Remy Electric Company, Anderson, Ind., maker of Remy magnetos, is a big safe which is the resting place of a fortune in platinum. Each morning when the men of this particular department arrive at the factory, a supply of the mineral, which sells at about $650 a pound, is handed out to them. This they use in the manufacture of the platinum points which are a feature of the Remy magnetos. With its output of over 150,000 magnetos a year the Remy company finds use for several hundred pounds of the valuable material annually.

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NEW FEATURES OF LBA STORAGE BATTERIES.

THE Willard Storage Battery Company, Cleveland, O., has been exhibiting at the recent automobile shows an improved battery cell for which extreme accessibility is claimed. One feature is a return to the use of bolted connectors, which type was originally used by battery makers and rejected because of corrosion from the electrolyte, and another is an improved form of cover which consists of a hard rubber plate and is used with a gasket of pure gum.

The custom has been for battery makers to seal the cells with a pitch or asphalt compound, heated to fluidity and poured into the top of the jars. When this cools it is necessary to cut or break it to expose the element, and in repair or



Showing Components of LBA Battery Cells:. At Left, Low Bridge Type with Bolted Connectors; at Right, High Bridge Sealed Cover Construction.

restoration the seal must be replaced and the connectors "burned," which means melting the lead, so that this will be a solid piece when cool. Corroded matter will, if permitted to accumulate, cause a short circuit or will insulate conductors, and it was to prevent this that the "burned" connectors were used. It is evident enough that time must be taken to cut the lead and to remove the sealed cover, while it is also necessary to have a tank of hydrogen gas or some other source of intense heat and the apparatus to "burn" the lead.

The condition of the battery can always be best determined by careful observation, which is not possible with the sealed type without cost for labor and perhaps material, although hydrometer readings may be made to test the electrolyte. It is maintained that with the LBA batteries the cells may be opened by the removal of the bolts and connectors and lifting the hard rubber covers and the soft rubber gaskets, minimizing time and labor and eliminating the special facilities for and the expert attention required for lead burning.

The jars are built with heavy walls to resist breakage, and with standard and extra high bridges to support the element. The latter construction affords more space for sediment to deposit in the cell. Vent plugs are made to condense the gas from charging by breaking the bubbles before they escape. The LBA plates are made by a process that insures the strength and service required for electric vehicle propulsion. Types J and K of the LBA vehicle batteries have heavy plates of standard thickness and are assembled in elements of from five to 21 plates. These types are made with the new bolted connectors and rubber gaskets, or with the old type connectors and sealed covers, and with either high or low bridge jars. Types L and M have medium plates and are assembled in elements from seven to 23 plates, the capacity of the cell being more for the same weight and bulk than with types J and K. These are also made with the low and high bridge, and it is held that the latter form will not short circuit from sediment during the life of the battery. Types N and O have light plates and the elements are composed of from seven to 27 plates. It is claimed the capacity is greater than the other and affords increased mileage.

The Willard Storage Battery Company has occupied a prominent position in the development of lighting and starting batteries. Three important features are claimed for the construction, these being: High voltage maintenance, low heat characteristics and ability to maintain the output for a considerable period. Many improvements have been incorporated during the past five years and these have been based upon the requirements of actual service.

A battery for use in connection with the lighting system on a motor car is subjected to hard service and must be designed to withstand severe treatment. For this reason all connections and supporting parts are very substantially constructed. The individual cell unit is employed on all types, permitting inspection or repair without disturbing other members. All connections are

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made above the top cover of the battery, reducing the possibility of local action to a minimum.

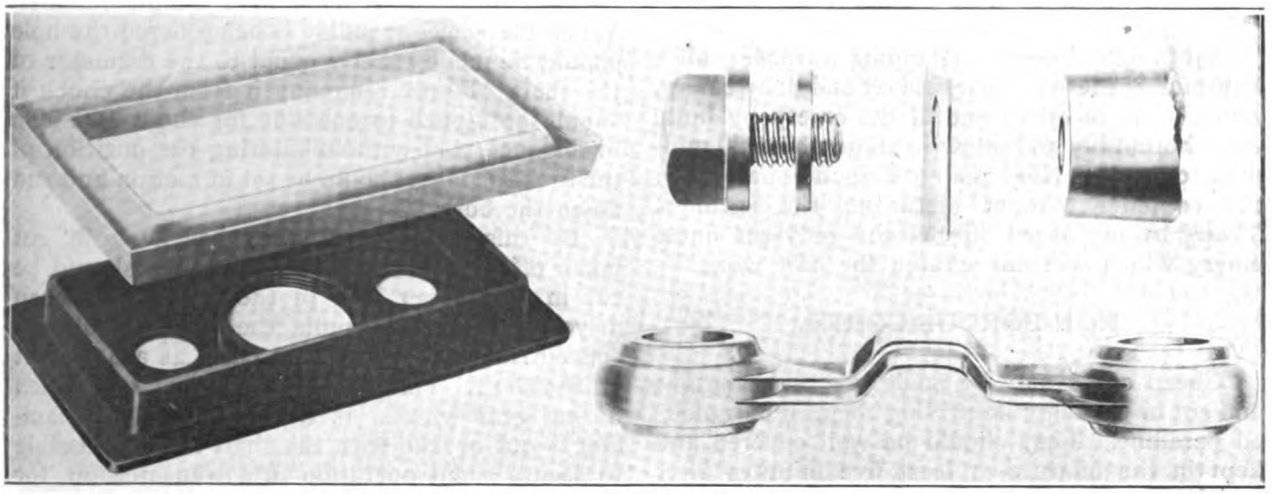
Maximum efficiency and voltage characteristics essential for starting purposes are claimed for the battery designed for motor starting. The important factor with the electric motor starter is the torque developed by the motor. A quality emphasized in the LBA is high efficiency and low internal resistance with corresponding high voltage when discharged at a rate that will give the motor its maximum torque. The lighting and starting batteries are produced in a wide range of voltage and capacity to meet every requirement of service in pleasure cars and trucks.

AUTOMOBILES IN ALASKA.

Mail Contractor Contemplates Their Use Exclusively on White Horse-Dawson Route.

An automobile line from White Horse to Dawson, in Yukon Territory, to be operated by a new company, is probable. The White Pass and Yukon route has operated a stage line for many years during the closed season of navigation, which lasts for about eight months in the year to convey mails, passengers, express and freight between these two points. Wagons are used for a few weeks after navigation closes and also before it opens, but for the rest of the time, about six months, sleds are utilized. The distance covered is 330 miles.

During the past summer the road was greatly improved at a heavy expense to the government by cutting down grades and making it wider so any gauged vehicle could be used on it and the sleds now are the same gauge as motor cars. The grades are even and none of them is so steep that automobiles cannot climb them with heavy loads. During the past summer motor cars were used on this road from White Horse to Carmacks, half the distance to Dawson, making the trip in 10 hours. The White Pass Company receives $80,000 a year for conveying mails over its lines to Dawson, in addition to its passenger and express business. The time occupied for making the trip is five to 10 days, whereas with the new service this can be reduced materially. The new company proposes to run automobiles all the year over the route and to make the trip from White Horse to Dawson in one day during the summer and in two days during the winter season.



LBA Battery Construction: At Left, Hard Rubber Cover and Soft Rubber Gasket for Quick Sealing of Jars; at Right, Type of Cell and Bolt Connector, Affording Greater Accessibility.

In a letter from White Horse, dated Dec. 28, 1912, Harold E. Wilson tells of a trip from that place to Dawson City made by the governor of Yukon Territory and representatives of big mining interests. The journey was made in a Locomobile, made by the Locomobile Company of America, Bridgeport, Conn., and was for the purpose of demonstrating to the government that it is possible to make such a run regularly by motor car over the "winter trail." Included in the party was Assistant Manager Thomas of the Guggenheim interests in the Yukon, and George Potter, said to be the best chauffeur in Alaska. Although the trail was in bad condition the trip is reported to have been made in a satisfactory and practical manner.

Texas railroad commission has issued an order classifying motor cars as extra baggage on trains.

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PREPARING EMERY FOR LAPPING.

To prepare emery for lapping purposes, fill a half-pint bottle with machine oil and flour emery, seven parts of oil to one of the emery by bulk. Mix thoroughly and allow to stand about 20 minutes to settle. Next pour off about one-half of the contents without disturbing the settlings. That portion poured off contains only the finest emery which will not scratch the best work.

NON-POROUS CORKS.

Cheap corks may be made gas and air-tight and cut or bored by immersing them in hot, melted paraffine. They should be well covered and kept in the mixture at least five minutes after which they are removed and placed upon a screen to dry.

BORING GEAR WHEELS.

While it would appear a simple matter to bore gear wheels, clutches, etc., correctly, this work may be performed improperly. Accuracy is important, especially when the parts are fitted to a shaft running at a high rate of speed. Under such conditions the bore of the gear or pulley must be slightly larger than the diameter of the shaft to which it is fitted. When hydraulic power is employed to force the wheel into position, very little difference between the bore of the part and the shaft is necessary.

Ordinarily, a pulley bored larger than the shaft is thrown out of centre when the key is driven in hard. In addition, most of the drive is taken by the key, contact between the shaft and the bush or pulley being made at a point directly opposite the feather.

This can be avoided in a simple manner. When the wheel or pulley is being bored the hole should be made exactly equal to the diameter of the shaft. Before removing it from the chuck it should be tapped to one side for about .001-inch in distance, and without altering the position of the tool, the lathe should be set in motion and run down the bore.

By this means the pulley has a slight cut taken off one side. The keyway then should be cut in the higher part of the shaft, and when driven in snugly it pulls the work absolutely concentric. In addition, the part has a better fit on the shaft. This is an important feature when boring gear wheels, as when the outside diameter is out of true with the shaft it is impossible to secure silent operation in a transmission, for example.

BLACK FINISH FOR BRASS.

An attractive black finish for brass may be secured by the following process: Dissolve in 1000 parts of ammonia water 45 parts of natural malachite. Clean thoroughly the part to be colored and immerse it in the mixture for a short period. Gradually warm the solution, examining the part from time to time to ascertain if the color be correct, then rinse and dry.

MAT ALUMINUM.

To give aluminum the appearance of mat silver, plunge the article into a hot bath composed of a 10 per cent. solution of caustic soda saturated with kitchen salt. Allow the metal to remain in the bath for 15 or 20 seconds, then wash and brush. Replace in the bath for about 30 seconds, then wash and dry in sawdust.

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THE NEW LANCHESTER ANTI-VIBRATOR.

IN A RECENT issue of The Autocar, a British motoring print, F. W. Lanchester of the Lanchester Motor Car Company, Ltd., Birmingham, England, presented an interesting article concerning the Lanchester anti-vibrator, a new system of balancing a motor which is fitted to the company's product and being experimented with by several prominent British car makers. The device is also being considered by manufacturers of large engines, stationary and marine, including the Diesel. Mr. Lanchester's article is reproduced herewith.

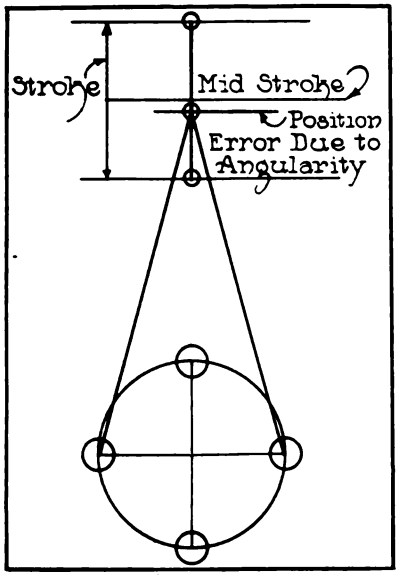


Fig. 1—Showing Error in the Position of Pistons of Four-Cylinder Motor When They Should Be at Mid-Stroke.

(By F. W. Lanchester.)

It is well known by automobile engineers and by users of four-cylinder machines, that the balance of a four-cylinder gasoline motor is far from perfect. At high speeds the vibration becomes an important factor, both as affecting the comfort of the passengers, and as prejudicial to the durability of both the chassis and the bodywork; it is, in fact, on this want of balance of the four-cylinder engine that the demand for the six-cylinder motor is mainly based. It is true that the six-cylinder motor for a given power has the advantage of more uniform torque; that is to say, for given mean torque, less extremes of maximum and minimum, but the advantage of the six-cylinder engine in this respect is a secondary matter as compared with its advantage in the matter of smooth running as dependent upon more perfect balance and freedom from vibration.

The main piston movements on a four-cylinder engine may be said to be balanced, since the pistons of the first and fourth cylinders are at their highest points when those of the second and third are at their lowest, and vice versa. If the connecting rods were of infinite length, or in practise of such length that their extreme angularity were very small, all four pistons would reach mid-stroke position at the same instant, and at all other points the number 1 and 4 pistons would by their motion accurately compensate for the second and third members. In an actual engine with a rod length of about 2.25 times the stroke, as indicated at Fig. 1, there is considerable error in the position of the pistons when they should be at mid-stroke. Thus when the crankpin is at 90 degrees from the in-centre all four pistons are somewhat below their mid-stroke position; in the case of an ordinary 20 or 25 horsepower engine (R. A. C. rating) the error of position amounts to about one quarter of an inch. This downward displacement of all four pistons, due to connecting rod angularity, takes place twice a revolution, or (regarding the main piston motions as mutually balancing each other) there is left a displacement of the whole reciprocating equivalent mass through the distance of one quarter of an inch vertically taking place twice a revolution.

Analysis shows that this displacement may be approximated to a very close degree as a harmonic motion of twice the crankshaft period, and in the new anti-vibrator a simple means has been

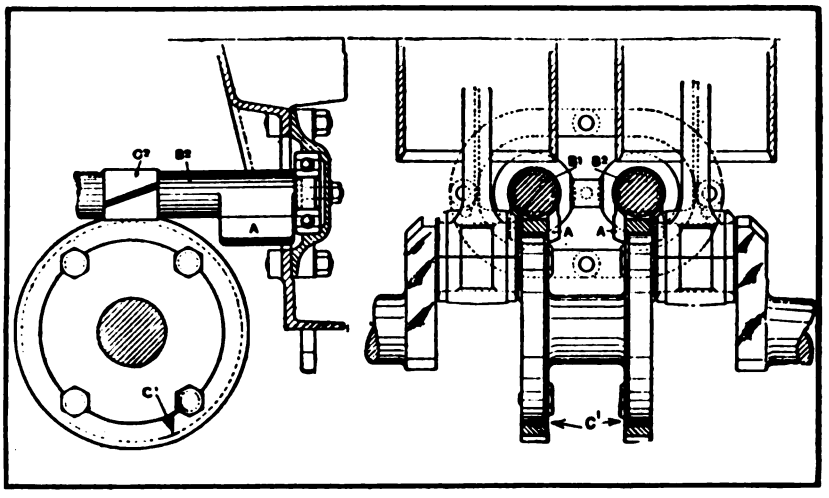


Fig. 2—Lanchester Anti-Vibrator Adopted Abroad for Securing Perfect Balance on Four-Cylinder Motors and Eliminating Vibration.

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found to compensate for this source of annoyance.

The serious magnitude of this secondary vibration on existing four-cylinder engines is scarcely appreciated by many designers. It amounts on an ordinary 25 horsepower four-cylinder motor at full running speed to as much as half a ton applied alternately upwards or downwards twice a crankshaft revolution. The importance of eliminating a want of balance of this magnitude can scarcely be overstated.

On an open car the vibration due to the cause under discussion is always felt at certain critical speeds, and has heretofore been looked upon as inseparable from the four-cylinder design. Of recent years the trouble has become aggravated owing to a powerful sympathetic vibration or resonance set up in limousines, landaulets and other closed forms of body, which have today come into general use. It has become more or less difficult to meet the demand for perfect

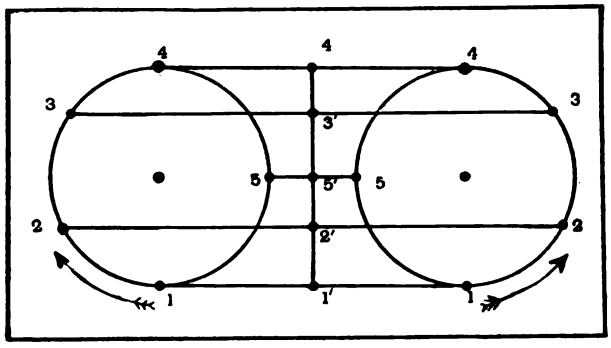


Fig. 3—Diagram Explaining Action of Lanchester Anti-Vibrator Comprising Four Rotating Balance Weights.

smoothness consequent to the high ideals created by the six-cylinder car.

The new patented anti-vibrator acts by supplying the equivalent of a reciprocating movement equal and opposite in effect to the unbalanced component of the piston and connecting rod motion of twice the frequency of the main piston reciprocation.

The means employed will be noted by referring to Fig. 2. It will be seen that there is no actual reciprocating part, but in the place thereof four rotating balancing weights A are provided, arranged symmetrically in pairs at the extremities of spindles B 1 and B 2, driven by gears C 1 and C 2 at double the crankshaft speed. The two spindles rotate in opposite directions, and so the lateral movement of the balance weights, that is the horizontal components of their motion, neutralize one another, but the vertical motions combine to give the effect of a single reciprocation. The diagram presented at Fig. 3 depicts this action. Here the corresponding positions of the balance weights are numbered 1, 2, 3, etc., and their common centre of gravity for each numbered position is given by the figures 1^1, 2^1, 3^1, etc.

It is possible in this arrangement to correct for those irregularities of turning movement due to piston inertia; these follow the same law as to frequency as the linear secondary vibration, but in the ordinary gasoline motor the advantages in this direction have not heretofore been found sufficient to give any marked superiority to the engines corrected in this manner.

The balance weights in any case are quite small. In the arrangement shown at Fig. 2 each weight weighs about half a pound for an engine of 20 to 25 horsepower. An important point is that practically no power is utilized by the rotating spindles; the only resistance they offer to motion is frictional, and this is almost a negligible quantity. It may sound almost paradoxical to the uninitiated that a spindle rotating and doing no work can have any influence on the balance of the engine, but such is actually the case. In consequence, the gears suffer no appreciable wear, and there is no liability to noise due to backlash of the teeth, such as might be heard if employed for power transmission. It is impossible for the onlooker to tell that the motor is fitted with an anti-vibrator except from the essential fact that the noise and vibration are eliminated.

Since the announcement that the Speedwell Motor Car Company, Dayton, O., would give an option of its new rotary valve or a poppet valve motor in its 1913 Speedwell cars, orders have been received which necessitate the operation of the factory with day and night shifts. The prospects for future business make it extremely likely that this condition will exist for several months to come.

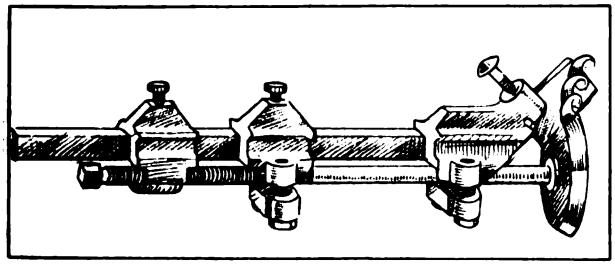
It is planned to give practical, cheap and quick transportation between Dubuque and East Dubuque, Ia., which will be equal to the best trolley service and at the rate of five cents a trip. It is proposed to purchase a 30-passenger motor car, which will run every day, starting at 6 in the morning and continuing half hourly until midnight. Special three-cent fares for working people are contemplated at certain hours of the day. It is estimated that it will cost $6000 to establish the line and it is planned to sell stock to this amount. As the route is not now covered, it seems certain that the venture might prove to be a great success.

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GARAGE AND REPAIR SHOP EQUIPMENT.

NOONAN'S VALVE TURNING TOOL.

A tool for obtaining a new seat on a valve is being marketed by F. A. Baker & Co., 10 Warren



Noonan Valve Turning Tool, a Compact, Adjustable Device for Recutting Seats.

street, New York City. It is shown in an accompanying illustration, is adjustable and will take any size valve of any angle. The construction is simple and a quality of the device is that the cutters may be removed and resharpened when they become dull with service. The tool is 11 inches in length, constructed of high grade material and is highly polished. The method of fitting and recutting the valve is shown in the drawing.

AMERICAN SONOSCOPE.

Knocks and pounds about the motor are sometimes difficult to locate, especially when the noise is not very loud. The American Electric Company, State and 64th streets, Chicago, is manufacturing a device for this work called the Sonoscope and it is held that by it the most baffling click may be located easily. It operates on the principle of a telephone receiver, and owing to the construction of the part held to the ear the sounds are greatly magnified. The outfit comprises the receiver member and test rod, the latter being attached to the device when its use is desired. It is moderately priced and the maker claims that it is invaluable in the repair shop as considerable time and expense is saved in locating mysterious noises annoying to the owner.

ASHCROFT VALVE GRINDER.

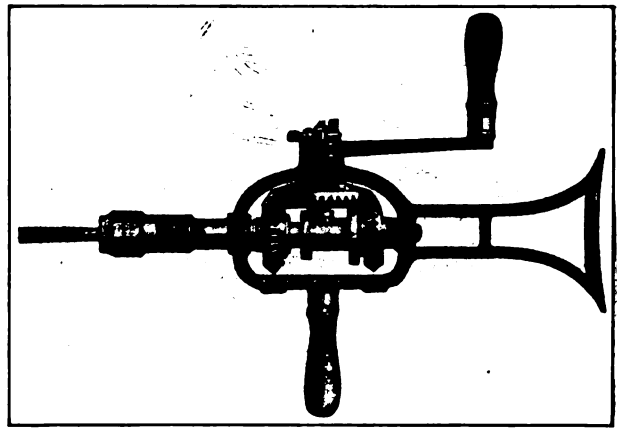
A combination valve grinder designed along the general lines of a breast drill, and so constructed that it may be utilized for a number of purposes, is the Ashcroft, made by Stevens & Co., New York City, and presented in an accompanying illustration. It is particularly adapted for grinding motor valves by hand. Its action is oscillating, with the arc of oscillation gradually advancing to the right, which prevents the cutting of grooves. Two different sized coil springs are included with each tool and these are utilized under the head of the valve when grinding for raising it as in conventional practise.

The tool may be used as a ratchet with either a left or right hand direction and for removing or replacing screws in places not easily accessible with ordinary tools. It may also be employed for drilling and tapping where a full swing of the operating crank cannot be secured with the usual drill. The Ashcroft is fitted with a chuck for either square or taper shank drills and the outfit includes a screw driver tool for rotating the valves during grinding, and a bottle of abrasive. The device is made in one size only and comes neatly packed in a serviceable box.

TURNER MOTOR WASHER.

The Turner Brass Works, Sycamore, Ill., is manufacturing a new series of motor washers actuated by pressure. They are made in three sizes holding one quart, two and five gallons respectively. One of the largest sizes is shown in an accompanying illustration.

The tanks are constructed of drawn steel, equipped with a pressure gauge registering up to 100 pounds and have large hand pumps. The design is such that the washer may be connected to a pressure tank in the garage or repair shop, suit-



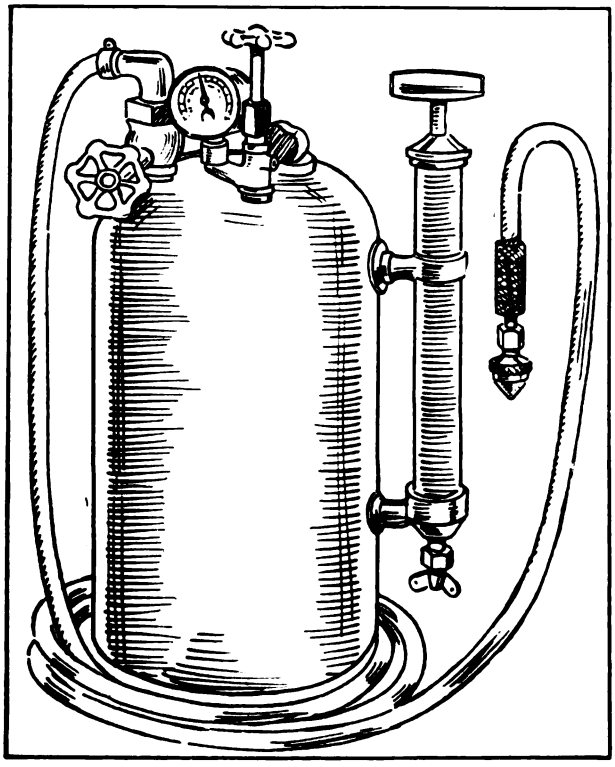
Ashcroft Combination Valve Grinder Which May Be Utilized as a Ratchet Tool, Etc.

able connections being provided for incorporating in the line. Each washer is fitted with 10 feet of cloth insertion rubber hose having an adjustable nozzle.

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Kerosene is utilized for cleansing and it is pointed out by the company that the same results can be obtained with this fluid as with the more expensive gasoline. The nozzle may be so adjusted that a finely divided or an intense needle stream can be secured. The fluid being forced out under high pressure all dirt or grease is easily and quickly removed from the motor or other parts of the chassis, machinery, etc. An advantage of the washer is that parts not accessible with the usual brush can be reached and thoroughly cleaned.

In addition to being utilized for cleansing with a fluid, the tank may be emptied and pumped



Turner Motor Washer, Made in Three Sizes and Employing Fluids or Dry Air for Cleaning Purposes.

full of dry air and employed for drying purposes, cleansing upholstery, etc. The washer is constructed of high grade material and is moderately priced.

FOSTNACHT VALVE RESEATER.

The National Auto Specialty Company, Tama, Ind., is marketing the Fostnacht valve reseater, a tool designed especially for reseating and polishing valves with a minimum outlay of energy. The outfit comprises a large cutter, designed to fit all sizes of 45-degree valves and five sizes of cutters, from 1.5 to 2.25 inches. The latter are constructed of a high grade carbon steel, properly tempered and have blades which may be removed and resharpened.

GOOD ROADS CONVENTION.

Plans Completed for Meeting of National Importance in Washington Next Month.

Farmers, business men and road users will be involved in what undoubtedly will be the most interesting session of the forthcoming Federal Aid Good Roads convention at Washington, D. C. At the evening meeting of March 6 the National Grange, the Chamber of Commerce of the United States, and the American Automobile Association will supply their most prominent highway advocates. Senator Jonathan Bourne, chairman of the joint committee of Congress, which is now investigating the subject of federal aid, has been invited to preside at this meeting, the conclusion of which will be in the form of an illustrated talk by Warden Thomas J. Tynan of the Colorado state penitentiary, who has accomplished much in the use of prisoners in the building of roads, with methods that embrace the honor system and absence of guards.

The National Grange spokesman will be C. S. Stetson of Maine, chairman of its executive committee, and who has studied the roads question and its relation to men and women who live in the country. It is expected that President Harry A. Wheeler will speak for the Chamber of Commerce and the interest of that organization in the development of highways, which has been inevitable, as the automobile industry, the growth of which has been a business wonder, is well represented in the chamber. Prominent examples are H. A. Meldrum, former president of the Automobile Club of Buffalo, and now president of the Buffalo chamber of commerce, and C. C. Hanch, president of the Indianapolis chamber of commerce and identified with the Nordyke & Marmon Company.

In order to boost the good roads movement and to protect automobile owners and dealers, the Sacramento Motor Car Association has been formed at Sacramento, Cal., thus taking the place of the defunct Sacramento Automobile Dealers' Association. About 40 dealers attended the organization meeting and these officers were elected: President, E. A. Meister; secretary, John McDonald; treasurer, A. Smitten.

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In The Aviation Field

With the Manufacturer and Operator in America and Abroad

It does not appear that the international Michelin prize for 1912 was awarded, and as a result the total this year will be $8000 instead of $4000. The conditions for the contest have been announced as follows:

The contest is for the longest flight over a measured course, consisting of two points not less than 50 kilometers (31 miles) apart. The winner must fly more than 2000 kilometers (1242 miles) at a speed greater than 31 miles an hour. At the conclusion of each round of the course the aviator must alight and sign the competitor's register. The time taken for this will not be deducted from the flying time, provided the average of 31 miles an hour is maintained. All flying must be done between sunrise and sunset, and at night the machine shall be sealed and housed in a shed. No change of machine or engine is permitted, but fuel may be replenished and repairs made if the specified average speed is maintained.

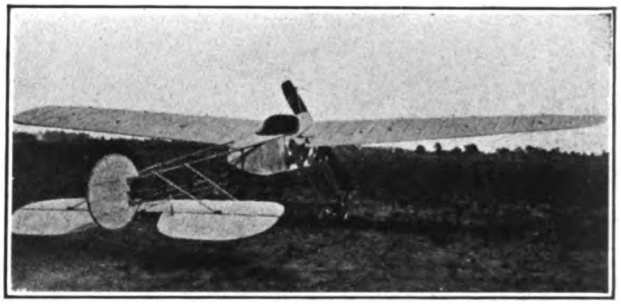
The contest appears to be arranged as one of endurance, rather than duration, as with the first Michelin competitions.

An accompanying illustration is that of the Caproni monoplane, recently presented to the King of Italy by Italians at home and in this country. It is of Italian construction throughout, and is similar in every respect to the machine flown by E. Cobiono at Somma, Italy, last March, to secure a world's speed record for 300 kilometers.

It appears also that the machine used by Slavorossof at Milan, Jan. 24, in making new world's speed records for 200 and 250 kilometers was a Caproni. Slavorossof flew 100 kilometers in 57:45; 200 in 1:56:30 and 250 in 2:24:30. Previous world's marks were held by Lieut. H. Bier at 2:03:49 for 200 kilometers and 2:39:37 for 250.

Miss Trehawke Davies of England holds the honor of being the woman who has been to the greatest altitude in an aeroplane. With Eugene Legagneux of France in a Morane monoplane she flew to an altitude of 12,093 feet at Issy les Molineaux, France, Jan. 27. The world's altitude record for a pilot and one passenger is 14,303 feet.

It is announced that Jerome Fanciulli, who has been connected with Glenn H. Curtiss as manager of the Curtiss exhibition forces for the past three years, is at the head of a new company



Caproni Monoplane of Italian Construction Recently Presented to King of Italy.

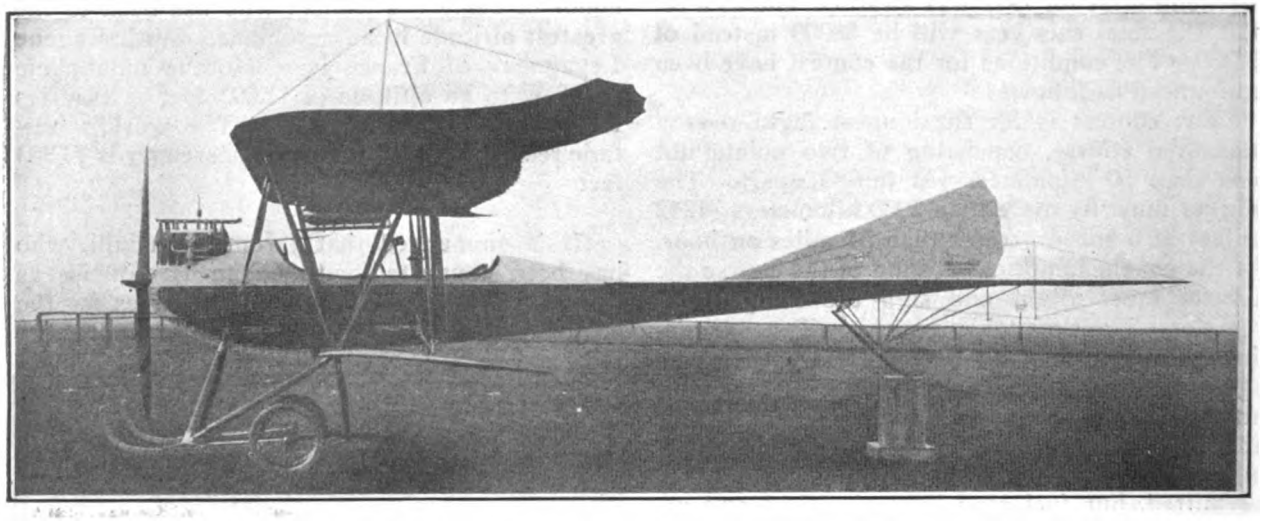
organized in Washington, D. C., for the construction of a new flying boat. Others said to be interested in the venture are: Henry R. Bond, Jr., treasurer, New London Ship & Engine Building Company, New London, Conn.; Edward C. Hammond, Boston, Mass., and P. Le Roy Harwood, a New London banker. It is stated that the factory will be located near New London on the Thames river.

Orville Wright, president of the Wright Company, Dayton, O., and one of the pioneer aviators of the world, sailed for Liverpool recently on the Mauretania. His object in going abroad at this

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time was to attend the hearing before a court in Berlin in a suit brought by German manufacturers to prevent the use in that country of the Wright patents applying to the method of aeroplane control. It is contended that the subject covered by the patent was disclosed in Germany before Wright secured the right to exclusive control in that country.

The maker of the Albatross biplane in Germany has recently brought out a new model, to be known as the military type II. In this the upper plane has a larger span than the lower, and the ends are brought back to the rear at the wing tips and are warped for lateral stability. The wing tips of the lower plane are lengthened in a similar manner, so that the machine resembles the Etrich, made in Germany under Austrian license.



Albatross Military Biplane, Type II, a German Production Which Presents Interesting Features and Resembles Etrich Design.

The upper and lower main planes are not connected by vertical struts, but these are arranged diagonally so that nearly all stay wires are avoided. The under carriage is particularly strong, each strut being swathed in canvas to obviate splintering. On landing the shock is absorbed by three methods—pneumatic tired wire wheels, rubber shock absorbing rings attaching the axles to the skids, and laminated springs. The last named form a part of the attachment of the skids to the diagonal struts of the landing chassis. Two hook brakes serve to slow up the machine after alighting.

The fuselage is of the square section streamline formation, and is made to accommodate two persons, the pilot sitting behind the passenger. The sides are covered with multi-ply wood. The radiator curves downward toward the under portion of the forward end of the fuselage. The fuel tank is under the passenger's seat and benzine is employed. The engine is an Argus of 100 horsepower or a 70 horsepower Mercedes.

The empennage is composed of a triangular tail, elevator, rudder and triangular vertical fin, and this is supported by an elastic buffered skid. All control planes are large and easily detachable for quick transportation. The supporting area is 430 square feet and the weight 1056 pounds. Its carrying capacity is rated at 660 pounds.

According to Claude Grahame-White of Great Britain, France has no less than 500 aeroplanes and dirigible balloons, while Germany has between 200 and 250. These figures were presented by him in an argument for greater activity on the part of the British government. Grahame-White finds that Great Britain has but 30 machines.

In this connection it may be pointed out that Alfred W. Lawson, who has addressed an appeal to the American Congress for a larger appropriation for aeronautics, finds that Germany has a larger number of machines than France. As a matter of fact there is no agreement among estimates, since foreign governments are proceeding with the greatest secrecy in the matter of purchasing aeroplanes and dirigibles.

Mr. Lawson's figures are particularly interesting, and are decidedly conservative. He finds that government machines are owned as follows:

Aeroplanes—Germany, 310; France, 280; Russia, 120; Italy, 80; Great Britain, 50; Austria, 30; Japan, 25; Belgium, 30; Spain, 20; Bulgaria, 20;

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Brazil, 18; Greece, 12; United States, six; Denmark, six; Holland, five; Turkey, five; Mexico, five; Roumania, five; Norway, four; Argentina, three; Servia, three; China, one.

Dirigibles—Germany, 22; France, 19; Russia, 10; Italy, seven; Great Britain, six; Austria, four; Japan, three; Brazil, three; Belgium, two; Spain, two; United States, one; Holland, one.

It will be seen that there is wide difference between the figures submitted by Grahame-White and Lawson with respect to Great Britain, and it may be added that still another estimate gives United States 18 machines, with provisions for 10 more before July 1. In view of the reported order of 70 aeroplanes for Austria, 20 for Chili and similar large orders for other countries, made by French constructors, it would appear that any estimate was far from correct. In any event, it will be found that America is well down in the list.

Another hydraeroplane prize has been offered by Mortimer Singer of Great Britain: The award comprises $2500 for a contest which will develop the most suitable land and water machine, the regulations to be formulated by the Royal Aero Club.

King Alphonso of Spain has at last satisfied his desire to test personally the advantages of aerial navigation. It will be remembered that when Wilbur Wright was abroad with one of the pioneer Wright biplanes, he gave several exhibitions of flying before royalty, at one of which King Alphonso was present. His majesty sat beside the aviator in the biplane for some time and at length requested Wright to take him on a short flight. The aviator declined to assume the responsibility, however.

Feb. 7, King Alphonso took a half-hour's ride in the dirigible balloon Espana, during which it make a circuit of Madrid and the royal buildings. Kaiser Wilhelm of Germany is believed to be the only other reigning sovereign to have had a similar experience. About a year ago he accompanied Count Zeppelin on a short trip in one of the Zeppelin dirigibles.

Some time since E. P. Noel, editor of Aero and Hydro, offered a special prize for an hydraeroplane race, the idea being to further the development of the hydraeroplane and aero boat. Arrangements are now being made to hold this race across the Great Lakes from Chicago to Detroit, the start to be made July 12.

It is anticipated that this will prove one of the most interesting events in the aviation field in America during 1913. Each contestant will be allowed 1000 points at the start, and will be penalized one point for each minute of tardiness at each of the various controls. Five hundred points will be the penalty for failure to carry a passenger between any two points. All mechanical parts will be sealed by the contest committee.

Already five entries have been promised, three from Glenn H. Curtiss of Hammondsport, N. Y., and two from Thomas Benoist, St. Louis, Mo. Several other manufacturers in the country are eligible, and it is probable that each will be represented.

Representative Peters of Massachusetts has introduced a bill in Congress establishing a national aeronautical laboratory under the direction of the Smithsonian Institute, to carry on research and experiments to increase the safety and effectiveness of aeronautics for commerce and national defense. The foundation of such a laboratory was urged by Capt. Washington I. Chambers, U. S. N. In December President Taft named a commission to investigate the need and scope of such an institution, and in January the Senate voted an appropriation of $5000 to forward the work of the commission.

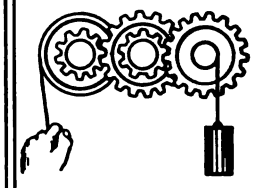
The annual international aviation show at Olympia, London, England, was held Feb. 14-22, a large number of British and Continental manufacturers being represented. The details of the several exhibits have not been received in this country as yet, but it is supposed that mechanical features of decided interest were revealed. Additional information will be presented in a later issue.

Glenn H. Curtiss has been awarded the Collier trophy for 1912 in recognition of his service to the cause of aviation in developing and demonstrating the flying boat. The trophy is awarded annually to the American doing the most during the preceding year for the advancement of practical aviation. It was presented to the Aero Club of America by Robert J. Collier, and a year ago it was awarded to Curtiss for his part in developing the hydraeroplane.

This makes five years in succession that Curtiss has been more or less officially recognized in this manner. In 1908, 1909 and 1910, he won the Scientific American trophy for actual accomplishment in flying. As a result of winning this cup three years in succession it is now held by him in perpetuity.

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RECENT MOTOR VEHICLE PATENTS



Craig Tire Cooling Device.

Friction creates heat and to prevent the pneumatic tire from becoming overheated, Andrew B. Craig, Tarkio, Mo., has invented and patented a cooling device. The wheel is provided with a circumferential cooling tube of less diameter than the shoe and located within the latter, having ends spaced from each other. A short tube is connected with one end of the cooling tube and extends through the rim, communicating with the outside air. A pump actuated by an electric motor is located on the wheel, and is connected by tubing to the other end of the cooling tube. Cool, fresh air is thus circulated through the cooling member.

Haas Gasoline Strainer.

Cyrus A. Haas, St. Louis, Mo., has been granted a patent for a gasoline strainer which differs radically from the usual filter in that it is a tubular casing, internally threaded at one end and having a polygonal shaped plug with a reduced exteriorly screw threaded portion. A head is provided at the opposite end of the casing and means fitted for the attachment of the fuel line. The strainer is a sack of wire gauze, having an open contracted end and being secured within the bore of the plug, it being intended to prevent the release of foreign particles within the sack. The latter is fluted longitudinally and is expanded throughout its entire length beyond the contracted portion to the rounded end of same, and is adapted for movable contact with the inner periphery of the casing, an arrangement claimed by the inventor to permit of the insertion of the sack as well as turning of same.

Zwolinski Automobile Lock.

The large number of thefts of automobiles has been responsible for many locking devices to prevent operation of the car by others than those intended. Thaddeus Zwolinski, San Francisco, Cal., has been granted a patent for an automobile lock which is designed to secure the gear shifting lever in a neutral position and thereby prevent operating the machine under its own power. The device comprises a supporting bar which is secured to the frame of the chassis and has a suitable opening into which the lever is placed when in the neutral position. The supporting member has a U shaped hasp, having one leg hinged to the end of the bar and a locking mechanism carried by the other extremity. When not in service the locking member may be swung back out of the way.

Newbold Battery Terminal.

Roger M. Newbold, Chicago, assignor to the Adams & Westlake Company of that city, has been granted a patent for a storage battery terminal. It comprises flattened posts having apertures in one of their faces, these being in the form of a channel extending through the post face, and threaded studs set through each post and passing through and beyond the aperture thereof. A pair of line terminals is provided, each with an eye for engaging one of the studs, this having a flat face for bearing against the post, while the other terminal has lateral lugs for entering the post channel and nuts engaging the studs.

Green Tire Casing.

Walter R. Green, Chicago, has been granted a patent for a protective casing for pneumatic tires. It comprises a sheet metal member conforming to the shape of the shoe and means for embracing or fitting the same. The device is made in sections, two of which overlap the air valve stem and the parts are hinged. A plurality of apertured segments are provided and so shaped as to fit into the outer tire casing. The casings are secured by a nut locking arrangement and provision is made for adjustment.

Marston Signalling Device.

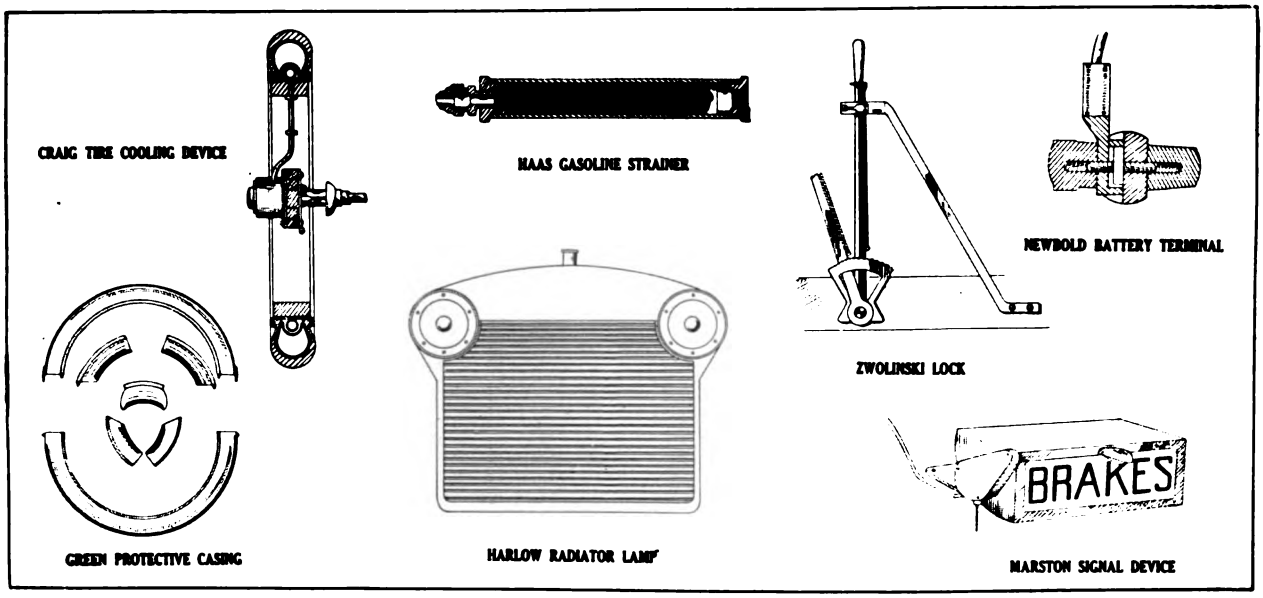
Among the inventions designed to prevent rear end collisions by notifying an approaching vehicle is the Marston signalling device, patented by Charles F. Marston, Great Neck, N. Y. It is mounted at the rear of the machine and is so arranged that when the brakes are applied for stopping the word "brakes" is shown upon a casing member. Within the latter is a journalled shaft with one end extending exteriorly and having a toothed wheel which is free to rotate. A drum turns on the casing and has an integral

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toothed wheel in mesh with the gear upon the shaft. The signal is mounted in the casing and is adapted to be swung by the shaft member. A flexible connection is made between the drum and the brake mechanism and operated as above described. A spiral spring is employed for returning the signal to normal position when the brakes are released. Means are provided for illumination at night by an electric lamp.

Harlow Radiator Lamp.

Don W. Harlow, Cleveland, O., has been granted a patent for a radiator lamp, the feature of which is its location in the radiator. Two are mounted in this manner and the cooler is specially constructed for the design. The lamp casing is rigidly mounted and contains the usual reflector and bulb retaining mechanism, but the glass front of the light is flush with the casing. Means are provided for adjusting the lamp.



Some Recent Patents Applicable to the Motor Car, Including Protective Tire Casing, Rear Signalling Device, Fuel Filter, Radiator Lamp, Lock and Battery Terminal.

OTHER PATENTS GONE TO ISSUE.

Tire Mail, Joseph B. Duhring, Chestnut Hill, Penn. A tire mail comprising crossed strands of chain links, the links of one strand inclosing a single loop in the adjacent link of said strand and the superimposed link of a crossing strand.

Oil Can, Ralph A. Wakefield, Sacramento, Cal. The can is similar to those of conventional construction, but carries a spring actuated pin projecting from the bottom to the top of snout. By compressing the bottom of the oiler the pin is forced away from snout opening, allowing the lubricant to flow. Normally the spring retains the head member upon its seat, closing the aperture.

Ignition System, Edwin S. Lincoln, Brookline, Mass. An ignition system comprising a generator, an induction coil, a circuit breaker having normally contacting separable contacts, and an electro-magnet for separating said contacts, a non-interruptible circuit connecting the generator with the coil through the magnet, and an interruptible circuit including said separable contacts and connected across the terminals of said coil.

Sanding Device for Cars, George F. A. McDougall, Dorchester, Mass., assignor of one-third to Christos John Scoulikas, Boston. The mudguards are utilized to carry the sand which is released by a lever member through a multiplicity of spouts, spraying the sand in front of the traction wheels. The lever is mounted convenient to the operator of the automobile.

Fastening Device for Tires, William Robert Morrison, Chicago. A tire fastening device embracing in combination with the felloe and rim an expansible and a contractible clamping ring between the wheel rim and the expansible clamping ring on each side of said wheel rim. The rings act mutually to draw a tire about the wheel, and an angled guard ring secured on each side partly covers the rings and co-operates in retaining the guard rings, which are anti-skidding members.

Valve Spring Compressor, Axel Peterson, New York City. The device is a valve spring lifter comprising a beam having a laterally projected fork at one end to engage the valve spring, while the other extremity has a pivoted rod and a lever. Moving the lever contracts and retains the valve spring as well as locks the tool.

Rubber Tire Protector, Joseph A. Utter, Crawfordsville, Ind., assignor of one-half to John F. Utter, San Francisco, Cal. It comprises an annular, trough shaped tire protector having interengaging notches in its opposite edges adjacent its ends, the bases of the notches being located in the median line of the protector.

Automobile Horn, Delroy Fifield, Cleveland, O. A horn actuated by the exhaust of the motor and comprising a tube having a partition therein and a valve disc. The latter has spring fingers embracing the partition, and is located at the mouth of the tube. A pipe is employed for conveying the gases toward the side of the disc opposite to the tube.

Fender, Charles G. Wegner, Baltimore, Md., assignor of one-third to Henry F. Sleepack and Amelia C. Wegner of the same city. It comprises a pair of parallel bars having bifurcated portions forming limbs connected to the axle and mudguards and a cross bar interconnecting the limbs, also a flexible covering.

Motor Car Headlight, Edward O. Clark, Spokane, Wash. The headlight is of the movable, swivelling type, being pivotally mounted and actuated by a rod moved by the tiebar of the car.

Inner Tube Guard, Siegfried Goodman, Bayonne, N. J. It comprises a casing of strips of textile fabric cut diagonally to the weaves thereof and having V shaped incisions formed at both edges. The latter are brought together by strap devices arranged in pairs.

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TAXATION IN CONNECTICUT.

State Wants Money Now Going to Towns—Seeks to Exclude Non-Resident Truck Men.

Albert Phillips, secretary of state for Connecticut, has asked the legislature to pass a bill taking the right of assessing motor vehicles from the towns and placing it under the jurisdiction of the secretary of state. Mr. Phillips proposes to assess cars at 75 per cent. of the manufacturer's list price the first year, 55 the second, 35 the third and 20 thereafter. The rate of taxation would be 10 mills on the dollar of assessed valuation.

Inasmuch as the present very liberal non-resident provision in the Connecticut law applies to motor trucks as well as pleasure cars, Mr. Phillips has asked that that portion of the law be changed to exempt commercial vehicles for 10 days only. This is held to be directed toward concerns in other states who operate delivery service in Connecticut, and the 10 days provision would permit moving vans, etc., to enter the state without registration.

AN INTERESTING DECISION.

Opinion Handed Down by Pennsylvania Court in Action Against Truck Owner.

Automobile owners will be interested in an opinion handed down recently by Judge R. A. Kennedy in the county court at Pittsburg, Penn., in an action where damages for an alleged injury were asked from the owner of a motor truck. Judge Kennedy said in part:

It is of vital interest to the public at large that the steering gear of a heavy automobile or truck, which can wander at the will of the driver all over the highways from side to side, veering, turning and twisting in all directions and running, as they frequently do, at a high rate of speed, should be in a high, if not the highest, degree of efficiency, and if a proper inspection made before starting the machine on the streets would have revealed an obvious defect in the running gear, and such inspection was not made, or if made, the defect was overlooked, and as a result an accident occurred, the defendant cannot say that the accident was unavoidable.

The circumstances of street travel at the present time requires a much greater degree of care, both on the part of the pedestrian and the driver of the machine, than was required, 20, or even 10, years ago, and it is almost imperative on the part of the owner of a modern self-propelling vehicle that the steering gear be kept in such a condition that the machine shall go where the driver intends it to go.

It is useless to say that in this case the accident was unavoidable, because the defendant's own testimony shows that if the nut, bolt or cotter pin had been inspected that morning their worn condition would have been discovered, and they could easily have been replaced, and if, as I said before, the inspector saw them and took chances, or failed to see them, the fault is with the defendant.

This is not a case of injuries arising from defective machinery in a mill or upon private property, but an accident happening on a public highway, where life and limb are every moment in peril of machines which dart hither and thither, their direction and speed controlled solely by machinery under the control of the operator, and if accidents can be averted by the proper care and inspection on the part of the owner or driver of the machine, it is but due the travelling public that such care be taken and inspection made.

ORGANIZE TO FIGHT BILL.

Massachusetts Truck Interests Take Decisive Action Against Weight Limitation.

Representatives of the motor truck and kindred industries, including users of mechanical transports, in Massachusetts, met in Boston early in the month to take decisive action on the bill now pending for the limitation of the weight of vehicles using the highways. It is generally conceded that the bill, which has the approval of the Massachusetts Highway Commission, is aimed at motor vehicles, the reason for the proposed legislation being that heavily loaded trucks damage bridges throughout the commonwealth.

The following committee was appointed to take up the fight in earnest: J. S. Hathaway, James T. Sullivan, J. B. Sullivan, Jr., James Fortesque, William H. Bain, John H. Duffell and

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J. Porter Russell. This committee already has been in conference with the highway commission in an effort to secure the defeat of the bill.

TO CHANGE REGISTRATION FEES.

New Hampshire Legislature Asked to Adopt New Figures and Prohibit Certain Horns.

Representative Shepard of Boscawen has introduced a bill in the New Hampshire legislature providing new registration fees for automobiles as follows: Pleasure cars of 16 horsepower and under, $5; 16-25, $10; 25-30, $15; 30-40, $20; 40-50, $30; 50-60, $40; over 60, $50; commercial vehicles of one-ton capacity and under, $10; one to 1.5 tons, $15; over 1.5 tons, $20. Apparently motorcycles are not included in the bill.

The present law provides for the following fees: Pleasure cars of 15 horsepower and less, $10; 15-30, $15; 30-40, $20; 40-50, $25; 50-60, $30; over 60, $40; all commercial vehicles, $10; all motorcycles, $3.

Representative Langdell of Milford presents an amendment to the existing law, which reads as follows:

The driver of any motor vehicle shall not operate the same within the thickly settled part of any city or town within the meaning of section 1 of said chapter 133, with the muffler open, and neither shall he, within said territory, signal by a whistle or device other than a horn attached to a rubber bulb or similar signal.

TO LICENSE OPERATORS.

Rhode Island Legislature Asked to Enact Bill Requiring Registration of Owners.

Representative Hammill of Bristol has introduced a bill in the Rhode Island legislature which provides for the registration of all operators of motor cars, whether chauffeurs or otherwise. It is understood that this bill was prepared by the Rhode Island Chauffeurs' Association. It amends the present law and reads as follows:

Sec. 7. No person shall operate a motor vehicle upon the public highways of this state until he shall have first obtained a license for that purpose, but nothing herein contained shall prevent the operating of a motor vehicle by an unlicensed person other than a person whose application has been refused, or whose license has been suspended or revoked, if accompanied by a licensed operator, which licensed operator shall also be personally liable for any violation of the provision of secs. 11, 12 and 13 of this chapter. All licenses for operating motor vehicles shall be issued by the state board of public roads.

Licenses issued under the provisions of this chapter shall be of two kinds. Licenses of the first kind shall be issued to persons operating or intending to operate motor vehicles for hire, or compensation, hereinafter referred to as chauffeurs. Licenses of the second kind shall be issued to persons other than chauffeurs or those intending to operate motor vehicles for hire or compensation.

No license of the first kind shall be issued to any person under the age of 20 years or to any person who has not driven a motor vehicle at least 500 miles accompanied by an instructor or licensed driver. Any applicant for a license of the first kind shall be required by said board to show such knowledge of the mechanism of motor vehicles, the rules of the road, and the motor vehicle law, as will, in the opinion of said board, render said applicant a proper and safe person to operate said vehicle upon a public highway; and the applicant shall further demonstrate his ability to operate the said vehicle by a road test under the supervision of a qualified expert appointed by said board.

No license of the second kind shall be issued to any person under the age of 16 years. Any applicant for a license of the second kind shall be required by said board to show such knowledge of the mechanism of motor vehicles, of the rules of the road and the motor vehicle law, as will, in the opinion of said board, render said applicant a proper and safe person to operate said vehicle upon a public highway.

The state board of public roads is hereby authorized and empowered to purchase, for the purposes of this statute, a motor vehicle which shall not exceed in cost $2500, and this amount or so much thereof as may be necessary, is hereby appropriated for that purpose, out of funds not otherwise appropriated. The state board of public roads is hereby authorized to employ an expert operator of motor vehicles at a salary of $1800 per year for the purpose of this act and this amount or so much thereof as may be necessary, is hereby appropriated for that purpose, out of any funds not otherwise appropriated.

No person shall operate a motor vehicle upon the public highways of this state for hire or compensation unless he holds a chauffeur's license or a license of the first kind. The state board of public roads, may, in its discretion, refuse to grant a license for operating a motor vehicle upon the public highways to any applicant whom, for any reason, it considers an improper person. Application for license shall be made under oath upon blanks furnished by said board and said application blanks and said licenses shall be in such form and contain such provisions, not inconsistent with this chapter, as said board may determine. A number shall be assigned to each licensee and a proper record of all applications for licenses and of all licenses issued, shall be kept by said board at its office, and shall be open to public inspection. Each license shall state the name, place of residence and postoffice address of the licensee and the number assigned to him.

Said licenses shall continue in force one year from the date of issue, unless suspended or revoked for cause. And shall, at all times, be carried by the licensee when he is operating a motor vehicle upon the highways of this state and shall be subject to examination upon demand by any proper officer; and said licenses shall have indorsed thereon in the proper handwriting of the licensee, the name of said licensee, and when requested by a proper officer, in the discharge of his duties, under this chapter, said licensee shall write his name in the presence of said officer, to the end that the identity of said licensee may be determined.

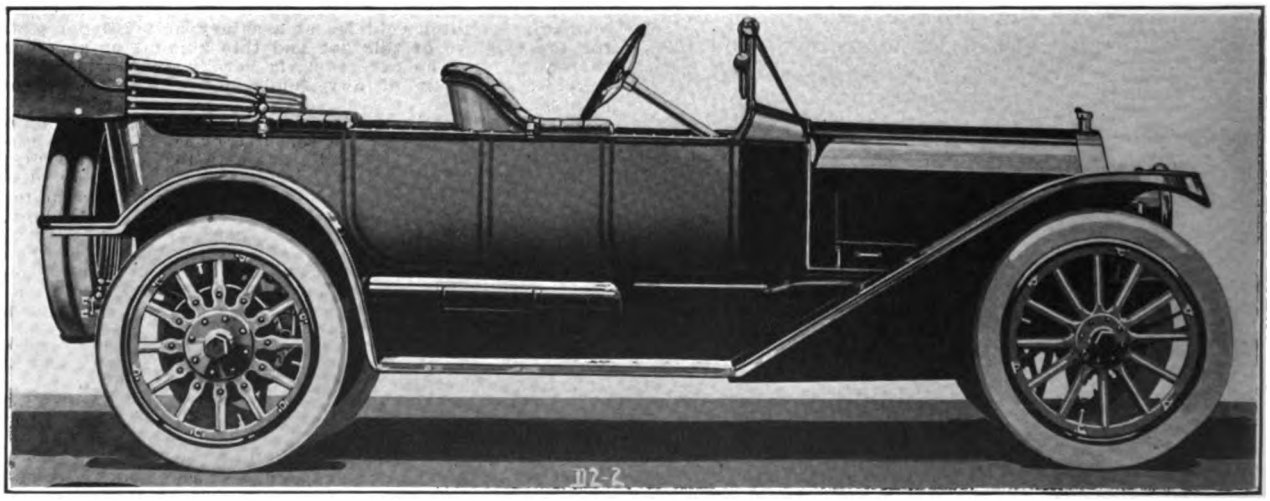
Must Be Labelled as Naphtha—If the bill introduced in the Michigan legislature by Representative Wolcott becomes a law, all motor fuel below 60 degrees test offered for sale in that commonwealth must be labelled as naphtha. The increased cost of gasoline is given as the reason.

Taking Car Without Permission—The House of Representatives in Missouri has passed the bill making it a misdemeanor, subject to a fine or jail sentence, or both, to use an automobile without the owner's permission. In case the offender is a chauffeur his license shall be revoked and cannot be renewed for two years.

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TWO CHASSIS REPRESENT HAVERS LINE.

TWO chassis, these being known as the Havers Six 55 series D and Six 44 series C, comprise the 1913 product of the Havers Motor Car Company, Port Huron, Mich. To each chassis is fitted a touring and roadster type of body. The same general specifications will apply to each machine and the same type of motor is employed, differing only in the bore and stroke. All models are completely equipped, the series D having an electric lighting and motor starting system, while the series C is fitted with an acetylene starter, the electrical equipment being listed as extra. The changes made over the 1912 designs are mostly in the nature of refinements and the same high grade material and workmanship noticeable of previous models are incorporated in the new product.



Havers Six 55 Series D Touring Car Having Ample Power to Meet All Requirements of Service and Being Completely Equipped.

The motor is of the L head type with cylinders cast in pairs. The bore of the series D is 3.75 inches and stroke five, while the smaller engine has a four-inch bore and stroke of five. The horsepower is rated by the company as 55 and 44 respectively. The water jackets are cast integral and the spaces through which the cooled fluid circulates are .75 inch diameter. This with large sized water manifolds and ample capacity cellular type of radiator provides proper cooling under all conditions of service. Cooling is further aided by a belt driven, adjustable fan.

The crankshaft is of ample diameter and rotates in four large bearings, the centre members being three inches long, that at the flywheel end four and the front 3.5. The connecting rods are large and their big ends have 2.625-inch bearings. The carburetor is a Stromberg. A Bosch dual system magneto is employed for ignition on the series C, the ignition, lighting and motor starter being a combined unit on the larger motor.

Lubrication is by a combination system of force feed and splash. The oil is pumped from a sump cast integral with the lower half of the crankcase through a distributing channel in the upper half to the main bearings and gears. The overflow collects in troughs into which the ends of the connecting rods dip, splashing the oil to the pistons, cylinder walls, etc.

The clutch is a multiple disc, steel plates, Raybestos lined, and easy engagement is emphasized in the construction. The transmission is of the selective type, providing three speeds forward and reverse, and all gears are of chrome vanadium steel, wide faced and of large diameter. They are heat treated and hardened and so designed as to give quiet operation. The main and layshaft are ample in size and rotate on large annular ball bearings. One of the qualities claimed for the Havers transmission is easy changing of speeds.

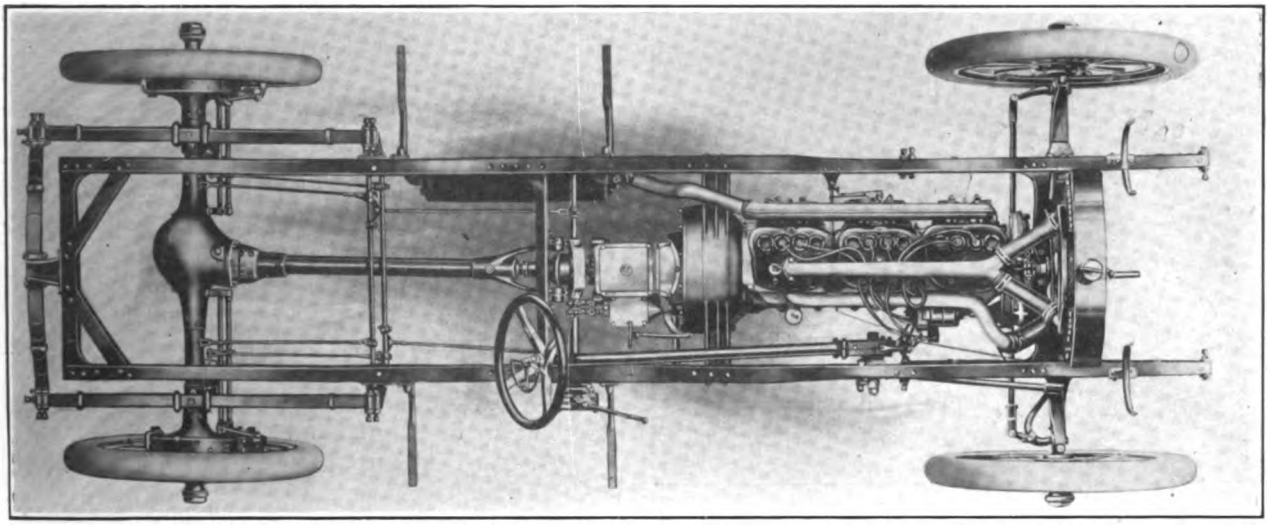
Drive is by a propellor shaft of a high grade steel carried in a torsion tube with a full universal joint and slip joint on the transmission shaft. The driving strain on the rear axle is carried through radius rods while torsional stresses are compensated for through the frame by a large yoke carried on a substantial cross member.

The rear axle is of the full floating type with

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1.5-inch nickel steel axles and the wheels are secured by a flange construction which may be removed easily when the shafts are withdrawn. The differential, driving pinion and bevel gear are accessible through a large inspection cover at the rear of the differential housing and means are provided for replenishing the supply of lubricant. The front axle is of the conventional I beam section type, a drop forging with forged yokes and spindles 1.5 inches in diameter. The construction makes for a large factor of safety and has ample overload capacity.

Semi-elliptic springs are employed in front, these being 40 inches long and two wide. The rear members are three-quarter platform, 46 inches long, two wide and the rear cross member is 36 inches long and two wide. All bolts or parts subject to friction are provided with grease cups.



Plan View of Havers Six Chassis Depicting Suspension of Power Plant and Accessibility of Components.

The frame is a heavy channel section of pressed steel, .1875 inch thick and is 31.5 inches wide at the rear where the usual kick-up is provided, making for a low centre of gravity. It is in-swept at the front, making easy turning of the car in narrow streets. The cross members are securely anchored.

Two sets of brakes are provided, the service being actuated by pedal and of the external contracting type. The emergency is of the internal expanding design operated by the conventional hand lever. Both sets are fitted with equalizers and liberal braking surface is secured through the large sized drums, which are 14 inches in diameter and have two-inch faces.

The wheels are of the artillery type, having 12 heavy spokes, and the hubs are substantial. Baker or Firestone quick detachable demountable rims are offered, with one extra member as standard equipment. Thirty-six by four-inch tires are fitted to both chassis. The wheelbase of the series D is 128 inches; that of the smaller machine 122. Tread is standard, 56 inches.

The driver is placed at the right on all models with quadrant containing gear shift lever and emergency brakes secured to the frame, but inside the body. The service brake pedal is located at the right of the steering column with clutch pedal at the left. The usual accelerator pedal is included.

The steering gear is of unusually sturdy construction, a worm and full wheel irreversible type being utilized. Provision is made for adjustment. The steering column is set at a comfortable angle and the spark and throttle controls are mounted on top of the column. The fuel capacity is 18 gallons on the series C and 20 on the larger vehicle, and with both feed is by gravity to the carburetor. The oil capacity of each motor is 1.75 gallons.

Ample room is provided in the touring models, especially in the tonneau. The rear seat of the series D has a width of 53 inches, and depth of 19. The upholstery is deep and luxurious, the finest grade of curled hair and leather being employed over comfortable springs.

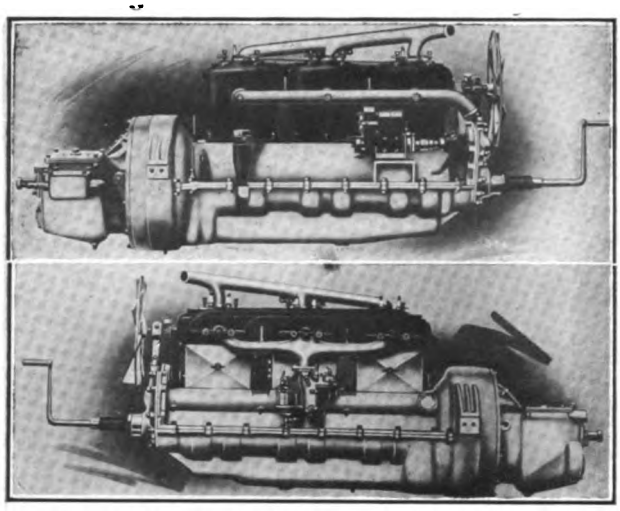
The bodies are of the latest straight line fore door type of attractive design with cowl dash, and when electrical lamps are fitted the side members are of the flush type in the dash. The fenders are well designed and substantially constructed and the passengers are protected from mud and water by splash aprons. The company calls particular attention to the finish of

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its cars, stating that considerable pains is taken in the painting, which is not only high grade, but very durable.

The equipment is very complete, including Havers mohair top with patented inside curtains and automatic ventilating windshield. The horn is located under the hood and the lamps employed are Gray & Davis, finished in black enamel and nickel. In addition to the above equipment there are provided a speedometer with grade indicator, robe and coat rail, tire irons, full set of tools, tire repair outfit, pump, jack and one extra demountable rim.

The Havers Six 55 Knickerbocker speedster is designed to afford a car of high speed possibilities and the maker claims that it is capable of attaining 72 miles an hour, as well as being throttled down to three miles an hour on the direct drive. It is noticeable for its racy appearance and low centre of gravity. A combination fuel and oil tank of ample capacity is mounted in the rear of the seats. Provision is made for carrying supplies, a large trunk being fitted to the deck while an ample sized tool box is mounted on the running board. The tire irons at the rear permit of the carrying of two extra rims.



Intake and Exhaust Sides of Havers Motor Showing Compact Construction and Method of Enclosing Valves.

NEW BOOK OF STANDARDS.

National Tube Company Presents Its 1913 Edition, Which Is Replete with Information.

The National Tube Company, Pittsburg, Penn., manufacturer of tubular goods, is publishing its 1913 edition book of standards containing 559 pages of information and engineering data upon tubing. Several pages are devoted to covering the main process of manufacturing both welded and seamless tubes, also threading, durability and physical properties of both National and Shelby seamless steel tubes. Those specialties of the last named design are described and illustrated and considerable space is given to tables dealing with this material.

The book is unusually replete with tables giving weights, dimensions, strengths, pressures, etc. Considerable attention is given to the mechanical properties of solid and tubular beams, notably those utilized in the motor car industry. Information in regard to water, gas and air is included, as well as tables of measures, etc. A glossary of terms used in the pipe and fitting trade is located in the back of the book. It is very compact, being four by 6.5 inches, printed on Canterbury Bible paper and retails for $2 the copy.

CADILLAC LIGHTS HOUSE.

Massachusetts Finds New Use for Storage Battery of Lighting and Starting System.

Owners of country homes not provided with means of gas or electric lighting may profit by the example of H. J. Murch of Worcester, Mass., who solved the problem in a unique way. Mr. Murch owns a Cadillac car, made by the Cadillac Motor Car Company, Detroit, and has adopted with much success the plan of illuminating his home by means of current drawn from the storage battery of his machine.

Mr. Murch's cottage is at Northboro, Mass., and he wired the house for electric lights and led the feed wires to the garage. There, by the insertion of a plug, connection is established between the automobile and the house and he has light. During his day's driving the electric system, which furnishes power for starting, ignition and lighting, is storing electricity in the battery. At night the current thus generated is sufficient for running five 16 candlepower electric lamps in the house.

At a recent meeting of the contest board of the A. A. A., Teddy Tetzlaff, who was disqualified for driving at an unsanctioned race meeting in California, was reinstated, such reinstatement to take effect May 28, 1913. This news is of importance to the motor racing world as it is expected that Tetzlaff will be one of the leaders in the 500-mile sweepstakes to be held May 30 at Indianapolis, Ind., although announcement of his entry has not been made as yet.

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FEATURES OF THE 1913 MOTORCYCLE.

Machines Equipped with Motors of Higher Power—Increase in Chain Models---Magneto Ignition Almost Exclusively---Motor Starter Makes Appearance.

CAREFUL study of the motorcycle situation at the beginning of the 1913 season indicates that while there are few changes which may be regarded as at all radical in their nature, the de-



Ten Horsepower Emblem Twin.

signers have been exceedingly busy during the past year. The list shows a total of 31 makes, as against 25 for 1912, but the names of six manufacturers are not continued in this year's specifications, suggesting a total gain of 12. Some of these are new firms, who are only just placing their product in the market.

Perhaps the most interesting innovation of the year is the motor starter, and as yet it is represented on but two models and those both of the same make. The two-cycle motor made its appearance a year ago, and is continued this year, with a second model of the same name. Then there is the miniature automobile, with its steering wheel, which made its initial announcement during the summer of 1912 and takes its place in the annual specification sheet for the first time.

In most other respects the 1913 product follows conventional, standardized lines, but with numerous changes as applied to the individual mounts. Last year, for instance, eight of the makers were producing machines with automatic inlet valves, while this year the list has been reduced to three. The mechanical valve, of which the overhead rocker type is the most popular, has gained decidedly, and with many of these the inlet is placed over the exhaust.

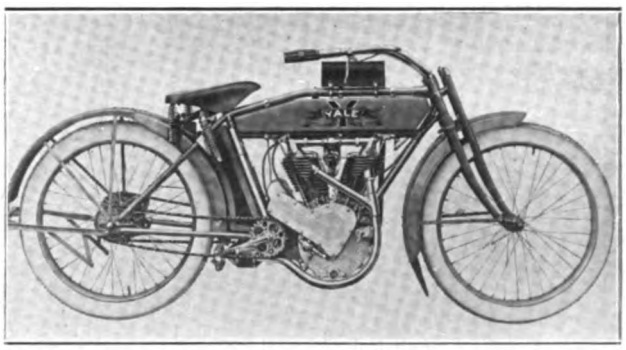
There also is evidenced a strong tendency toward greater horsepower. In 1912 there were 48 singles out of a total of 67 models, while this year there are 41 out of a possible 76. Of the 48, 30 were fitted with motors rated at four horsepower and 13 with five horsepower units. The figures for 1913 show 16 four horsepower machines and 21 of five horsepower.

Of the 16 twins in 1912, 11 were fitted with engines rated at seven horsepower, and the highest rating any producer cared to make was eight horsepower. This year there are 31 twins, and 17 of them are rated at seven horsepower, while there are three eight horspower machines—not counting those which are listed as 7-8 horsepower —six of nine and five of 10. One of the sevens is listed as 7-10, and one of the tens as 10-13.

But one battery model is listed as against nine in 1912. Several makers are furnishing independent spark control levers. The magnetos are largely of the armored water proof type.

In the matter of transmissions, there were 41 belt driven models in 1912, 21 chain, five with option of chain or belt and two shaft. This year there are 40 using the chain, 18 with option of chain or belt, 13 with belt and five shaft driven models.

Clutches are fitted almost exclusively and several two-speed machines have been added to the list. There is a decided increase in spring forks, and a very evident desire to consider the comfort of the rider in every respect. It also should be borne in mind that the forks have been widened to permit of larger tire sizes, which in most cases may be at least .25-inch larger than those listed as regular equipment. Provision also is made

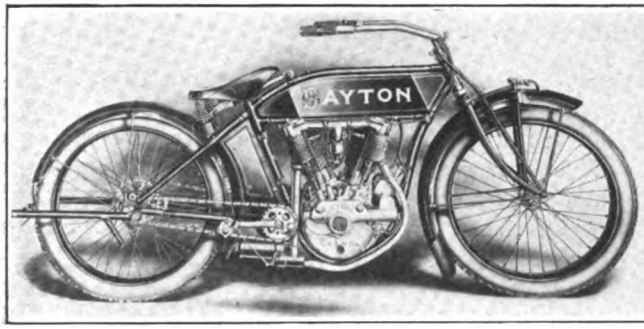


7-8 Horsepower Yale Twin.

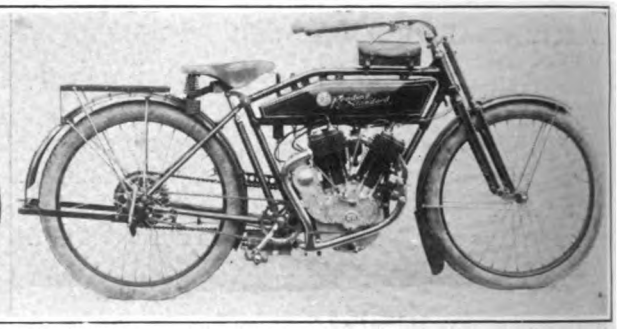
for the use of tire chains if desired. The newly adopted standard rims are universally fitted, and in almost every instance the rear wheel is 28 inches in diameter.

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DETAILED SPECIFICATIONS OF THE MOTORCYCLES

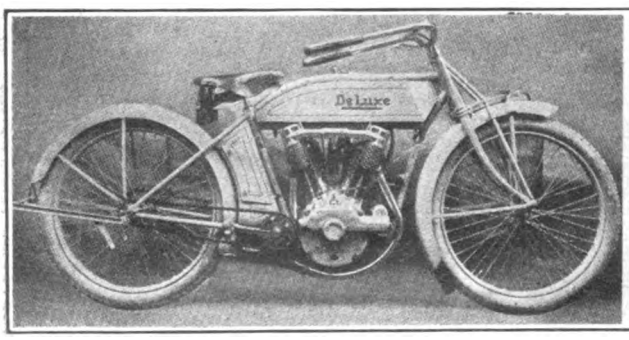


Seven Horsepower Dayton Twin.

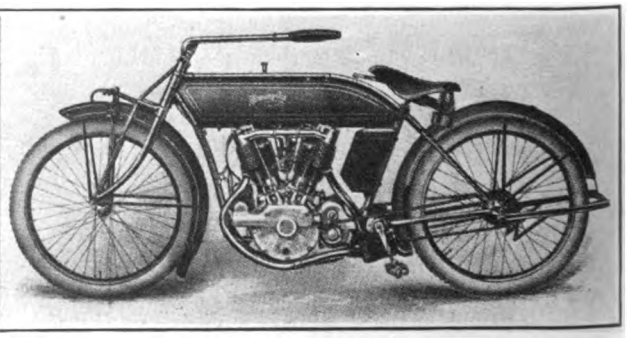


7-8 Horsepower R-S Twin.

Make	Type	H. P.	Bore	Stroke	G. Ratio	Drive	Intake Valve	Carburetor	Gals. Gas.	Magneto
A-M-C	single	4	3.25	3.67	....	option	mechanical	Schebler	3	Bosch
A-M-C	twin	7	3.25	3.67	....	chain	mechanical	Schebler	3	Bosch
Black Hawk	single	4-5	...	...	....	option	mechanical	Schebler	1.75	Bosch
Breed	single	4	...	...	....	option	mechanical	Schebler	2.5	Bosch
Breed	twin	7	...	...	....	option	mechanical	option	1.75	Bosch
Breed	twin	9	...	...	....	option	mechanical	option	1.75	Bosch
Crawford	twin	9	3.25	3.67	4-1	chain	mechanical	option	1.75	Bosch
Dayton	twin	7	3.25	3.67	3.75-1	chain	mechanical	Schebler	2.5	Bosch
Dayton	twin	9	3.50	3.67	3.75-1	chain	mechanical	Schebler	2.5	Bosch
De Luxe	twin	7	3.25	3.67	3.5-1	chain	mechanical	Schebler	2	Bosch
De Luxe	twin	9	3.50	3.67	3.5-1	chain	mechanical	Schebler	2	Bosch
Eagle	single	5	3.50	3.67	opt.	belt	mechanical	Schebler	2	Bosch
Eagle	twin	9	3.50	3.67	opt.	chain	mechanical	Schebler	2	Bosch
Emblem	single	5	3.25	4.00	4-1	option	mechanical	Heitger	2	battery
Emblem	single	5	3.25	4.00	4-1	option	mechanical	Heitger	2	Herz
Emblem	twin	8	3.37	3.75	3.5-1	option	mechanical	Heitger	2	Herz
Emblem	twin	10	3.25	4.00	3-1	chain	mechanical	Heitger	2	Herz
Excelsior	single	4-5	3.17	3.50	5-1	option	mechanical	Schebler	2.5	Bosch
Excelsior	twin	7-10	3.17	3.50	4-1	option	mechanical	Schebler	2.5	Bosch
Feilbach	single	5	3.31	4.00	....	option	mechanical	Heitger	2	Herz
F-N	single	....	...	...	....	shaft	automatic	F. N.	1.25	Bosch?
F-N	4-cyl.	6	2.07	2.24	....	shaft	automatic	F. N.	1.25	Bosch?
F-N	2-sp. 4-cyl.	6	2.07	2.24	....	shaft	automatic	F. N.	1.25	Bosch?
Harley-Davidson	single	5	3.31	4.00	opt.	option	mechanical	Schebler	1.5	Bosch
Harley-Davidson	twin	7-8	3.62	3.50	opt.	chain	mechanical	Schebler	2.5	Bosch
Henderson	4-cyl.	8	2.62	3.00	4-1	chain	mechanical	Schebler	3	Bosch
Indian	single	4	3.25	3.67	3.47-1	chain	mechanical	Hedstrom	2.5	Bosch
Indian	2-sp. single	4	3.25	3.67	3.47-1	chain	mechanical	Hedstrom	2.5	Bosch
Indian	twin	7	3.25	3.67	3.47-1	chain	mechanical	Hedstrom	2.5	Bosch
Indian	2-sp. twin	7	3.25	3.67	3.47-1	chain	mechanical	Hedstrom	2.5	Bosch
Iver Johnson	single	4-5	3.25	3.75	....	V belt	mechanical	Schebler	2	Bosch
Iver Johnson	twin	7-8	3.25	3.75	....	chain	mechanical	Schebler	2.5	Bosch
Jefferson	single	4	3.37	3.40	....	chain	mechanical	Heitger	2	Bosch
Jefferson	twin	7	3.37	3.40	....	chain	mechanical	Heitger	2	Bosch



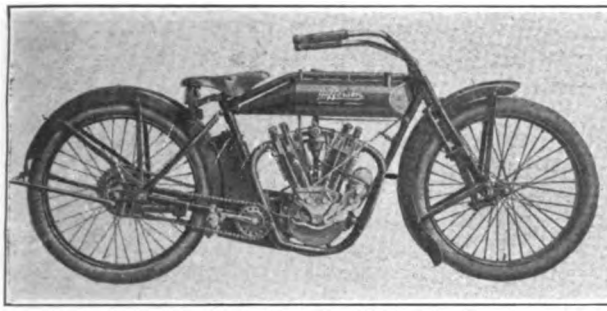
Seven Horsepower De Luxe Twin.



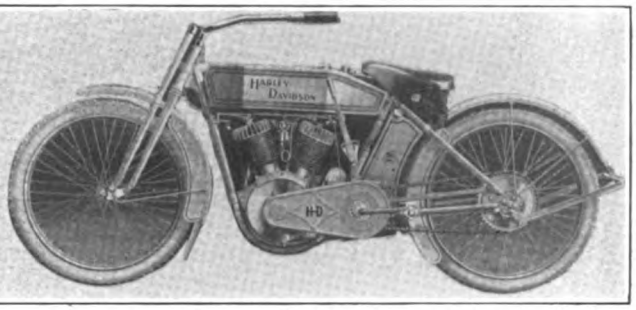
Ten Horsepower Minneapolis Twin.

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IN THE AMERICAN MARKET FOR THE 1913 SEASON.

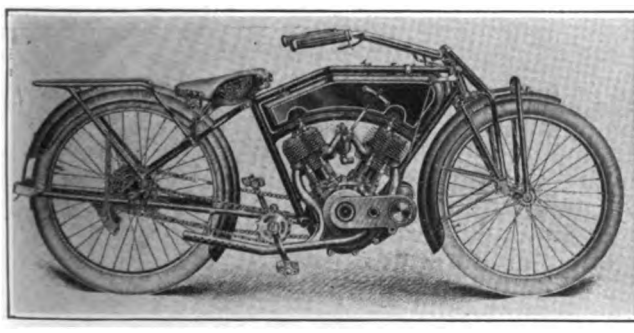


Seven Horsepower Jefferson Twin.

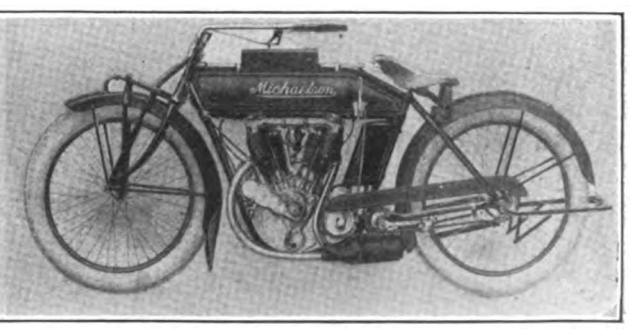


7-8 Horsepower Harley-Davidson Twin.

Lubrication	Qts. Oil	Forks	Brake	Control	Wheelbase	Tires	Clutch	Price
sight feed	2	spiral spring	Musselman	double grip	58	28x2.75	Eclipse	$245
sight feed	2	spiral spring	Musselman	double grip	58	28x2.75	Eclipse	285
force pump	3	truss, spring	Black Hawk	double grip	53	28x2.75	Black Hawk	235
sight feed	2	cradle spring	Eclipse	grip, pushrod	57.5	28x2.75	Eclipse	285
force pump	4	special cushion	Eclipse	rod	57	28x2.50	Eclipse	225
force pump	4	special cushion	Eclipse	rod	57	28x2.75	Eclipse	285
force pump	4	special cushion	Eclipse	rod	57	28x2.75	Eclipse	285
s. feed, pump	2	suspension spring	Lester	double grip	57	28x2.75	Eclipse	265
s. feed, pump	2	suspension spring	Lester	double grip	57	28x2.75	Eclipse	275
s. feed, pump	4	cradle spring	Musselman	double grip	57	28x2.75	Eclipse	275
s. feed, pump	4	cradle spring	Musselman	double grip	57	28x2.75	Eclipse	285
sight feed	3	truss, leaf spring	band	double grip	60	28x2.75	Eclipse	235
sight feed	3	truss, leaf spring	band	double grip	60	28x2.75	Eclipse	275
sight feed	2	cushion spring	option	double grip	56	28x2.50	Emblem	175
sight feed	2	cushion spring	option	double grip	56	28x2.50	Emblem	200
sight feed	2	cushion spring	option	double grip	56	28x2.50	Emblem	250
sight feed	2	cushion spring	option	double grip	56	28x2.50	Emblem	300
automatic	4	cradle spring	option	double grip	57	28x2.50	Eclipse	200
automatic	4	cradle spring	option	double grip	59	28x2.75	Eclipse	250
drip feed	2	truss, spring	Corbin	double grip	58	28x2.75	Eclipse	250
pump	1.3	elastic spring	.....	lever	56	28x2.50	.....	275
pump	1.3	elastic spring	hand, foot	lever	56	28x2.50	disc	300
pump	1.3	elastic spring	hand, foot	lever	56	28x2.50	.....	350
sight feed	3.5	double plunger	Thor	double grip	56.5	28x2.75	Free Wheel	235
sight feed	2.5	double plunger	Thor	double grip	57.5	28x2.75	Free Wheel	285
sight feed	2	triple stem, spring	Henderson	double grip	65	28x3.00	Eclipse	325
force pump	2	cradle spring	Corbin	double grip	55	28x2.75	Indian	200
force pump	2	cradle spring	Corbin	double grip	58	28x2.75	Indian	275
force pump	2	cradle spring	Corbin	double grip	55	28x2.75	Indian	250
force pump	2	cradle spring	Corbin	double grip	58	28x2.75	Indian	350
hand pump	1.5	truss, leaf spring	Corbin	grip	56	28x2.50	Iver John'n	225
hand pump	2	truss, leaf spring	Corbin	grip	56	28x2.75	Iver John'n	275
force pump	2	truss, leaf spring	Corbin	double grip	56	28x2.75	Eclipse	225
force pump	2	truss, leaf spring	Corbin	double grip	56	28x2.75	Eclipse	275



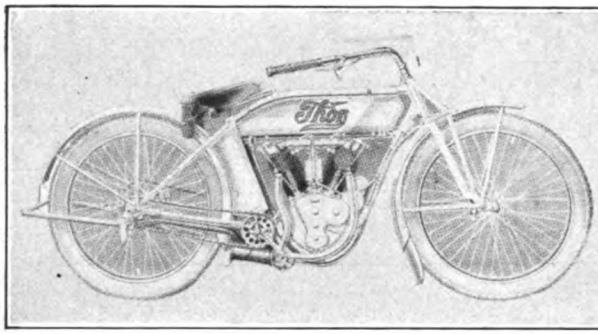
7-8 Horsepower Iver Johnson Twin.



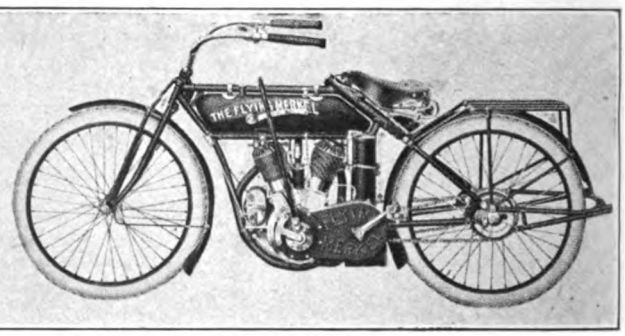
10-13 Horsepower Michaelson Twin.

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DETAILED SPECIFICATIONS OF THE MOTORCYCLES IN



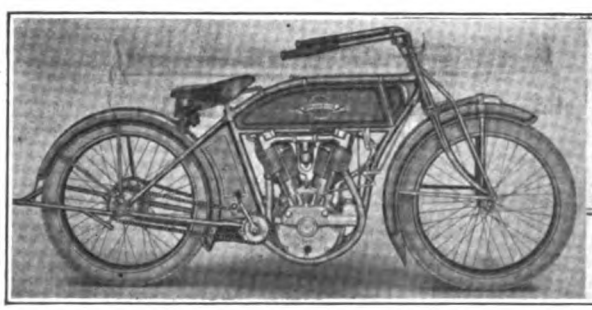
Seven Horsepower Thor Twin.



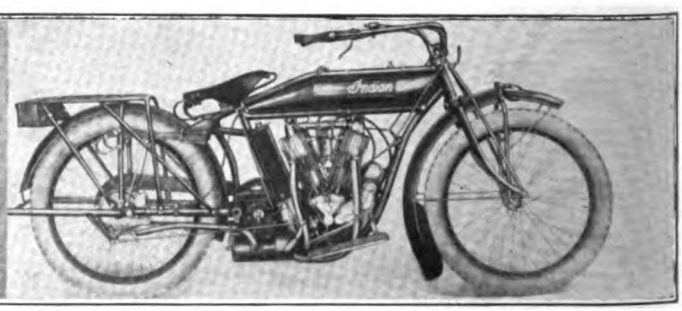
Self-Starting Flying Merkel Twin.

Make	Type	H. P.	Bore	Stroke	G. Ratio	Drive	Intake Valve	Carburetor	Gals. Gas.	Magneto
Merkel	single	4	3.25	3.67	....	option	mechanical	Schebler	2.25	Bosch
Merkel	2-sp. single*	4	3.25	3.67	....	chain	mechanical	Schebler	2.25	Bosch
Merkel	twin	7	3.25	3.67	....	option	mechanical	Schebler	2.25	Bosch
Merkel	2-sp. twin*	7	3.25	3.67	....	chain	mechanical	Schebler	2.25	Bosch
Michaelson	single	5-6	3.50	3.75	....	chain	mechanical	Schebler	3	option
Michaelson	tricar	5-6	3.50	3.75	....	chain	mechanical	Schebler	3	option
Michaelson	twin	10-13	3.50	3.75	....	chain	mechanical	Schebler	3	option
Militaire	twin	9	3.50	3.70	3.5-1	shaft	mechanical	Schebler	2.5	Bosch
Milwaukee	single	5	...	...	....	chain	mechanical	Heitger	2.5	Splitdorf
Minneapolis	single	5	3.50	3.75	4.25-1	chain	mechanical	Schebler	2	Bosch
Minneapolis	tricar	5	3.50	3.75	6-1	chain	mechanical	Schebler	2	Bosch
Minneapolis	twin	10	3.50	3.75	3-1	chain	mechanical	Schebler	3	Bosch
M-M	single	4.5	3.25	4.00	4-1	belt	automatic	Schebler	1.5	Bosch
M-M	twin	8	3.25	4.00	4.75-1	belt	automatic	Schebler	1.75	Bosch
Monarch	single	5	...	...	....	option	mechanical	option	2.5	Herz
Monarch	twin	10	...	...	....	chain	mechanical	option	2.5	Herz
New Era	single	4	3.21	3.75	4.5-1	chain	mechanical	Acme	1.75	Bosch
New Era	twin	8	3.21	3.75	3.5-1	chain	mechanical	Acme	1.75	Bosch
Pierce	single	5	3.50	3.75	4.5-1	belt	mechanical	Breeze	2	Herz
Pierce	single	5	3.50	4.00	4.5-1	belt	mechanical	Schebler	2	Burling
Pierce	4-cyl.	7	2.43	2.25	4.5-1	shaft	mechanical	Breeze	2	Burling
Pope	single	4	3.00	3.68	4.25-1	V belt	automatic	Schebler	1.5	Herz
Pope	single	4	3.32	3.50	4.6-1	fl. belt	mechanical	Schebler	2	Herz
Pope	single	5	3.62	3.68	5-1	chain	mechanical	Schebler	2	Bosch
Pope	twin	7-8	3.32	3.50	4-1	chain	mechanical	Schebler	2	Bosch
R-S	single	4	3.34	3.46	5-1	belt	mechanical	Schebler	2.5	Bosch
R-S	single	5	3.37	3.50	5-1	option	mechanical	Schebler	2.5	Bosch
R-S	twin	7-8	3.37	3.50	4.25-1	chain	mechanical	Schebler	2.5	Bosch
Schickel	single	5	3.37	3.37	opt.	belt	two-cycle	double jet	3	Eisemann
Schickel	single	5	3.37	3.37	opt.	chain	two-cycle	double jet	3	Eisemann
Schickel	single	6	4.00	3.37	opt.	belt	two-cycle	double jet	3	Eisemann
Schickel	single	6	4.00	3.37	opt.	chain	two-cycle	double jet	3	Eisemann
Thiem	single	5	3.25	3.73	....	V belt	.....	Thiem	1.75	option

*Motor starter in this model.



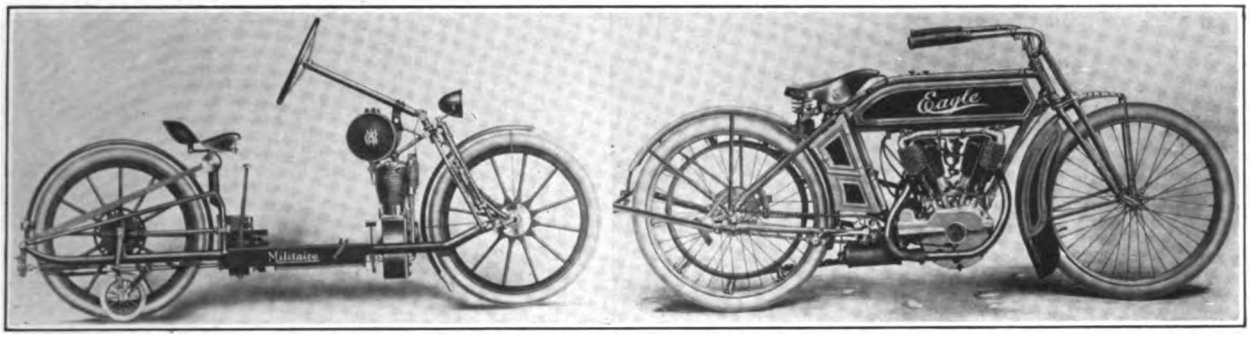
Nine Horsepower Crawford Twin.



Tourist Trophy Indian Twin.

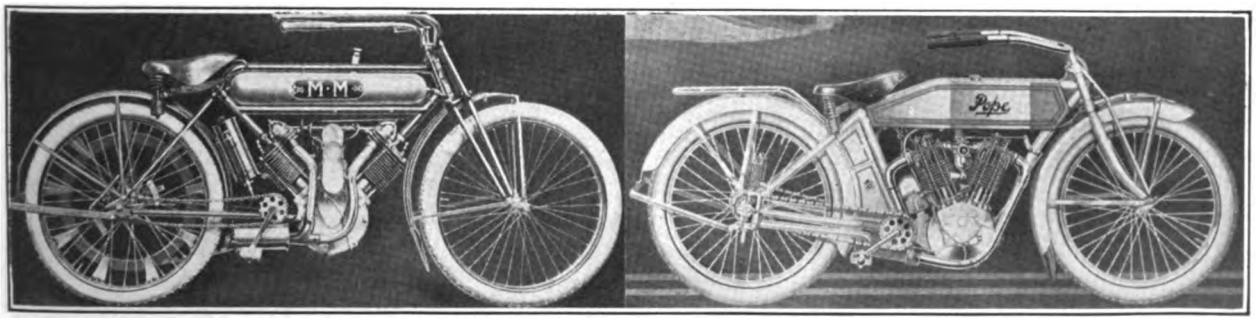
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THE AMERICAN MARKET FOR THE 1913 SEASON, CONT.



Nine Horsepower Militaire Twin. **Nine Horsepower Eagle Twin.**

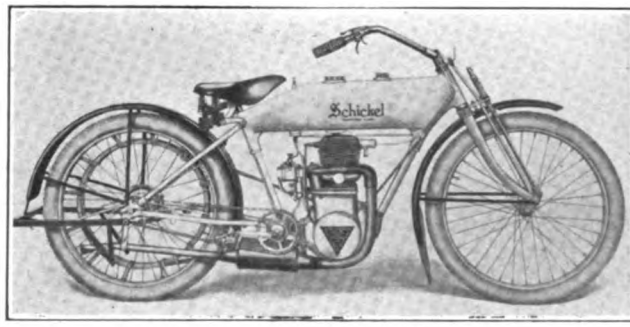
Lubrication	Qts. Oil	Forks	Brake	Control	Wheelbase	Tires	Clutch	Price
drip feed	2	truss, spring	Musselman	double grip	55	28x2.50	Eclipse	$210
drip feed	2	truss, spring	flat band	double grip	55	28x2.50	Eclipse	285
drip feed	2	truss, spring	Musselman	double grip	55	28x2.75	Eclipse	260
drip feed	2	truss, spring	flat band	double grip	55	28x2.75	Eclipse	335
force pump	4	leaf spring	Corbin	grip	58	28x2.75	mul. disc	275
force pump	4	leaf spring	Corbin	grip	58	28x2.75	mul. disc	375
force pump	4	leaf spring	Corbin	grip	58	28x3.00	mul. disc	325
sight feed	2	special spring	two sets	wheel	64	28x2.75	cone	300
s. feed, pump	4	Sager spring	Eclipse	Bowden wire	55	28x2.75	Eclipse	225
hand pump	3	cradle spring	Thor	wire	55	28x2.75	disc	275
hand pump	3	cradle spring	Thor	wire	55	28x2.75	disc	375
force pump	4	cradle spring	Thor	wire	57	28x2.75	disc	325
force pump	1.5	truss, leaf spring	New Departure	double grip	56	28x2.50	Eclipse	200
force pump	1.5	truss, leaf spring	New Departure	double grip	58	28x2.50	Eclipse	240
force pump	2.5	truss, leaf spring	option	grip, lever	60	28x2.50	Eclipse	225
force pump	2.5	truss, leaf spring	option	grip, lever	60	28x2.75	Eclipse	275
sight feed	2	compound spring	New Era	grip	62	28x2.75	New Era	250
sight feed	2	compound spring	New Era	grip	62	28x3.00	New Era	300
hand pump	2	pneumatic spring	Corbin	Bowden wire	54	28x2.50	Eclipse	225
hand pump	2	pneumatic spring	Corbin	Bowden wire	54	28x2.75	Eclipse	250
f. f., splash	2	pneumatic spring	Corbin	Bowden wire	60	28x2.75	Pierce	400
hand pump	2	leaf spring	Eclipse	double grip	51	26x2.25	Eclipse	165
hand pump	2	leaf spring	Eclipse	double grip	56	28x2.50	Eclipse	200
force pump	2	leaf spring	Corbin	double grip	56.5	28x2.50	Eclipse	215
force pump	2	leaf spring	Corbin	double grip	56.5	28x2.75	Eclipse	250
sight feed	3	vertical spring	option	double grip	55	28x2.50	Eclipse	200
sight feed	3	vertical spring	option	double grip	55	28x2.50	R-S cone	225
sight feed	3	vertical spring	option	double grip	55	28x2.50	R-S cone	275
.....	...	tension spring	Corbin	grip	57	28x2.75	idler	225
.....	...	tension spring	Corbin	grip	57	28x2.75	Eclipse	230
.....	...	tension spring	Corbin	grip	57	28x2.75	idler	235
.....	...	tension spring	Corbin	grip	57	28x2.75	Eclipse	240
.....	2	special spring	Thiem	Bowden wire	56	28x2.75	Thiem	250



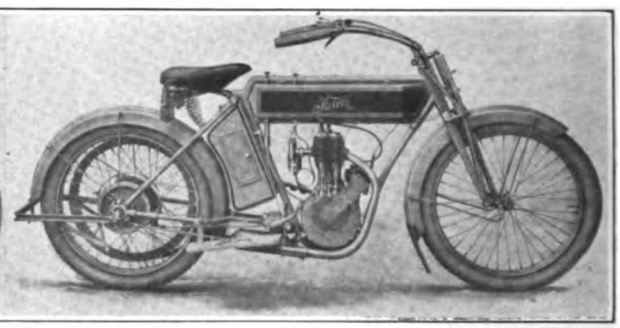
Eight Horsepower M-M Twin. **7-8 Horsepower Pope Twin.**

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DETAILED SPECIFICATIONS OF THE MOTORCYCLES IN



Two-Cycle Schickel Single.



Ten Horsepower Thiem Twin.

Make	Type	H. P.	Bore	Stroke	G. Ratio	Drive	Intake Valve	Carburetor	Gals. Gas.	Magneto
Thiem	twin	10	3.25	4.00	....	V belt	.....	Thiem	2	option
Thor	single	4	3.25	3.60	4.95-1	chain	mechanical	Thor	2.75	Bosch
Thor	2-sp. single	4	3.25	3.60	4.95-1	chain	mechanical	Thor	2.75	Bosch
Thor	single	5	3.57	3.80	4.95-1	chain	mechanical	Thor	2.75	Bosch
Thor	2-sp. single	5	3.57	3.80	4.95-1	chain	mechanical	Thor	2.75	Bosch
Thor	twin	7	3.25	3.60	3.7-1	chain	mechanical	Thor	2.75	Bosch
Thor	2-sp. twin	7	3.25	3.60	3.7-1	chain	mechanical	Thor	2.75	Bosch
Yale	single	5-6	3.25	3.67	5-1	option	mechanical	Heitger	3	Bosch
Yale	twin	7-8	3.25	3.67	3.75-1	option	mechanical	Heitger	3	Bosch

DIRECTORY OF MAKERS.

A-M-C—Allied Motors Corporation, Chicago, Ill.

Black Hawk—Black Hawk Motor Co., Rock Island, Ill.

Breed—Breed Manufacturing Company, Bay City, Mich.

Crawford—Midland Manufacturing Co., Saginaw, Mich.

Dayton—Davis Sewing Machine Company, Dayton, O.

De Luxe—Excelsior Cycle Company, Chicago, Ill.

Eagle—American Motor Company, Brockton, Mass.

Emblem—Emblem Manufacturing Co., Angola, N. Y.

Excelsior—Excelsior Motor Manufacturing & Supply Company, Chicago, Ill.

Feilbach—Feilbach Motor Company, Milwaukee, Wis.

F-N—American F-N Company, Newtonville Station, Boston, Mass.

Harley-Davidson—Harley-Davidson Motor Company, Milwaukee, Wis.

Henderson—Henderson Motorcycle Co., Detroit, Mich.

Indian—Hendee Manufacturing Co., Springfield, Mass.

Iver-Johnson—Iver Johnson's Arms & Cycle Company, Fitchburg, Mass.

Jefferson—Waverley Manufacturing Co., Jefferson, Wis.

Merkel—Miami Cycle & Manufacturing Co., Middletown, O.

Michaelson—Michaelson Motor Co., Minneapolis, Minn.

Militaire—Militaire Auto Company, Inc., Cleveland, O.

Milwaukee—Milwaukee Motorcycle Co., Milwaukee, Wis.

Minneapolis—Minneapolis Motor Co., Minneapolis, Minn.

M-M—American Motor Company, Brockton, Mass.

Monarch—Ives Motorcycle Corporation, Owego, N. Y.

New Era—New Era Auto-Cycle Company, Dayton, O.

Pierce—Pierce Cycle Company, Buffalo, N. Y.

Pope—Pope Manufacturing Company, Hartford, Conn.

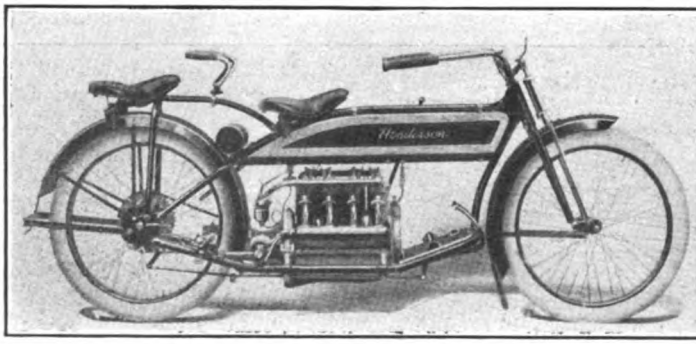
R-S—Reading-Standard Company, Reading, Penn.

Schickel—Schickel Motor Company, Stamford, Conn.

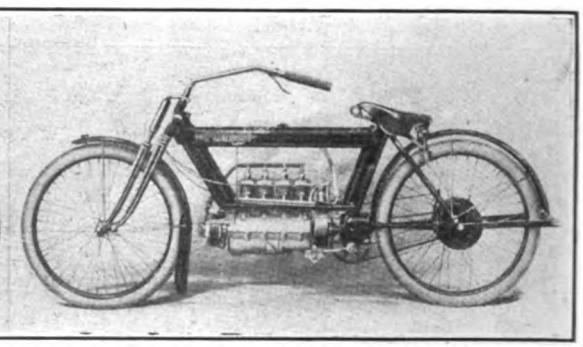
Thiem—Joerns-Thiem Motor Company, St. Paul, Minn.

Thor—Aurora Automatic Machinery Company, Aurora, Ill.

Yale—Consolidated Manufacturing Company, Toledo, O.



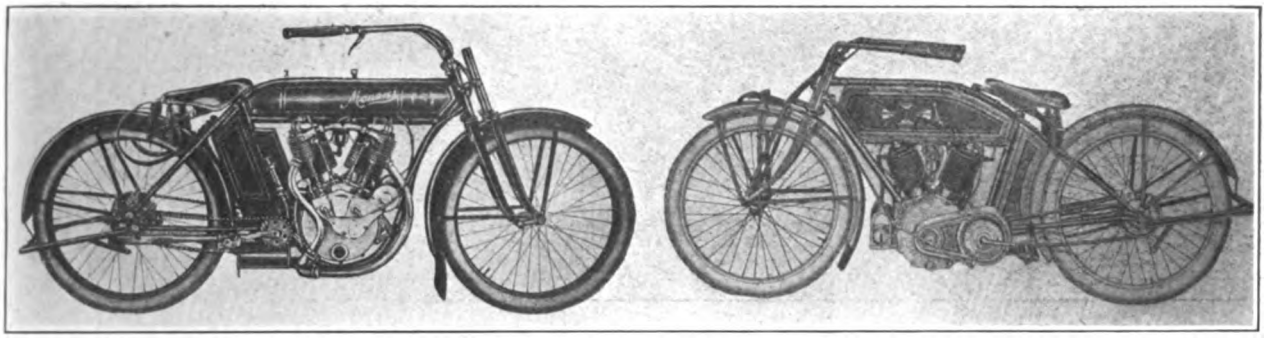
Eight Horsepower Henderson Four-Cylinder.



Seven Horsepower Pierce Four-Cylinder.

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THE AMERICAN MARKET FOR THE 1913 SEASON, CONT.



Ten Horsepower Monarch Twin.

7-10 Horsepower Excelsior Twin.

Lubrication	Qts. Oil	Forks	Brake	Control	Wheelbase	Tires	Clutch	Price
.....	2	special spring	Thiem	Bowden wire	56	28x2.75	Thiem	$300
force pump	4	truss, spring	Thor	double grip	58	28x2.50	Thor	225
force pump	4	truss, spring	Thor	double grip	58	28x2.50	Thor	265
force pump	4	truss, spring	Thor	double grip	58	28x2.75	Thor	240
force pump	4	truss, spring	Thor	double grip	58	28x2.75	Thor	280
force pump	4	truss, spring	Thor	double grip	58	28x2.75	Thor	290
force pump	4	truss, spring	Thor	double grip	58	28x2.75	Thor	330
force pump	4	cradle spring	option	double grip	57.5	28x3.00	Eclipse	225
force pump	4	cradle spring	option	double grip	57.5	28x3.00	Eclipse	275

BOSCH AT THE SHOW.

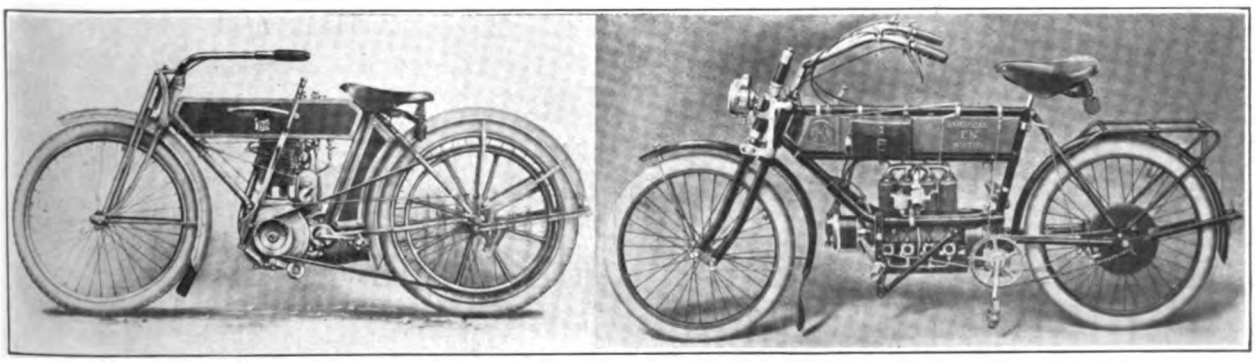
The Bosch Magneto Company, New York City, is particularly pleased with the showing made by its product at the first independent motorcycle show in Chicago. According to its figures 80 per cent. of the 77 machines on display were fitted with Bosch magnetos. The tabulated score submitted by the company is as follows:

Exhibited by Manufacturers.

Make of Machine	Bosch	Herz	Berling
Excelsior	6	..	..
Harley-Davidson	4	..	..
Indian	6	..	..
Pierce	..	..	2
Emblem	..	4	..
Henderson	3	..	..
M-M	2	..	..
Eagle	1	..	..
Thor	4	..	..
Crawford	1	..	..
Pope	2	2	..
Dayton	2	..	..
Iver Johnson	2	..	..
R-S	5	..	..
Merkel	4	..	..
Schickel	..	..	2
Jefferson	2	..	..
De Luxe	2	..	..
Yale	4	..	..
Minneapolis	3	..	..
A-M-C	..	..	2
Fellbach	..	1	..
Monarch	..	2	..
Black Hawk	2	..	..

In Other Exhibits.

Excelsior	1	..	..
Harley-Davidson	3	..	..
Indian	2	..	..
Thor	1	..	..
Totals	62	9	6



4-5 Horsepower Black Hawk Single.

Six Horsepower F-N Four-Cylinder.

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ACTIVITIES OF MOTORCYCLISTS, THE RIDER, THE MANUFACTURER, AND THE DEALER

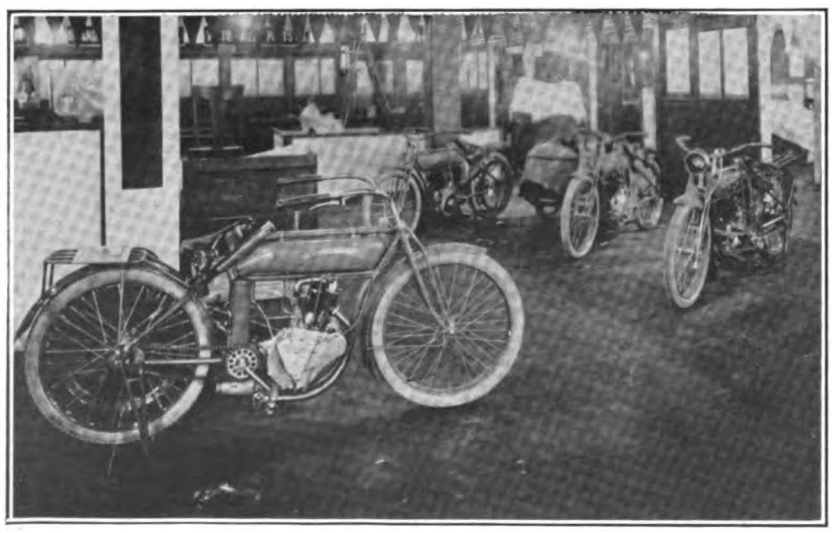


National Motorcycle Show.

The experiment of the Motorcycle Manufacturers' Association in holding an exclusive national show in Chicago appears to have been successful from every viewpoint. It is considered by the makers and others in the industry as marking a new epoch in the history of the two-wheeled mount. Heretofore, these vehicles have been displayed in connection with the big automobile shows in New York, Chicago and Boston, and there has been a feeling for some time, by manufacturers, dealers and riders, that insufficient opportunity was afforded in this manner to call direct attention to the merits of the product.

With the inauguration of the separate show, there comes a suggestion that the business of producing motorcycles has reached a point where it must be regarded in a new light. The success of the enterprise indicates that the industry has developed sufficient proportions to warrant consideration of its separate identity. The exhibition was most complete in this respect, accessories, supplies and fittings applicable to the motorcycle forming no small portion of the display.

Just previous to the opening of the show a movement was set on foot looking toward but one annual display, this to be held in Chicago. While it is true that two-thirds of the makers are at present located in the Middle West, it must be remembered that those with factories in the East are decidedly important factors in the motorcycle industry. Some of these latter have made it plain that the eastern market must be considered as well as that which has its centre in and about Chicago. The entire question will be taken up at an early meeting of the associa- torcycle also forming a decidedly important section of the display.



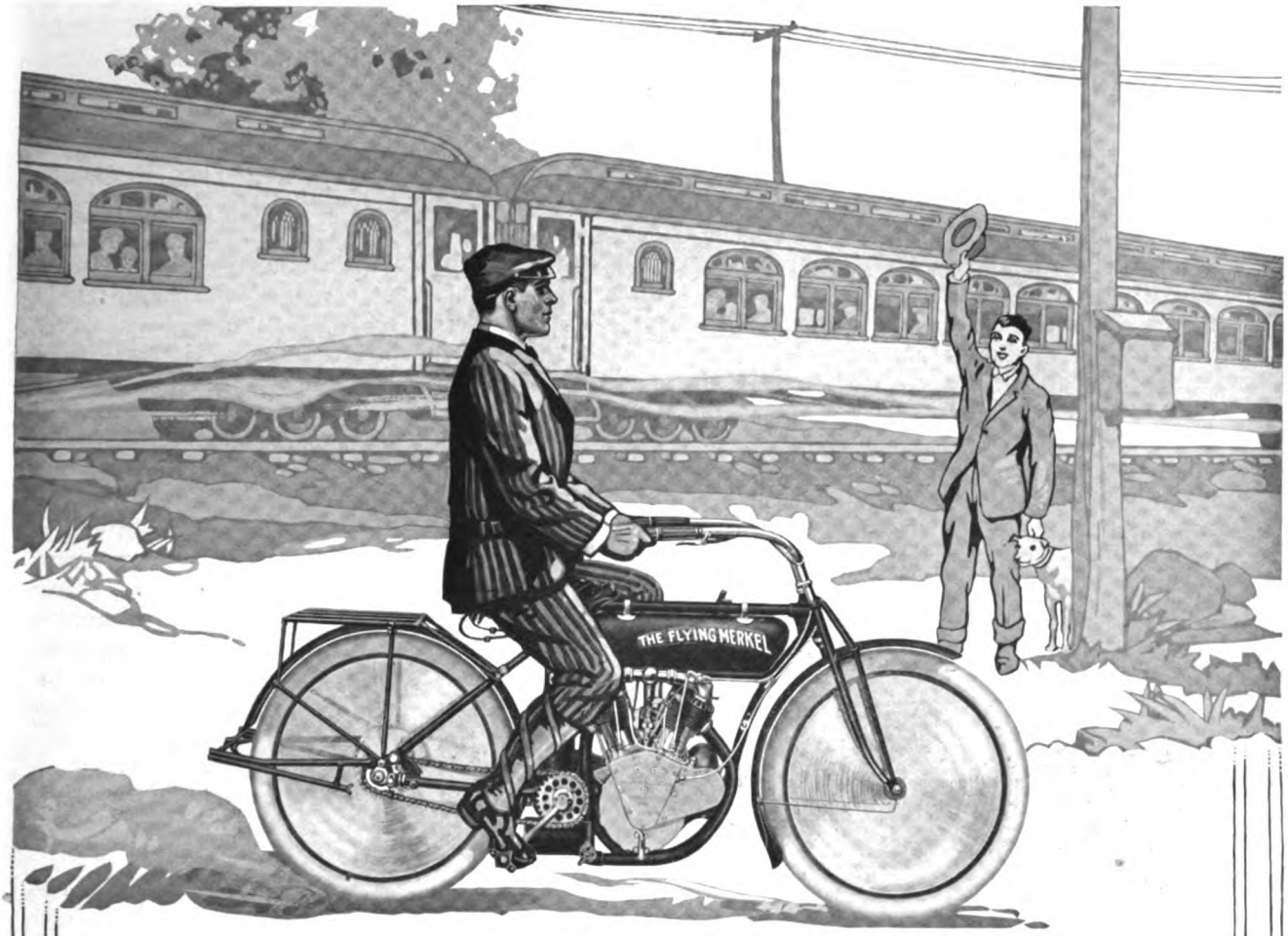
Headquarters of Flying Merkel During Recent Chicago Show.

Merkel Starter Proves Point.

During the closing hours of the Chicago show an amusing incident took place at the Flying Merkel booth. Advertising Manager F. L. Valiant was trying to convince a doubting Thomas that the motor starter on the new Yellow Jacket model was all that the company claimed for it, when someone accidentally touched the small lever which sets the starter in motion. It so happened that a little gasoline had been left in the carburetor, and the machine started with a roar, which took the doubting Thomas completely by surprise.

Mr. Valiant claims that the Yellow Jacket models will do more to promote the use of the sidecar in this country than any other one agency. He calls attention to the fact that when it is necessary to lift the motorcycle onto the stand the sidecar is thrown out of line with the rear axle. With the motor starter no stand is necessary and the rear wheel of the machine may

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THE PULLMAN OF THE OPEN ROAD

but inadequately expresses the superior and exclusive features embodied in the motorcycle which has created a sensation wherever motor vehicles are known.

THE FLYING MERKEL

for 1913 is the only motorcycle in the world with a Self-Starter and Two-Speed Free Engine Hub —an exclusive feature which at once makes motorcycling more than ever a sport for gentlemen. The original and improved Spring Frame and Spring Fork makes all roads boulevards, and the full Hess-Bright ball-bearing motor gives the power plant flexibility not found in any other motorcycle engine. Write for art catalog fully describing the famous prize winner "4-45" and "7-75" "Yellow Jacket" models.

The Miami Cycle & Mfg. Co.
320 HANOVER STREET.
MIDDLETOWN, OHIO
MEMBER M.M.A.

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rest upon the ground at all times, keeping its alignment with the wheel of the sidecar.

California Clubs Remain Loyal.

Several of the motorcycle clubs in California are opposed to joining the new Western Federation, preferring to remain with the F. A. M. One of these is the San Jose Motorcycle Club and Mr. Banta, a prominent member of the club, states as one reason that the F. A. M. will soon be able to give sick and injured benefits to its members, which the new organization will be unable to do for many years to come.

A Million Motorcycle Plugs.

The wonderful growth of the motorcycle industry since the first crude affair with a small gasoline engine mounted on the front forks and propelling the machine by a friction pulley, is shown in the statement that one American firm will manufacture 1,000,000 spark plugs this year for motorcycle use alone. The Splitdorf Electrical Company, Newark, N. J., which recently was merged in a $3,000,000 combination, was the pioneer American producer of ignition apparatus. The far-sighted business policy of the Torrington Company, Torrington, Conn., in acquiring this veteran house appears to have been proven conclusively when it is known that it already has produced so far this year over 100,000 magnetos.



Where the Emblem Mounts Were Exhibited at the Chicago Display.

New F. A. M. Commissioners.

The following F. A. M. county commissioners have been appointed by the state commissioner for Indiana: Allen county, C. F. Schory, 1110 Broadway, Ft. Wayne; Cass, Edward W. Arnold, 211 Sixth street, Logansport; Clay, Otis E. Allen, Brazil; Dearborn, Emmanuel V. Oberting, Lawrenceburg; Decatur, Earl Rogers, 128 West Main street, Greensburg; Fulton, C. M. Studebaker, Twelve Mile; Grant, G. Carlton Harwood, 217 East Fourth street, Marion; Hamilton, P. E. Ummel, Noblesville; Knox, J. F. Borrowman, Vincennes; Kosciusko, Burcke C. Cooke, 120 West Market street, Warsaw; Madison, George Reisinger, 12 West 10th street, Anderson; Marion, David Baumann and Ray Hofstatter, 334 North Illinois street, Indianapolis; Marshall, Vern Warner, Argos; Miami, John J. Miller, 19 East Main street, Peru; Montgomery, Grant Gould, Crawfordsville; Randolph, Thurman Constable, Union City.

Club Notes, Here and There.

The annual election of officers of the Providence Motorcycle Club, Providence, R. I., was held recently with the following result: President, E. L. Buffington; secretary, J. G. Edwards; treasurer, B. A. Swenson; captain, Edward G. Luther; first lieutenant, Charles W. Rayhill; second lieutenant, George W. Lane. B. A. Swenson is the oldest officer of the club, having been elected treasurer at the second annual meeting and having held the position continuously since.

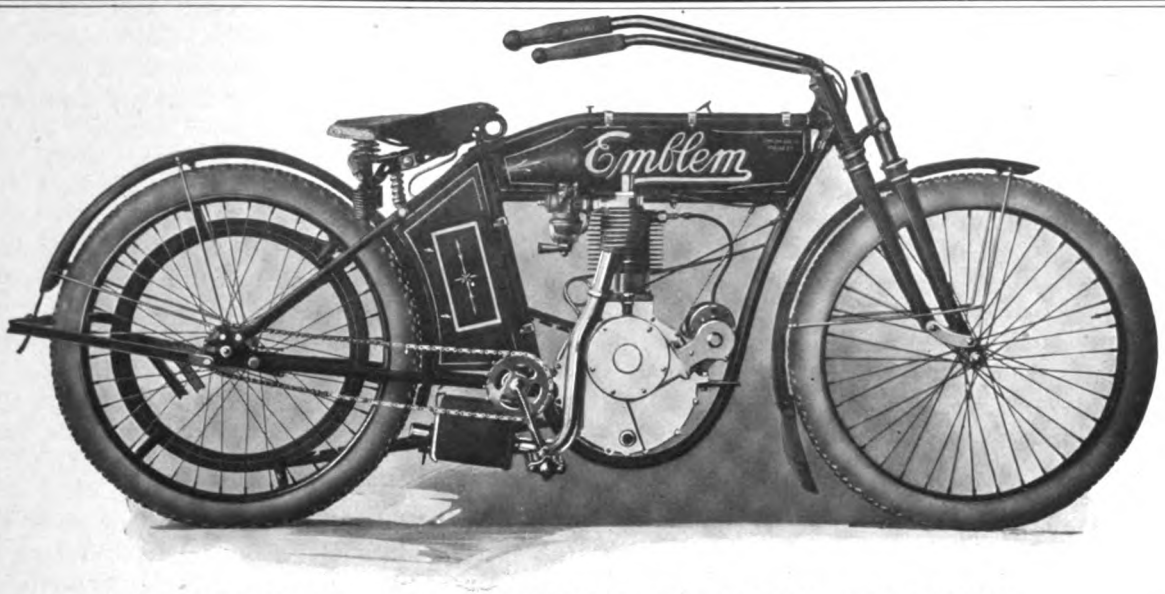
The National Capitol Motorcycle Club has elected the following officers for 1913: President, E. Mitchell Dodson; vice president, Paul A. Draper; corresponding secretary, Thomas O. Wansleben; recording secretary, Fred M. Mills; treasurer, Harry B. Cohen; captain; W. F. Throop; first lieutenant, Frank Hazelton; sergeant, W. F. Throop; directors, P. N. Moulden, George W. Parezo, E. M. Dodson, Paul A. Draper, T. O. Wansleben, Fred M. Mills, W. F. Throop, Harry B. Cohen.

The Pittsburg Motorcycle Club opened new rooms to its members last month and all were pleased with the manner in which they were furnished. A surprise was a Victrola piano player and it was announced that a pool table is among the comforts to be purchased later.

The annual run to Woody, Cal., by the Bakersfield Motorcycle Club was held recently and an enjoyable programme was carried out, including a turkey dinner at the Woody hotel. The run was 31 miles over a rolling country.

The Motorcycle Club of Manhattan, Kan., has affiliated with the F. A. M. At a recent meet-

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Do you, Mr. Rider, feel the bumps along your way? Emblemize.
Does your engine trouble? Do you something awful say? Emblemize.
Do you, Mr. Dealer, like to see your business pay? Emblemize.
To please the rider helps the dealer. It's the Emblem way. If you're wise, Emblemize.

Write Dept. D for Catalogue and Descriptive Literature. Dealers, Ask for Agency Proposition.

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Also Makers of the Famous Emblem Bicycles.

ANGOLA ERIE COUNTY NEW YORK

ing in the Commercial Club rooms an invitation was considered to join the Kansas Short Grass Club in its run next summer from Kansas City to Denver, Col., and thence to Yellowstone Park. An effort will be made to have the route include Manhattan.

At the second annual banquet of the La Porte Motorcycle Club, La Porte, Ind., it was announced that the club will soon have quarters of its own. Four race meets will be held and riders on the run from Indianapolis to Michigan City will be entertained when they pass through the city next summer. During the evening Joseph C. Smith presented the club with a silver cup suitably inscribed. It was formally accepted by President J. Earl McCurdy.

The Cleveland Motorcycle Club has already begun plans for the coming season and several suggestions have been made, including an endurance run of three days, a hill climb, a 24-hour day and night run, and at least one race meet at the Randall track. The proposition of buying a piece of property and building a club house was considered and action looking to this result may be taken in the near future.

Recent Affiliations.

Clubs that have affiliated with the Federation of American Motorcycle during past the week are: La Verne Motorcycle Club, Lordsburg, Cal., 19 members, secretary, Philip S. Danner, Lordsburg; Bellevue Motorcycle Club, Bellevue, O., 12 members, secretary, L. W. Moyer, 155 Ashford avenue; Dixie Motorcycle Club, Roanoke, Va., 21 members, secretary, J. T. Preston, Roanoke; Kensington Motorcycle Club, Philadelphia, Penn., 13 members, secretary, G. W. Lord, 3321 Kensington avenue, Philadelphia.

JOIN THE F. A. M.

which is the National Organization fostering the interests of motorcyclists along legislative and other lines. Cut this out, mail it, and you will get the reasons.

E. M. ESTABROOK
Chairman Membership Committee Federation American Motorcyclists,
BANGOR, MAINE.

Please send me the F. A. M. Booklet and all information interesting to prospective members.

Name .....

Address .....

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Additional Local Commissioners.

Edwin P. Tappan, 241 Salem street, Haverhill, Mass., has been appointed local commissioner by the Massachusetts state commissioner, and G. A. Allen, Livermore Falls, Me., has been similarly appointed in that state. P. N. Bushnell, 316 South Lincoln street, Aberdeen, S. D., has been appointed a state commissioner.

Manufacturers' Chicago Meeting.

At the recent meeting of the Motorcycle Manufacturers' Association at Chicago, the resignation of President A. B. Coffman, which was tendered in September, 1912, when he became a manufacturers' agent, was withdrawn by request and Mr. Coffman agreed to continue in office until his term expires in July. Mr. Coffman has made an efficient executive and his retention is pleasing to the members of the association. The



Where C. J. Swenson Looks After the Interests of Riders in Newport, R. I.

Davis Sewing Machine Company, Dayton, O., maker of the Dayton motorcycle, was admitted to membership.

The full membership of the association was present and represented as follows: L. D. Harden, secretary, Pope Manufacturing Company; Frank J. Weschler, treasurer, Hendee Manufacturing Company; Arthur Davidson, Harley-Davidson Motor Company; Ignaz Schwinn, Excelsior Motor Manufacturing & Supply Company; W. G. Schack, Emblem Manufacturing Company; Peter O'Horo, F. D. Freeman, Excelsior Cycle Company; F. L. Valiant, Miami Cycle & Manufacturing Company; T. W. Henderson, Henderson Motorcycle Company; R. L. Hinds, Consolidated Manufacturing Company; E. J. Knight, Aurora Automatic Machinery Company; A. J. Musselman, Allied Motors Corporation; F. E. Starnes, Minneapolis Motor Company; G. E. Atkins, Reading-Standard Company; H. A. Skinner, Schickel Motor Company; Guy M. Greene, American Motor Company; A. W. Mitchell, Black Hawk Motor Company.

Hendee Buys More Land.

The Hendee Manufacturing Company, Springfield, Mass., maker of Indian motorcycles, has purchased a 10-acre tract of land at East Springfield, near the Athol branch of the Boston & Albany railroad. It is understood that the company will build on the land, although it has not been announced what the nature of the buildings will be or their specific use.

To License Motorcycles.

Senator Walter R. Herrick of New York City has introduced a bill in that state providing for the licensing of motorcycles. Similar action is contemplated in Pennsylvania, although in the latter instance a separate law will be enacted for two-wheeled mounts. The Herrick bill also provides for the licensing of motorcycle operators.

Baker's Riding Records.

E. G. Baker of Indianapolis, Ind., has kept a record of his performances on an Indian motorcycle from Dec. 14, 1911, to Dec. 14, 1912, and it is a formidable one. His diary shows his road mileage during that time to be 17,584.8 and track mileage 1583. In the races in which he won a place he scored 53 firsts, nine seconds and 11 thirds. He made 14 new track records, registered three perfect scores in endurance runs and lost 13 races.

Humiston's Records Clear.

J. P. Thornley, secretary of the competition committee of the F. A. M., has set at rest all doubt as to the eligibility of Lee I. Humiston when he made his world's records at the Playa del Rey track, Los Angeles, Cal., on Dec. 31 and Jan. 8. Investigation developed that Mr. Humiston's membership expired on Jan. 2, 1913, but the referee of the contest for world's records at Los Angeles took a renewal receipt for dues, which was permissible under the rules. The last affidavit necessary has been received and as every requirement was complied with the records by Humiston will stand.

In this connection it is stated that the lines relative to lapsed dues will be drawn closer this year than last. Referees of races will be held strictly accountable in every case where a rider is allowed to compete without a card fully up-to-date. If a referee fails to give the number of a

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rider's card, or gives it and it is discovered, as it is certain to be, that the rider has not paid his dues to date, the referee will be fined for the omission. A rider who is discovered deceiving a referee in the matter of his dues, whether he deliberately tells a falsehood or simply attempts to enter a race, will render himself liable to suspension for a month.

New Registered Repair Shops.

The following new repair shops have been registered with the F. A. M.: O. H. Kathmann Company, 114 South Seventh street, Quincy, Ill.; Santa Cruz Cyclery, 229 Pacific avenue, Santa Cruz, Cal.; Sarver & Retz, 508 South Walnut street, Muncie, Ind.; Edgar H. Brunelle, 359 Fulton street, Troy, N. Y.; A. D. Diamond, Public square, Galion, O.; J. Johnson & Son, 3321 Kensington avenue, Philadelphia, Penn.; Harry F. Seamark, Sixth and G streets, W, Washington, D. C.; Santa Fe Trail Garage, Dodge City, Kan.; Spahr Bros., Canal Dover, O.; Medina Garage, North Court street, Medina, O.; Monarch Garage, 20 South 57th street, Philadelphia, Penn.; Knupp Bros. Garage, Court street, Sidney, O.; Carter & Turner, Huntington, W. Va.; Markley-Smith Motor Company, 204 Poyntz avenue, Manhattan, Kan.; Swint Motor Company, Box 377, Oakharbor, O.; Tyler & Brown, 6232 Broadway, Cleveland, O.; Ludden & Whitten, 24 East Elm street, Brockton, Mass.; William R. Benedict, 430 Warren street, Hudson, N. Y.; Noah Smith, 320 South Oakes street, San Angelo, Tex.; Ideal Cycle Company, 114 North West street, Bellevue, O.; Hendricks Bros., 705 State street, Santa Barbara, Cal.

Indian on Exploring Trip.

Umbrella rock is a curious sandstone formation on Lookout mountain in Tennessee, and has become one of the favorite places in that district with tourists who desire to have their pictures taken. It commands an unrivalled view of the surrounding country. An accompanying illustration shows F. L. Hunt, an Indian tourist, who recently paid a visit to Umbrella rock. He rode his machine as close as possible to the scene of his conquest, although at the time the photograph was taken the 1913 Indian mount was 275 feet below.

Will Handle Merkel.

The Boyd Motor Company, one of the most important motorcycle concerns located at Boston, has signed a contract to handle for 1913 Merkel mounts, made by the Miami Cycle and Manufacturing Company, Middletown, O. The Boyd company has inaugurated an extensive advertising campaign and the success already achieved has been such as to warrant placing an order at the factory for a carload of Flying Merkels.



F. L. Hunt, Indian Rider, at Umbrella Rock, Lookout Mountain, Tennessee.

Motorcycle Aids Telephone Company.

At Salina, Kan., a wire chief who has many calls to repair country telephones, not only uses a motorcycle to carry him quickly to the point of trouble, but he is saved the inconvenience of carrying an entire telephone equipment. He merely takes a receiver and a coil of twisted pair wire. The motorcycle is of the battery type so in order to test the wire the chief opens the line and connects the line wire to the motorcycle by means of the pair wires. To call central he pedals a few times and connects the receiver to the wire.

INDIAN RIDERS

Cold weather is here. Motor turns over hard. Very hard work to get started. A little kerosene or gasoline injected into cylinder head will remedy this at once. A priming cup is needed in top of cylinder head as it takes too much time to take out spark plug each time. Indian riders, send at once for a finely made and finished priming cup to fit top of cylinder head of your Indian. Price, postpaid, $1 each. Money refunded if you are not satisfied.

B. A. SWENSON 522 Broad St., Cor. Blackstone St., Providence, R.I.

1913 F. N. SHAFT-DRIVE MOTORCYCLES.

Lightweight Single, with Two-Speed Gear $275
Only Machine Built With Handle Bar Control of Clutch.
Four-Cylinder $300
With Handle Bar Control of Clutch $350
Two-Speed Gear, Extra $50
Equipment includes two brakes, footrests if desired, compound spring fork, combined luggage carrier and stand.

American F. N. Company, Boston, Mass.

Branch—415 Trumbull St., Hartford, Ct.

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The following concerns have been incorporated recently to manufacture and deal in motor cars, accessories, etc.:

Lathan Auto Supply Company, San Francisco, Cal.; $25,000; incorporators, J. E. Lathan, A. Lathan, A. S. Lathan.

Vulcan Manufacturing Company, Painesville, O.; $300,000; to manufacture automobiles, wagons, etc.; incorporators, F. H. Murray, E. H. Heartwell, J. C. Ward, William Truhy, Harry E. Hammar.

Anna Motor Car Company, Anna, Ill.; $2500; general garage business; incorporators, Ernest Lawson, J. J. Corzine.

Tourraine Motors Company, Newark, N. J.; $37,500; general automobile business; incorporators, C. H. Van Vleck, F. N. Kolb, E. M. Dalley.

Pilot Car Sales Company, Richmond, Ind.; $50,000; to deal in automobiles; incorporators, T. F. Williams, H. E. Bradford, J. E. Hayes, C. E. Hayes, Arnold Schaer, W. D. Williams, E. F. Goggins.

Montroy Ignition Starter Company, Clarksdale, Miss.; $10,000; incorporators, E. M. Fant, E. Fant, C. L. Montroy, J. M. Montroy.

Collier Rotary Valve Company, Inc., New York City; $100,000; motors and engines; incorporators, John N. Blair, Arthur B. King, Harry D. Johnson.

Chaplin-Dille Motor Car Company, Morgantown, W. Va.; $25,000; incorporators, M. C. Wildman, O. Howard Dille, B. M. Chaplin, Minnie Chaplin, James E. Dille.

Chico Garage Company, Chico, Cal.; $10,000; general automobile business; incorporators, S. P. McLerran, T. H. Morgan, E. S. Sauber.

Western Auto Supply Company, Tulsa, Okla.; $5000; incorporators, Frank Wolfe, R. J. Myers, F. W. Dye.

Cragg Motor Manufacturing Company, Detroit; $4000; to make motors and accessories; incorporators, E. F. Alleman and others.

South Texas Traction Company, Houston, Tex.; $20,000; to manufacture gasoline motors; incorporators, A. E. Hall, John A. Owen, C. H. Hall.

Adix Automobile Company, Chicago; $2500; general automobile and garage business; incorporators, Percy L. Adix, Jacob Rothschild, George H. Rees.

Hanna Motor Manufacturing Company, Kansas City, Mo.; $60,000; incorporators, John M. Hanna, Frank A. Hanna, Roy J. Hanna.

Harrisonburg Garage, Harrisonburg, Va.; $25,000; incorporators, John N. Garber, J. J. Hawse, H. L. Furr.

Blacklock Tire & Rubber Company, Birmingham, Ala.; $3000; incorporators, H. Blacklock, H. H. Bostick, K. Blacklock.

WITH THE MANUFACTURERS.

The Oliver Motor Truck Company, Detroit, maker of Oliver trucks, is occupying the former Carhartt plant and will continue to make the 1500-pound light truck and the 3000-pound vehicle, which has been given a four-cylinder motor. The Oliver Motor Truck Company recently took over the assets of the Oliver Motor Car Company and the factory which it vacated has been sold to the Keeton Motor Car Company, maker of Keeton pleasure cars.

The American Locomotive Company, New York City, maker of Alco trucks and pleasure cars has announced the following appointments of agencies: Jefferson Garage Company, Syracuse, N. Y.; Pawlik & McGuidwin, Rochester, N. Y.; Merchants Auto Service Company, Reading, Penn.; Downs Company, Minneapolis, Minn.; William Motor Car Company, Kansas City, Mo.; Villamil & Miller, Havana, Cuba; Thompson Auto Company, Detroit.

E. H. Broadwell, vice president of the Hudson Motor Car Company, Detroit, maker of Hudson cars, is reported at New York City as saying he has withdrawn from the company, having sold all his holdings. Mr. Broadwell will leave for Florida, where he will remain for some time. He announced no plans for the immediate future.

The R-C-H Corporation, Detroit, has appointed the following agents to handle R-C-H cars in their respective territory: Cowles Tolman, New Haven, Conn.; D. B. Dalzell, Iliff, Col.; Hood & Currie, Bond, Miss.

M. A. Newmark & Co., a large wholesale and importing firm in Los Angeles, Cal., is utilizing 11 G. M. C. trucks, made by the General Motors Truck Company, Pontiac, Mich., which have replaced a large number of horses and wagons. In order to secure the utmost efficiency from the equipment wheeled bins are used for loading in the warehouse of the company. These bins are transferred from and to the trucks with minimum loss of time, increasing the efficiency of the delivery system by at least 30 per cent., according to the estimate of the company.

The Motometer Company, Inc., 1784 Broadway, New York City, has opened a Chicago branch at 1322 Michigan avenue. R. G. Ames has been made manager.



G. M. C. Gasoline Truck Equipment of M. A. Newmark & Co., a Los Angeles Wholesale and Importing Firm.

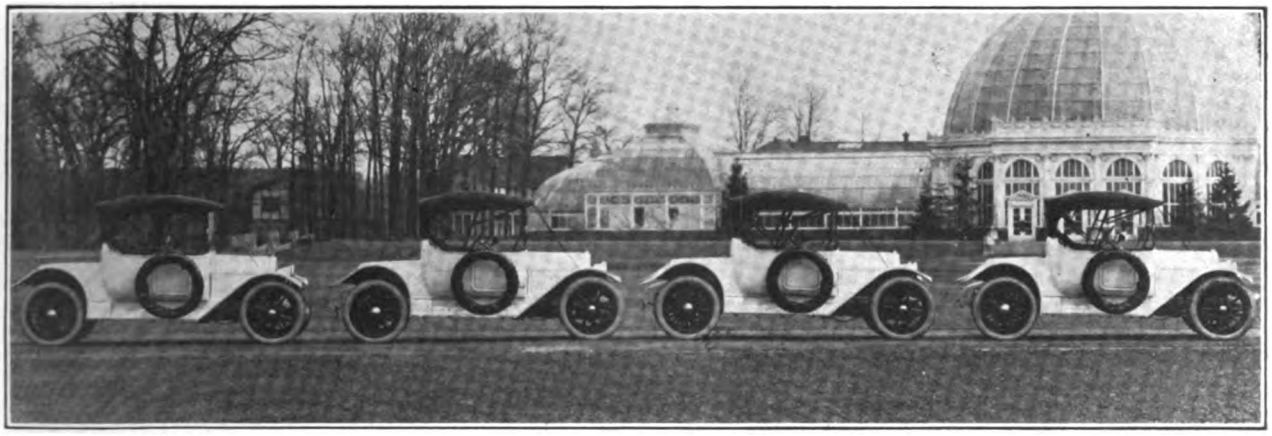
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The Anderson Electric Car Company, maker of the Detroit electrics, has opened a new factory branch at 903 Boylston street, Boston. A service station is also located in the same building which is equipped with every facility for the maintenance of the high quality of service extended to all Detroit electric owners.

The Cole Motor Car Company, Indianapolis, Ind., maker of the Cole cars, has appointed the following distributors: F. A. Wilson, Amherst, N. S., Canada; J. P. Krall, Avon, S. D.; Davis Sparger Auto Company, Bristol, Tenn.; A. V. Hunt, Clarinda, Ia.; LaFayette Motor Car Company, Easton, Penn.; Serfas Motor Car Company, Lehighton, Penn.; Swanson Bros., Lyons, Neb.; Thomas Mabon, Northfield, Neb.; Pink, McVerty, Blackburn Company, Ottawa, Ont., Canada; G. Williams & Bros., Poplar Bluff, Mo.; Chamberlain Bros., Salem, Ore.; Trenton Motor Car Company, Trenton, N. J.; Baehr Bros., Wadena, Minn.; Morgan & Williams, Warren, O.

The Abbott Motor Company, Detroit, Mich., recently filled an order for four Abbott-Detroit roadsters, finished in white with gold stripes and red artillery wheels, for the city of Denver, Col. These cars, which are shown in an accompanying illustration, are for the use of the assistant chiefs of the fire department.

The R-C-H Corporation, Detroit, maker of R-C-H cars, has appointed the following managers of newly established branches: J. D. Palmerlee, 548 Peachtree street, Atlanta, Ga.; C. E. Wheeler, 563 Boylston street, Boston; R. W. McMullen, 1225 Main street, Buffalo, N. Y.; H. E. Westerdale, 2021 Michigan avenue, Chicago; A. D. Caldwell, 2122 Euclid avenue, Cleveland, O.; E. W. Swanbrough, 1520 Broadway, Denver, Col.; M. D. Davidson, Jefferson and Lycaste streets, Detroit; E. E. Guthrie, 3501 Main street, Kansas City, Mo.; J. W. McCrea, 1242 Hennepin avenue, Minneapolis, Minn.; W. S. Jewell, 1989 Broadway, New York City; E. N. Stimson, 330 North Broad street, Philadelphia, Penn.; A. E. Morrison, 819 Ellis avenue, San Francisco, Cal.; Don J. Campbell, Walkerville, Ont., Canada.



Fleet of Abbott-Detroit Cars Recently Delivered to the City of Denver, Col., for Use of Assistant Fire Chiefs.

GARAGE AND DEALER.

The Glenwood Garage Company, which operated the Glenwood garage at Riverside, Cal., under the management of C. A. Dundas, has awarded the contract for a substantial addition to the plant.

The Central Vulcanizing Company, Albany, N. Y., has purchased a two-story building at 148 Central avenue and after suitable alterations have been made, will move from 357 Central avenue. Jacob Brown is manager of the concern.

O. M. Driscoll has opened a large salesroom and service station at 24 East Front street, Trenton, N. J. He handles the Hupmobile line, made by the Hupp Motor Car Company, Detroit.

The West Virginia Automobile Company, Wheeling, W. Va., has sold its garage on 16th street to a new company, the name of which was not announced. Extensive improvements are to be made it is said.

The Central Iowa Motors Company, Des Moines, Ia., has purchased the interest of the Van Vliet-Bradt Auto Company at 706 Mulberry street, and will make improvements to the garage building.

The Fleming Auto & Tire Company, Montgomery, Ala., has been formed and has leased the garage at 21 Washington street. The company will distribute the Overland line, made by the Willys-Overland Company, Toledo, O.

Perl W. Devendorf, Watertown, N. Y., has purchased the entire interest of the Warner Automobile Company at 155 Arsenal street. Mr. Devendorf will handle the Ford cars.

The Waupaca Garage, owned by **F. L. Hoaglin, Waupaca,** Wis., has been transferred to Van A. Nelson, who will also take the agencies for three well known makes of cars.

The White Motors Company, New Haven, Conn., is erecting a new service station at 1094 Chapel street, to cost $2000.

The Boonton Auto Garage & Transportation Company, Boonton, N. J., will erect another garage adjoining its present establishment on Washington street.

R. J. Moore, Glasgow, Mont., has sold his interest in the Moore garage on Market street to J. H. Aschliman, formerly of Twin Cities, Mont.

The Woodburn Auto Company, Woodburn, Ind., is erecting a large addition to its plant.

Fred Jensen and Milton Frey of Hancock, Minn., have formed a partnership and will erect a modern garage in that place. They will conduct a general automobile business and will be equipped to do repair work of all kinds.

W. H. Olds of Crookston, Minn., who conducts a garage and repair shop for automobiles, motorcycles and bicycles, is enlarging his place of business.

Charles E. Preston, Berwick, N. H., has fitted up his garage in the Clark & Davis building at Sullivan square and the business will be conducted under the name of the Preston Auto Garage Company. Mr. Preston will handle the Ford cars, which are made by the Ford Motor Company, Detroit.

Miller & Geiger, Birdsboro, Penn., has completed improvements to a building on Main street, which has been transformed into a modern garage and repair shop.

Yerkes & Pritchard, Paris, Ky., is the name of a new firm which has opened a garage and repair shop in that town.

The Sims-Thomson Garage, Waxahachie, Tex., is to be enlarged to care for growing business.

Thomas Kielty and H. Ryan, DeGraff, Minn., will erect a garage in that town which will be modern and contain an up-to-date repair shop.

Sanders Nestegard and A. C. Haimsness, Fillmore, N. D., have erected a modern garage in that town.

Abel Mitchell, Madison, S. D., is making repairs to the Tierney building on West Fourth street, to accommodate his garage and automobile business.

Charles C. Collins and Thomas S. Davidson of Denver, Col., have formed a company to handle automobile tire supplies. The concern is located at 1633 Court Place.

Ralph Peltier and Arthur R. Weld have opened an automobile repair shop on Federal street, Greenfield, Mass. They are prepared to undertake work of all kinds.

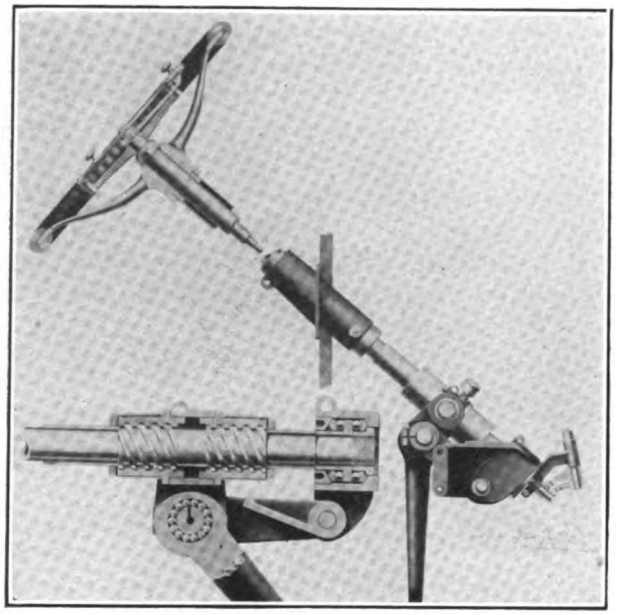
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NEW STEERING GEAR.

Boyer-Miller Company Organized to Build Invention of Joseph Boyer at Detroit.

A steering gear that presents interesting features in that all parts are easily accessible and quickly adjusted is the Boyer, designed and invented in 1910 by Joseph Boyer, president of the Burroughs Adding Machine Company of Detroit. It is presented in an accompanying illustration, a sectional view of the mechanism also being included.

In the Boyer design an integral double screw of steel is utilized, having full contact with two separate bronze nuts. These are solid members,



Boyer Steering Gear, Noticeable for Full Length Contact of Screw and Nuts and Small Number of Parts.

but are adjustable by means of a trunnion collar bolt and a nut. Steering action is taken from the centre of the bronze nuts by the trunnion collar and transferred to the reach rod by the steering arm, but with the Boyer this member is suspended on ball bearings between the arm yoke and the trunnion pins.

By this arrangement the inventor claims that not only is friction eliminated, but lost motion as well. It is further pointed out that adjustments are not required and that one of these designs has been in service since 1910 without requiring attention. The parts are very accessible and the absence of keys is noted, with the exception of one in the screw. The end thrust bearings are of the self-aligning type and the full length contact of the screw and nuts makes for a large factor of safety. The gear is being built in several sizes to meet all requirements of frame construction, weight, size and type of steering wheel by the Boyer-Miller Company, Detroit.

STUTZ CREATES NEW RECORDS.

Unofficial Figures Give Earl Cooper Marks for Seventy and Two Hundred Miles.

Earl Cooper in a Stutz car created new world's record for 75 and 200 miles on a circular mile dirt track at Fresno, Cal., Feb. 10. He failed to meet the 100-mile record by 1:23. Cooper's time for the 75 miles was 1:17:05 and for the 200 miles, 3:28:05.8.

These records are not official until passed upon by the contest board of the American Automobile Association. Each official that acted at the race must be sworn and a surveyor must take oath that the track is one mile in length. When this information reaches New York action will be taken by the A. A. A.

STUDYING FUEL PROBLEM.

National Association of Automobile Manufacturers to Investigate Present Price Situation.

The National Association of Automobile Manufacturers, composed of a large number of motor car makers, has decided to appoint a committee to confer with the Standard Oil Company on the question of fuel. Alfred Reeves has been selected as chairman.

That the increased cost of motor fuel has caused much apprehension among motorists generally is recognized by automobile makers. With this situation in view they appear to have taken action which is expected to result either in a reduction in price or adoption of a plan whereby a substitute may be placed in general use.

A good idea of the magnitude of the automobile industry for 1913 can be obtained from the figures of the Splitdorf Electrical Company, Newark, N. J., maker of Splitdorf magnetos, and one of the oldest ignition houses in the country. The company has taken one order for 50,000 magnetos from the Willys-Overland Company, Toledo, O., while the orders from the Maxwell Motor Company, the Abbott Motor Company and the Chalmers Motor Car Company will total its production to 100,000 instruments.

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AMENDMENTS IN OHIO.

Automobile Clubs Calling Attention of Owners to Necessary Legislation.

The organized motorists of Ohio are urging all automobile owners to aid in the passage of five amendments to the present law, which are claimed to be decidedly necessary. The legal committee is actively engaged in pressing the matter before the legislature. The five amendments provide as follows:

Compelling all vehicles, whether horse drawn or motor propelled, to be equipped with lights both front and rear; emergency placard for use in the event that one of the regularly issued number plates is lost or mislaid; establishing local depots where license tags may be obtained without waiting for return from Columbus; making it clear that no city or town may enact ordinances taxing automobiles in addition to the fee demanded by the state; making it a felony, punishable with penitentiary imprisonment, for any person to steal an automobile.

THE REACTO HORN.

The Holtzer-Cabot Electric Company Announces Interesting New Signalling Device.

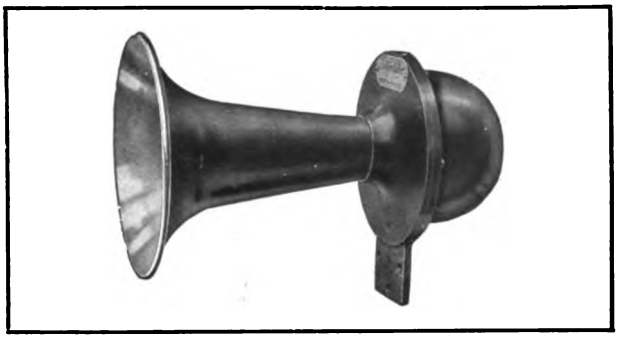
A desirable quality of a signalling device is its tone. To be efficient and to fulfill that function for which it is designed, that of warning pedestrians and approaching vehicles, the tone should be clear and penetrating, but not harsh. Some pedestrians are startled easily by strident notes and often become confused. The ideal horn is easily and quickly operated, of distinct value in the country when approaching blind corners, and not at all disagreeable in its tone when used within the city limits.

The Holtzer-Cabot Electric Company, Boston and Chicago, has perfected an electric horn which although moderately priced, is constructed of high grade material and with that care for which the products of this company are noted. The Reacto horn is of the simple hammer blow type, a construction that secures a direct application of the power to the diaphragm and consequently instantaneous response. The diaphragm is 5.5 inches in diameter, constructed of a high grade steel and so clamped as greatly to increase its efficiency. The heavy armature or hammer, strikes it squarely and rebounds so quickly that vibration is not retarded, preventing rasping or discord in the sound produced.

One of the qualities of the horn is that it will respond to battery voltages 25 per cent. below normal and therefore does not require adjustment. Means are provided for changing the tone, however, a knurled and locked screw increasing or decreasing the contact between the heavy platinum points. Sparking of these members is prevented by the use of a well designed condenser which also serves to improve the tone. The casing and projector are of the best material and of the proper weight. The entire construction is sturdy.

The binding posts are within the rear casing, protected from possible injury, and all carrying parts are insulated from the main structure at all times. Consequently they are not exposed to the weather or accidental damage.

The rear casing may be removed easily when connecting in circuit by displacing the retaining screws. The standard finish is japan, baked on, with nickel throat, but it is also finished with



Reacto Electric Horn of the Single Blow Hammer Type and Having a Penetrating but Not Harsh Tone.

polished brass throat or in full nickel or brass. The Reacto horn is designed to meet the requirements of motorists desiring a strictly high grade signal, one having a pleasing tone, and capable of maximum service without attention. With the normal six-volt adjustment it will operate throughout a range from 4.5 to eight volts. The company also manufactures Reacto horns for any specified voltage from four to 125, thus adapting them for electric pleasure and commercial vehicles and factories, as well as gasoline automobiles.

Benjamin Briscoe, formerly president of the United States Motor Company, has opened an automobile factory at Billancourt, France, in the heart of the motor car manufacturing district and where the Renault is made. The company is registered under the name of Briscoe Freres, and it is understood will produce a car designed for the American market, to sell at less than $1000.

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"There's Where YOU Are Wise!

That Other Fellow is a Menace to Everyone's Safety"

Nine-tenths of all automobile accidents are caused by skidding and by foolish dependence on rubber alone. In these days of crowded streets and congested traffic, the motorist who does not take precaution to guard against every possibility of disaster is *next to criminal.*

"The ever-present danger that is quite as much of a terror to the experienced driver as it is to the novice is **skidding.** There is nothing that makes a man lose his nerve so thoroughly or dread a repetition of the experience so keenly as a bad skid that ends in a broken wheel against a curb, or that makes matters far worse by 'sideswiping' a moving trolley car. To feel the car start to slide from under you, aiming directly at the nearest obstruction, despite all manipulations of the wheel and brakes---well, once is too often."

Weed Anti-Skid Chains

VS.

Slipshod Traffic

Traffic policemen, by the hundreds, interviewed in all the large cities throughout the country, express the unanimous opinion that their work would be greatly reduced; that nearly all **skidding accidents would be eliminated** if motorists would take the precaution of always carrying WEED CHAINS, and putting them on when the roads and pavements are wet, slippery and uncertain, or covered with snow.

Some of these **guardians of public safety** go so far as to say that the time is not far off when State Legislatures will make **the use of WEED CHAINS compulsory,** for the protection of life and property.

Make Safety Yours

Take no chances. Fully equip your own car with WEED CHAINS and **insist,** for your own protection, that other drivers do the same.

On the Rear Tires

they afford perfect traction and adequate brake control.

On the Front Tires

they act as ladders to enable the front wheels to easily climb out of mud-ruts, car tracks and all uneven places in pavements or roads, always insuring absolute steering control, eliminating all chance of the front wheel skid.

If you haven't a set of **WEED CHAINS,** or if you have a pair for the rear tires only, **get a full equipment now.** Delay is dangerous. Stop at your dealers today and **WEED CHAIN** your car to safety.

For Sale by all Reputable Dealers

THE NAME WEED ON EVERY HOOK

WEED CHAIN TIRE GRIP CO.

28 Moore Street New York

Location at Boston Show, Booth J-551.

COMING EVENTS.

February.

Feb. 20-March 1—Show, Toronto, Can.
Feb. 22-March 1—Show, Brooklyn, N. Y.
Feb. 24-27—Commercial car show, Kansas City, Mo.
Feb. 24-March 1—Show, Omaha, Neb.
Feb. 24-March 1—Pleasure car show, Cincinnati, O.
Feb. 24-March 1—Show, St. Louis, Mo.
Feb. 24-March 1—Show, Memphis, Tenn.
Feb. 24-March 1—Show, Paterson, N. J.
Feb. 24-March 1—Show, Bangor, Me.
Feb. 25-28—Show, Eau Claire, Wis.
Feb. 25-March 1—Show, Syracuse, N. Y.
Feb. 26-March 1—Show, Glen Falls, N. Y.

March.

March 1- 8—Show, Pittsburg, Penn.
March 3- 8—Commercial car show, Cincinnati, O.
March 3- 8—Show, Sioux City, Ia.
March 3- 8—Pleasure car show, Des Moines, Ia.
March 3- 8—Show, Bridgeport, Conn.
March 5- 8—Show, Louisville, Ky.
March 8-15—Pleasure car show, Boston, Mass.
March 10-15—Commercial car show, Des Moines, Ia.
March 12-15—Show, Ogdensburg, N. Y.
March 17-22—Commercial car show, Buffalo, N. Y.
March 19-26—Commercial car show, Boston.
March 24-29—Show, Indianapolis, Ind.
March 29-April 5—Show, New Brunswick, N. S.

The Cole Technical Bulletin, a comprehensive talk on the construction of the automobile, issued by the Cole Motor Car Company, Indianapolis, Ind., maker of Cole cars, has been adopted as a text book by the high school of Bloomington, Ind. The book was issued under the signature of Chief Engineer Charles Crawford of the Cole company and was found so comprehensive by Prof. E. R. Glen, instructor of physics at the Bloomington high school, that he immediately procured copies for the students as a supplementary text book.

A. Escalante, a wealthy automobile dealer of Merida, Mexico, in the state of Yucatan, states that short cars only are fitted for use in the streets of Yucatan. These are so narrow that it is impossible to use cars with a long wheelbase.

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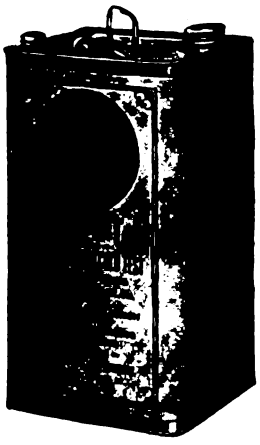
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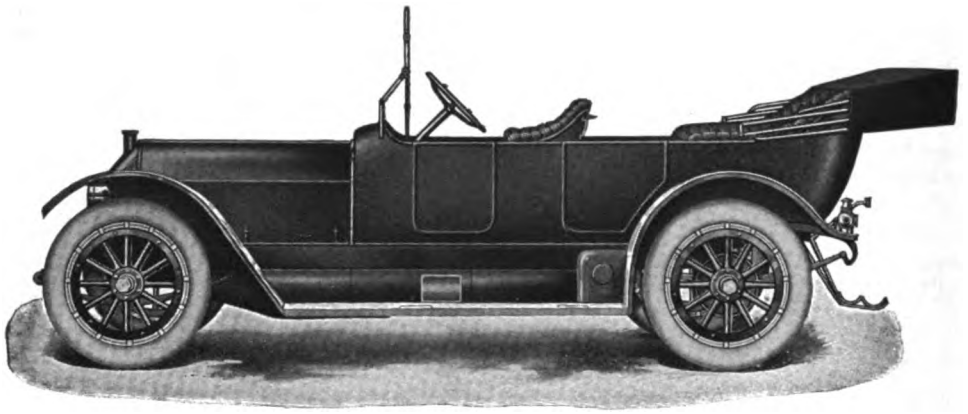
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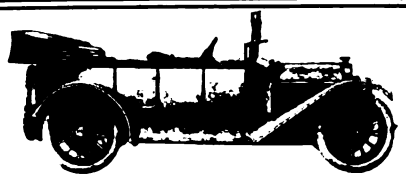
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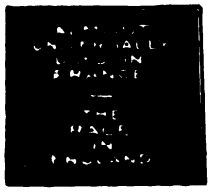
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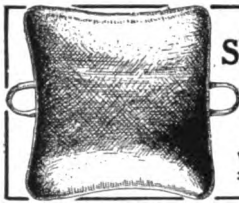
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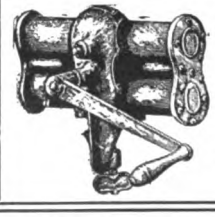
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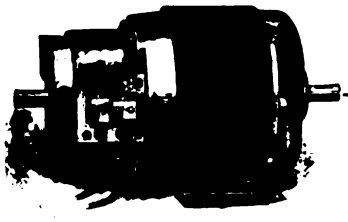


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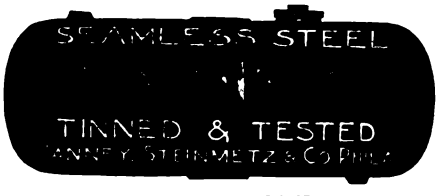
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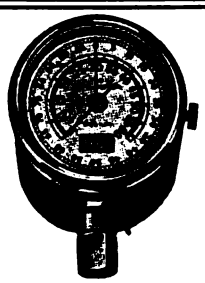


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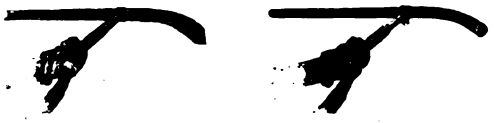
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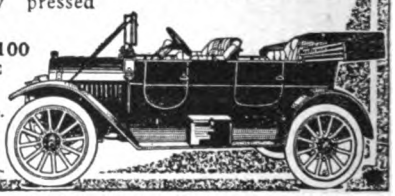
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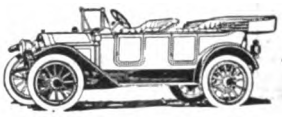
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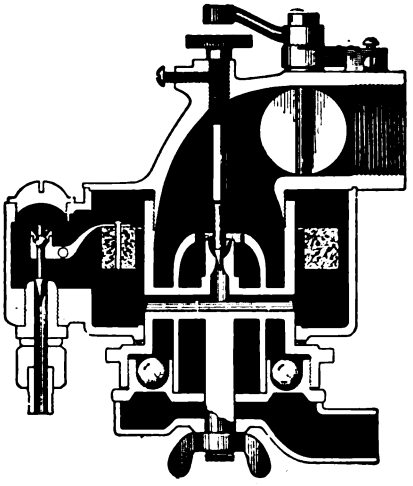
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SOAPS.

Hopewell Brothers, Newton, Mass. (Paos.)
Branch: 1974 Broadway, New York.

SOLDERS.

Simplex Aluminum Solder Co., 108 Broadway, Long Island City, N. Y. (Simplex.)

SPARK PLUGS AND IGNITERS.

Bosch Magneo Co., 223-225 W. 46th St., New York.
Branches: See Magnetos and Magneto Supplies.

Frontier Specialty Co., 734 Main St., Buffalo. (All-In-One.)

Heinze Electric Co., Lowell, Mass. (H. E. Co. Priming.)

Janney, Steinmetz & Co., Philadelphia.

Mosler, A. R., & Co., P. O. Box M, Mt. Vernon, N. Y. (Spit Fire.)

Randall-Faichney Co., Boston. (Mac-Kae.)
Branches: See Horns.

Splitdorf Electrical Co., 98 Warren St., Newark, N. J.
Branches: See Magnetos and Magneto Supplies.

Standard Co., The, Torrington, Conn. (Black Eagle.)

SPARK PLUG TERMINALS.

Randall-Faichney Co., Boston. (Mac-Kae Blitz.)
Branches: See Horns.

SPEEDOMETERS.

Hoffecker Co., The, Motor Mart, Boston. (Hoffecker.)

Jones Speedometer, New Rochelle, N. Y.
Branches: Broadway and 76th St., New York; 109 Massachusetts Ave., Boston; 1416 Vine St., Philadelphia; 1430 Michigan Ave., Chicago; 852 Main St., Buffalo; 253-255 Jefferson Ave., Detroit; 530 Golden Gate Ave., San Francisco; 1229 So. Olive St., Los Angeles, Cal.; 329 Ankeny St., Portland, Ore.; 917 E. Pike St., Seattle, Wash.

Warner Instrument Co., 1221 Wheeler Ave., Beloit, Wis. (Auto-Meter.)
Branches: 116 Edgewood Ave., Atlanta, Ga.; 925 Boylston St., Boston; 720 Main St., Buffalo; 2420 Michigan Ave., Chicago; 807 Main St., Cincinnati; 2062 Euclid Ave., Cleveland; 1518 Broadway, Denver; 870 Woodward Ave., Detroit; 330½ North Illinois St., Indianapolis; 1613 Grand Ave., Kansas City; 748 S. Olive St., Los Angeles, Cal.; 1902 Broadway, New York; 302 N. Broad St., Philadelphia; 5940 Kirkwood Ave., Pittsburg; 14 N. Seventh St., Portland, Ore.; 36-38 Van Ness Ave., San Francisco; 611 E. Pike St., Seattle, Wash.; 3023 Olive St., St. Louis; 559 Yonge St., Toronto, Can.

SPRINGS FOR AUTOMOBILE SUSPENSION.

Marburg Bros., Inc., 1786 Broadway, New York. (Marburg-Hagen.)

Perfection Spring Co., No. 1 Plant, 2414 Superior Ave., N. W.; No. 2 Plant, East 65th and Central Ave., Cleveland.

SPROCKETS.

Boyd, F. Shirley, 903 Boylston St., Boston. (Baldwin.)

STEEL PARTS, SEAMLESS.

Standard Welding Co., Cleveland.

STORAGE SYSTEMS—GASOLINE AND OIL.

Janney, Steinmetz & Co., Philadelphia.

Scaife & Sons Co., Wm. B., Pittsburg, Penn.
Branch: New York City.

SWITCHES, LOCK.

Blackburn Specialty Co., 1120 Prospect Ave., S. E., Cleveland. (Autolock.)

TANKS, ACETYLENE GAS.

Prest-O-Lite Company, 271 East South St., Indianapolis. (Prest-O-Lite.)
Branches: See Cylinder Cleaning Compound.

TANKS FOR FUEL AND WATER.

Janney, Steinmetz & Co., Philadelphia.

Scaife & Sons Co., Wm. B., Pittsburg, Penn.
Branch: New York City.

TANKS, TIRE INFLATING.

Prest-O-Lite Co., 271 East South St., Indianapolis. (Baby Tire Filler, The Emancipator.)
Branches: See Cylinder Cleaning Compound.

THERMOS CASES.

Dover Stamping & Manufacturing Co., Cambridge, Mass.

TIRE ACCESSORIES.

Firestone Tire & Rubber Co., Akron, O.
Branches: See Rims—Removable and Detachable.

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CLASSIFIED BUYERS' GUIDE—Continued

TIRE CASES.

Hopewell Brothers, Newton, Mass. (Hopewell.)
Branch: 1974 Broadway, New York.

TIRE CHAIN GRIPS. (See Chains.)

TIRE PRESERVATIVES AND PROTECTORS.

Gray Specialty Co., 148 Avon Ave., Newark, N. J.
National Rubber Co., 4433 Papin St., St. Louis, Mo. (Tirenew.)
Page-Lester Co. 2644 Indiana Ave., Chicago. (Tite-Wad Rubber Putty.)

TIRES—CASINGS AND INNER TUBES.

Diamond Rubber Co., Akron, O. (Diamond.)
Firestone Tire & Rubber Co., Akron, O. (Firestone.)
Branches: See Rims—Removable and Detachable.
Fisk Rubber Co., Chicopee Falls, Mass. (Fisk.)
Branches: 811-813 Boylston St., Boston; 17½ Dorrance St., Providence.
Frontier Tire & Rubber Co., 1054 Main St., Buffalo, N. Y. (Frontier.)
Goodyear Tire & Rubber Co., Madison St., Akron, O. (No-Rim-Cut.)
Branches: In all principal cities.
Hood Rubber Co., Watertown, Mass. (Shawmut.)
United States Tire Co., Broadway and 58th St., New York. (Continental, G & J, Hartford, Morgan & Wright.)
Branches: See Rims—Removable and Detachable.

TIRES—CUSHION.

Cataract Rubber Co., Wooster, O. (Cataract.)
Branches: Boston, New York, Providence.
Firestone Tire & Rubber Co., Akron, O. (Firestone.)
Branches: See Rims—Removable and Detachable.
Motz Tire & Rubber Co., The, Akron, O. (Electric Special Motz Cushion.)
Branches: Boston, New York, Philadelphia, Pittsburg, Chicago, Kansas City, Detroit, Cleveland, Los Angeles.

TIRES—MOTORCYCLE.

United States Tire Co., Broadway and 58th St., New York. (Morgan & Wright. G & J.)
Branches: See Rims—Removable and Detachable.

TIRES—SOLID AND COMMERCIAL.

Diamond Rubber Co., Akron, O. (Diamond.)
Firestone Tire & Rubber Co., Akron, O.
Branches: See Rims—Removable and Detachable.
Fisk Rubber Co., Chicopee Falls, Mass.
Branches: See Tires—Casings and Inner Tubes.
Motz Tire & Rubber Co., The, Akron, O. (Motz.)
Branches: See Tires—Cushion.
Republic Rubber Co., Youngstown, O. (Republic.)
United States Tire Co., Broadway and 58th St., New York.
Branches: See Rims—Removable and Detachable.

TOPS AND ATTACHMENTS.

Springfield Metal Body Co., 20 Medford Ave., Springfield, Mass.

TROUBLE FINDERS.

Hopewell Brothers, Newton, Mass. (Vibrator.)
Branch: 1974 Broadway, New York.

TRUCKS—See Cars, Commercial.

TRUNK RACKS.

Connecticut Steel & Wire Co., Hartford, Conn.

TURNTABLES.

Beach Co., T. C., 108 Ottawa St., St. Johns, Mich. (Beach.)
Canton Foundry & Machine Co., Canton, O. (Universal.)

UNIVERSAL JOINTS.

Brets Co., J. S., 520 W. 54th St., New York. (Hartford.)
Kinsler-Bennett Co., The, P. O. Box 124, Hartford, Conn. (Kant-Break.)

VALVE GRINDERS.

Wall, J. H., 290 Hope St., Bristol, R. I. (Ford.)

VULCANIZERS.

McVey Manufacturing Co., Third and Canal Sts., Dayton, O. (McVey.)
National Motor Supply Co., 1911 Euclid Ave., Cleveland. (Garage and Individual.)
Branches: In all principal cities.
Williams Foundry & Machine Co., Akron, O.

WELDING OUTFITS.

Prest-O-Lite Co., 309 W. South St., Indianapolis. (Prest-O-Welder.)
Branches: See Cylinder Cleaning Compound.

WELDING, STEEL.

Standard Welding Co., Cleveland.

WHEELS.

Eberly & Orris Mfg. Co., Mechanicsburg, Penn.

WIRES AND CABLES.

Diamond Rubber Co. of N. Y., Akron, O. (Diamond.)

WIRE MECHANISM.

Bretz Co., J. S., 250 W. 54th St., New York. (Bowden.)

WRENCHES AND COMBINATION OUTFITS.

Coes Wrench Co., Worcester, Mass.
Cutter, George A., Taunton, Mass.
Walworth Manufacturing Co., Boston. (Stillson.)

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THE AUTOMOBILE JOURNAL THE MOTOR TRUCK

THE ACCESSORY AND GARAGE JOURNAL

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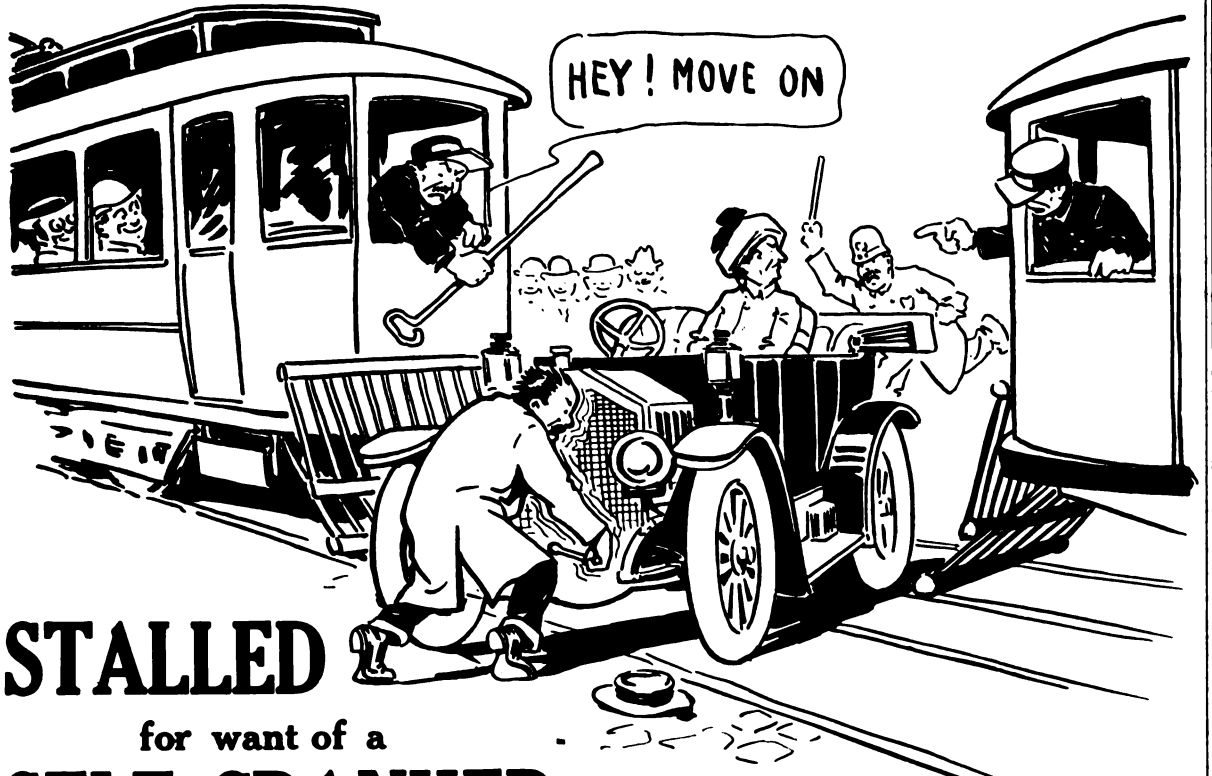
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SELF CRANKER

Every person who drives a gasoline car has had this unpleasant experience, delaying traffic, and running the risk of serious injury.

With an Electric Self Cranker your car may be started instantly, by the push of a button, without leaving your seat.

It is positive insurance against accident in a case like this, adds to your convenience and eliminates the necessity of soiling hands and clothes while wrestling with a crank before an amused audience.

Investigate the good Electric Systems for cranking and lighting. You'll probably find them operated from an LBA Storage Battery. If not, insist that yours must have an

LBA

Storage Battery

Use Class A LBA Battery with an Electric Lighting Generator

Use Class B LBA Battery with an Electric Self-Starter

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Willard Storage Battery Co.

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New York Branch: 136 W. 52d St. **Chicago Branch: 2241 Michigan Ave.**

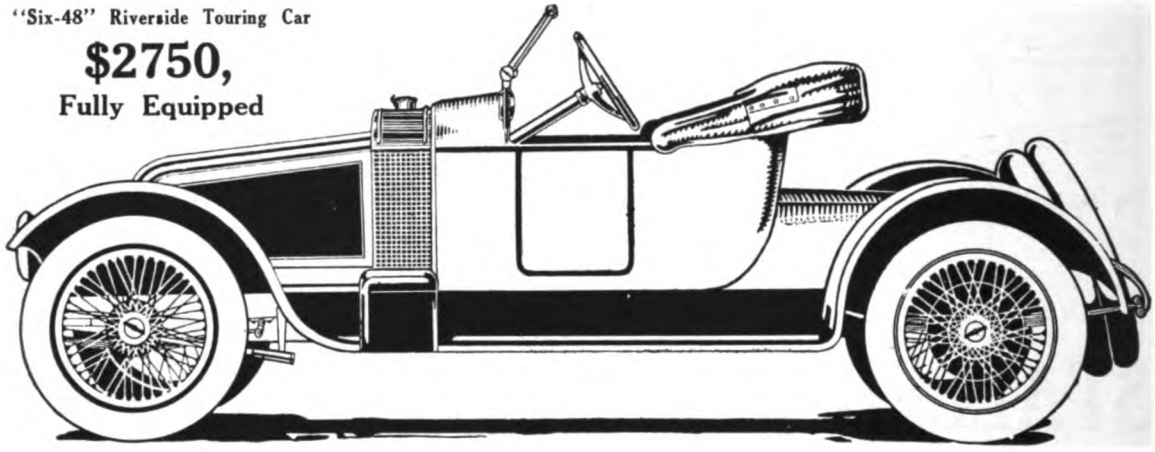
Detroit Branch: 1191 Woodward Ave. **San Francisco Branch: 243 Monadnock Bldg.**

Depots in all Principal Cities in the United States, Canada and Mexico

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KEETON—"The Six" Demanded By Your Prospects

"Six-48" Riverside Touring Car
$2750,
Fully Equipped



Are you selling a six-cylinder car that combines all the advantages of the latest European and American practice in construction with a distinctive French type of design at a very attractive price? Keeton is the car demanded by the public as the greatest value offered today, either at home or abroad. This "Six" is the most talked of car in this country. It was a leader from the day it was announced and stands out in a class by itself.

Buyers are enthusiastic over its remarkable qualities. Have you a car on your salesroom floor that can compare with it in construction and appearance? Go over it part by part. You will find only the very best of workmanship and materials.

The powerful small bore long stroke motor—dashboard radiating system, doing away with the troublesome water pump, fan and fan belt—electric starting and lighting system—left hand drive and right hand control—four speed transmission—imported annular bearings throughout—special alloy steels—long wheelbase—wire wheels—large roomy body with luxurious upholstery—light weight and numerous other features all combine to make it a car that is a continual source of pride and satisfaction to the owner.

Aside from the utter simplicity of the mechanical features you have a French type of design that is only found on foreign cars selling for three times the price of the Keeton.

The buying public has been quick to realize the extraordinary value offered in the "Six-48" Keeton, and we can put you in touch with dozens of purchasers right in your own territory who are anxious to see and buy this car.

Read the specifications of the "Six-48" Keeton. Compare it with any other cars irrespective of price and decide for yourself about its merits and selling possibilities.

We have a dealer's proposition that is very attractive and will make you money. You cannot afford to neglect this opportunity. Write or wire us at once.

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Important Features and Brief Specifications

Electric starting.
Full electric light equipment.
Small 3¾ inch bore—long 5½ inch stroke.
Cylinders cast en bloc, large valves.
All moving parts completely enclosed.
Exceptionally powerful and flexible.
The most efficient cooling system in use today.
Radiator at rear of motor in proper and protected position.
Four speeds forward in transmission.
Direct on 3d—geared up on 4th.
Left hand drive—right hand control.

Wire wheels—option of wooden wheels.
Extra detachable wire wheel or extra demountable rim.
Long 136 inch wheelbase—long springs—special alloy spring steel—nearly flat under load.
Chrome Vanadium Gears and shafts on imported annular bearings.
Pressure gasoline feed.
Very roomy and comfortable bodies.
Best of foreign practice adapted to American road and touring conditions.

Complete Equipment

Electric starting and lighting system with 12½-inch headlights, dash lamps and tail lamp with license holder, 80-mile speedometer and eight-day clock combined with electric light, lamp for changing tires at night, with extension cord, dynamo electric horn; robe and foot rails; silk mohair top, with self contained folding curtains and slip cover; double acting rain vision windshield; option of wire wheels with extra detachable wire wheel or wood wheel with extra demountable rim; wheel or tire carrying irons; full set of tools; pump; jack and tire repair outfit; all touring bodies will take auxiliary seats.

THREE EXCELLENT MODELS

Prices F. O. B. Detroit

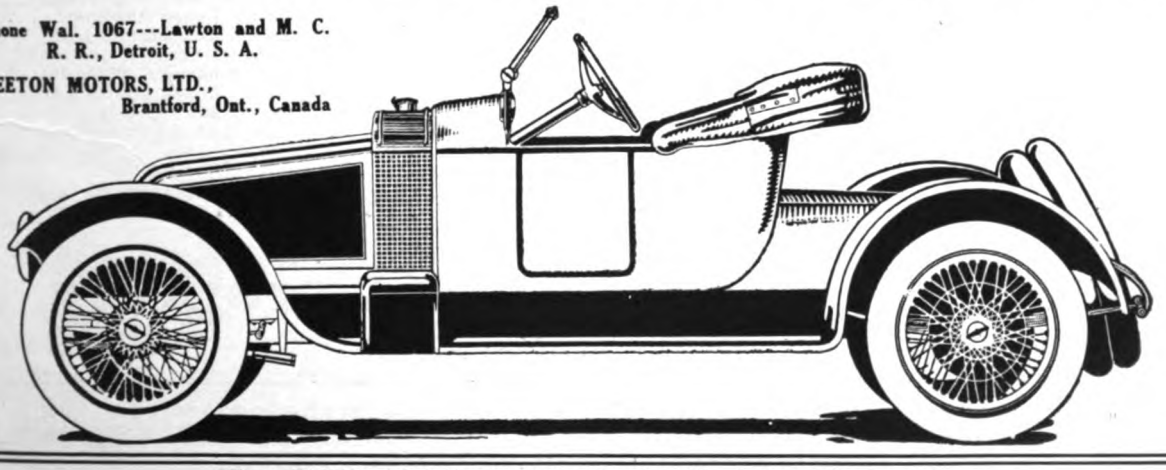
RIVERSIDE TOURING CAR, 5-passenger, completely equipped - - - - - **$2750**
Two extra folding seats for above $25
MEADOWBROOK ROADSTER, completely equipped - - - - - **$2750**
TUXEDO COUPE, completely equipped - - - - - **$3000**
CHASSIS, without tires or rear guards - - - - - - **$2250**

BOOKLET ON REQUEST.

New England Representative W. B. DOAN, 643 Washington St., Brookline, Mass.

KEETON MOTOR CO., DETROIT U. S. A.

Phone Wal. 1067---Lawton and M. C. R. R., Detroit, U. S. A.
KEETON MOTORS, LTD., Brantford, Ont., Canada

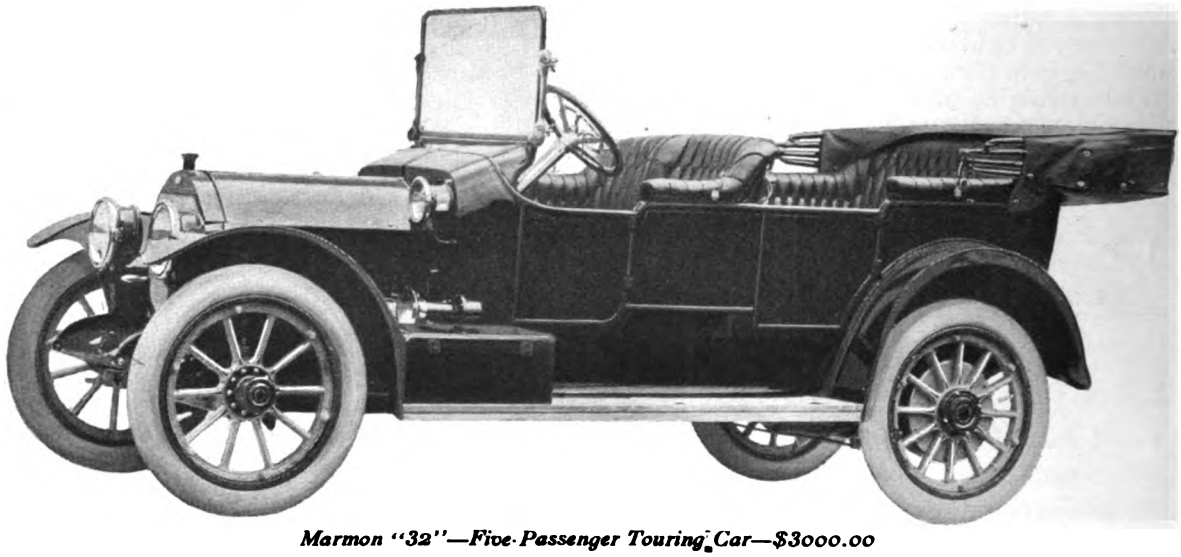


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"The Easiest Riding Car In The World"

The MARMON "32"



Marmon "32"—Five-Passenger Touring Car—$3000.00

THE graceful and beautiful lines of the new bodies distinguish the Marmon at a glance. The many refinements in equipment and appointments add to the comfort, luxury and ease of operation. But underlying all the new features is the same high standard of design, materials and construction that has made these cars world-famous in contests and service. No one can question the judgement of the Marmon owner in his choice of this car. The records of its performance are the highest indications of value.

Outline Specifications

Motor—4½"x5", "T" head, 32-40 h. p. **Oiling**—Marmon system automatic force feed lubrication. **Ignition**—Two spark dual system. **Transmission**—Selective sliding gear, unit with rear axle. **Clutch**—Cone. **Rear Axle**—Floating type, unit with transmission. Pressed steel housing. **Brakes**—Internal expanding, 403 sq. in. surface. **Wheelbase**—120 in. **Rims**—Quick detachable, demountable. **Tires**—35x4½ front and rear. **Control**—Left-hand steering, right-hand control in center. **Carburetor**—Improved automatic float feed. **Springs**—Rear, full elliptic; front, semi-elliptic. **Body**—Marmon perfected cast aluminum construction with sheet metal seat backs. Deep cushions. Nickel trimmed. **Equipment**—Electric starting and lighting system, Pantasote top, built-in windshield, speedometer and clock, electric light to illuminate entire dash, horn, shock absorbers front and rear, single tire carrier, extra demountable rim, coat rail, foot rest, assortment of tools, oiler, jack, tire repair kit and pump. **Prices**—Five-Passenger Touring Car or Four-Passenger Suburban, $3000.00; Two-Passenger Roadster, $2900.00; Limousine (seats seven) $4000.00; Landaulet (seats seven) $4100.00; prices f. o. b. factory, Indianapolis, Ind.

New England Dealers

F. E. WING MOTOR CAR COMPANY, "Motor Mart," 12 Columbus Ave., Boston

Manufactured By

Nordyke & Marmon Company

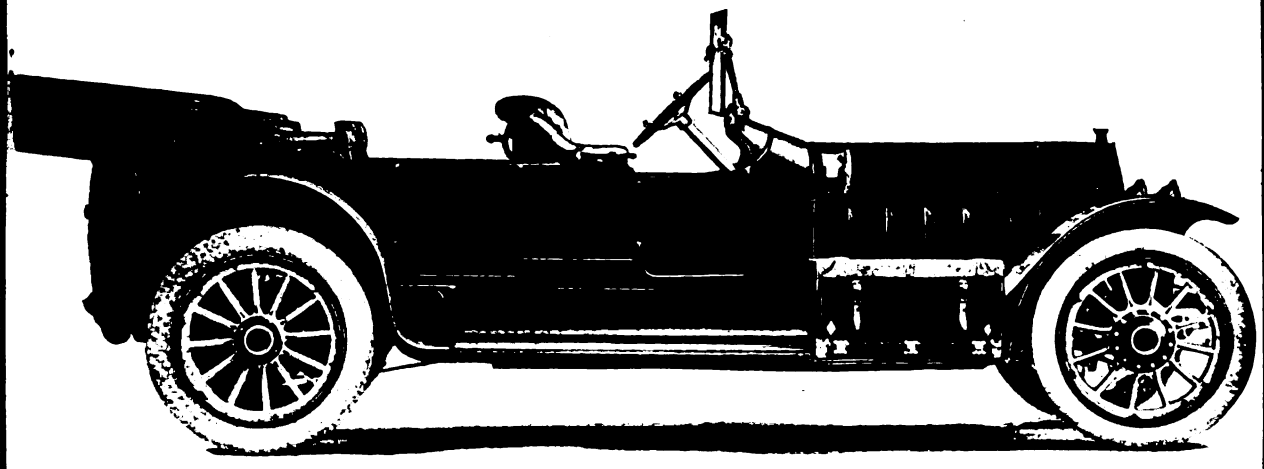
Indianapolis **(Established 1851)** **Indiana**

Sixty Years of Successful Manufacturing

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"The Easiest Riding Car In The World"

The MARMON SIX



Marmon "48"—(Six)—Seven-Passenger Touring Car—$5000.00

YOU may know, by a glance, of the Marmon's luxury, its beauty, its completeness of appointment, its fitness to be classed first among the best.

You may know its superiority of design, materials and construction by actual records in the hands of owners and the world's greatest contests.

But a new and different sensation, the realization of true Marmon value, grows as you come to own and admire this car for its adaptability to meet your every requirement with delightful satisfaction.

Outline Specifications

Motor—4½"x6", "T" head, 48-80 h. p. **Oiling**—Marmon system automatic force feed lubrication, delivering oil through hollow crank shaft directly into main bearings, connecting rod bearings and piston pin bearings, also through hollow cam shafts to cam shaft bearings. **Ignition**—Two spark dual system. **Clutch**—Improved dry plate multiple disc. **Rear Axle**—Floating type unit with transmission. Pressed steel housing. **Front Axle**—A new type, an exclusive feature of the Marmon Six. The vertical spindle is placed in the direct center line of the wheel. This construction makes the safest, surest and easiest steering mechanism ever devised. **Brakes**—Internal expanding, 403 sq. in. surface. **Wheelbase**—145 in. **Rims**—Quick detachable, demountable. **Tires**—Front 36x4½, rear 37x5; front and rear rims and tires interchangeable. **Steering Gear**—Left-hand with center control. **Carburetor**—Improved automatic. **Springs**—Front, semi-elliptic; rear, ¾ elliptic. **Body**—Convex curve type Marmon perfected cast aluminum construction with sheet metal seat backs. Deep cushions. Nickel trimmed. **Equipment**—Electric starting and lighting system, cape top, windshield designed as part of dash with provision for ventilation, speedometer and clock, electric light to illuminate entire dash, electric step light under tonneau doors, electric emergency lamp with long extension cord, electric horn, power tire pump, shock absorbers front and rear, tire carrier, extra demountable rim, coat rail, foot rest, assortment of tools, oiler, jack and tire repair kit. **Prices**—Seven, Five, Four or Two-Passenger Body Types, $5000.00; Limousine (seats seven) $6250.00; Berlin Limousine (seats seven) $6450.00; Landaulet (seats seven) $6350.00.

New England Dealers

F. E. WING MOTOR CAR COMPANY, "Motor Mart," 12 Columbus Ave., Boston

Manufactured By

Nordyke & Marmon Company

Indianapolis **(Established 1851)** **Indiana**

Sixty Years of Successful Manufacturing

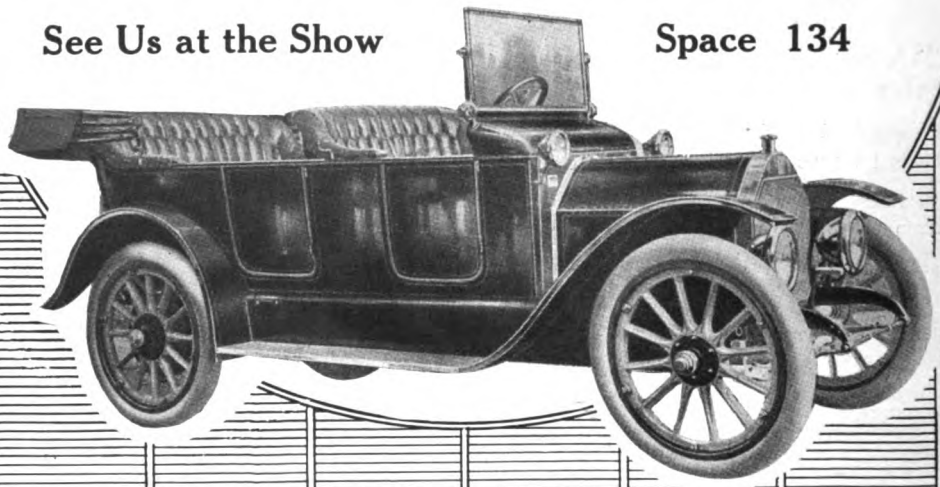
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THE FOUR

A big, roomy, luxuriously appointed car, with every feature that makes motoring a comfort. Built in Boston of New England quality. Long stroke motor, 4¼ inch bore, 5½ inch stroke —long wheel base—over-tired—left hand drive, centre control. Fully equipped with Firestone demountable rims (one extra rim)—double tire-holders at rear of car—Hoffecker Speedometer—Mohair Top, side curtains and envelope—one-piece wind shield—full electric lamp equipment—robe and foot rest —12-inch Turkish upholstering and nickel trimmings.

See Us at the Show **Space 134**



LENOX

THE LENOX MOTOR CAR CO.

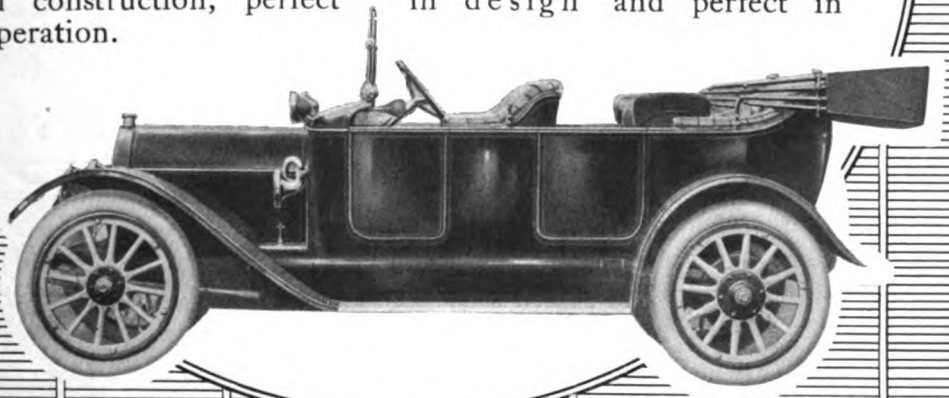
Factories HYDE PARK •BOSTON•MASS• Salesroom: Motor Mart

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THE SIX

A six-cylinder car of the very highest type of automobile construction—a car that has created a class by itself. No essential that makes for motoring pleasure has been omitted. Driven from the left side, started by electricity from the seat, lighted also by electricity, the centre control gives complete mastery of the car under all conditions. The motor of 4 inch bore and 5 inch stroke is flexible, efficient and silent.

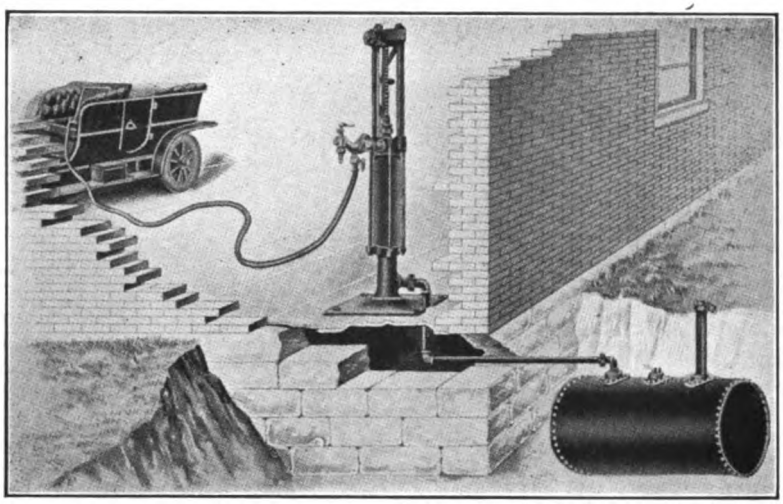
Fully equipped with every requisite—in fact a car perfect in construction, perfect in design and perfect in operation.

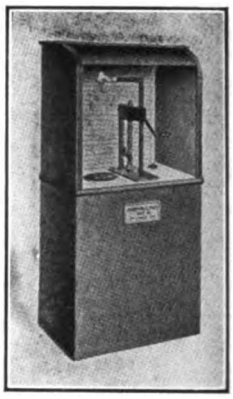


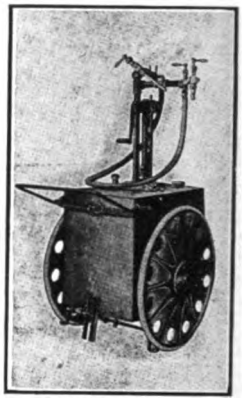
LENOX

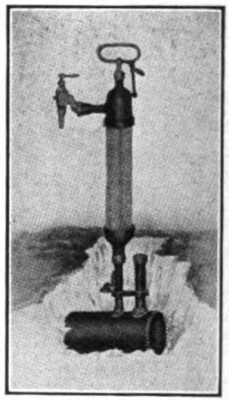
Quality of a Master

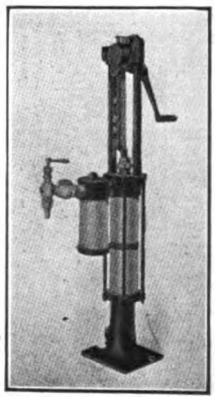
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TEXACO
OIL HANDLING EQUIPMENTS

PUBLIC GARAGE AND PRIVATE AUTOMOBILE OWNERS

Will Positively Solve Your Storage Problems and Earn You 100 Per Cent on the Investment.

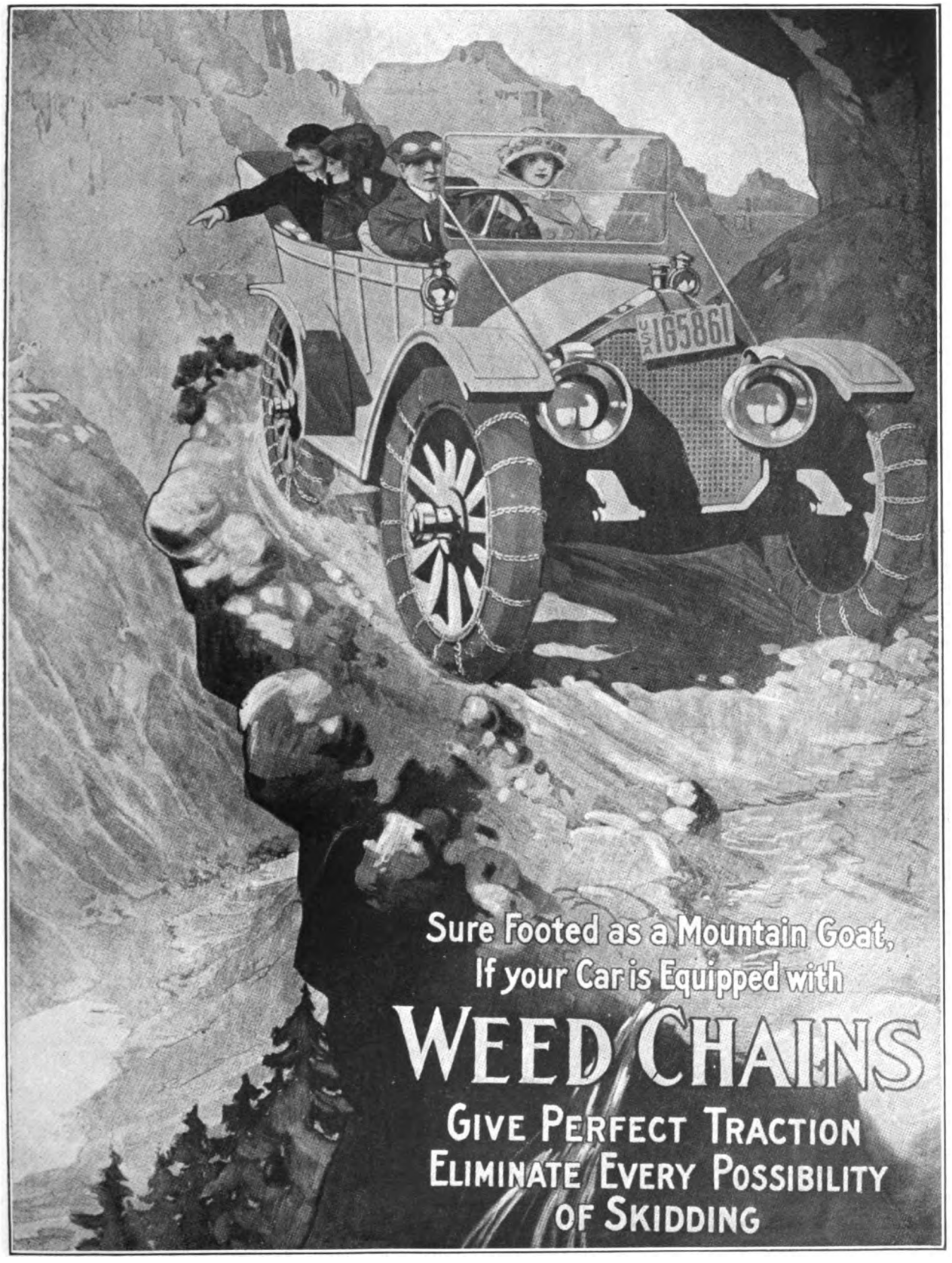
They Are Fire-Proof, Evaporation Proof, and Absolutely Safe.

They Will Reduce Your Cost in Handling, Eliminate Waste, and Filter Your Oils.

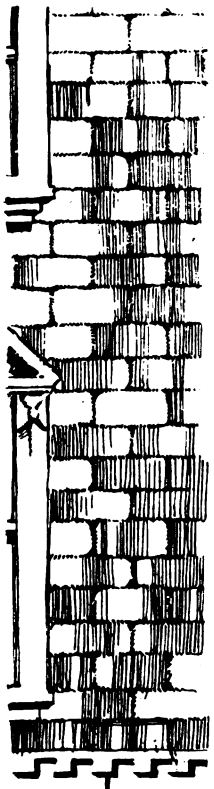
THE TEXAS COMPANY

146 Summer Street Boston, Mass.

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Abbott-Detroit

THE ONE PERFECT CAR

THOSE who are attending the shows for the purpose of making an unprejudiced study of motor car values, unanimously declare that all honors go to the Abbott-Detroit.

The Abbott-Detroit maintains its position as leader of motordom. It is the incomparable and unapproachable car. Persons already intimately acquainted with this superb line go away with even greater appreciation of its superior value than before. Every owner is fully convinced of the wisdom of his choice.

Some lines you have perhaps passed by with no more thought of buying or selling than were you a customer looking for all-wool goods and nothing but cotton were shown you. But when you approached the Abbott-Detroit booth you at once recognized the genuine article. You were unable to find any other car that offered such beauty, comfort and mechanical perfection at anything near the price and nothing in all-around qualities that could excel at any price.

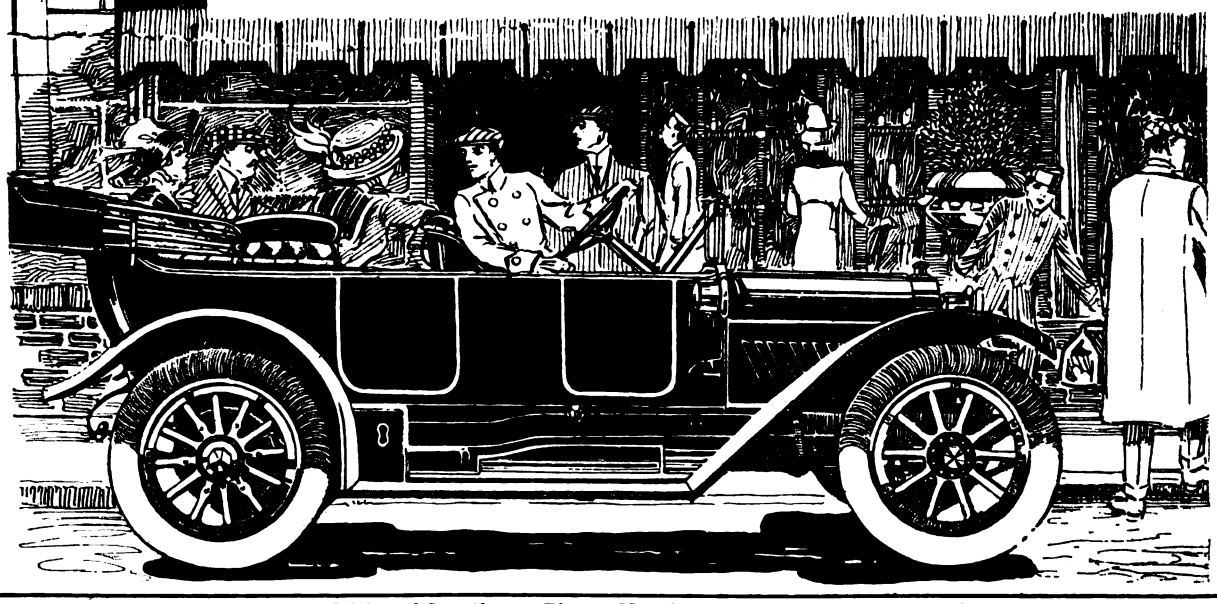
We cannot put the truth too strongly. We are dealing in cold, hard facts. The Abbott-Detroit is the maximum car. Ask any Abbott-Detroit owner what he thinks of his car. Those who previously owned other cars are unanimous in their declaration that the car cannot be matched at any price. This is as true with those having owned $5000 and $6000 cars as those who paid much less. Unsolicited testimonials being received daily show that in scores of instances the 1912 model Abbott-Detroits have been driven from 10,000 to 200,00 miles through all sorts of weather and road conditions without a single cent being spent for repairs.

If as an owner you want a car that will give you the same consistent service year after year, you should buy an Abbott-Detroit. As a dealer you will hold your trade and insure future success by handling the only perfect and reliable car.

MODELS AND PRICES

34-40 3-Pass. Roadster, 116-inch wheelbase	$1700	44-50 7-Pass. Touring Car, 121-inch wheelbase	$2000
34-40 5-Pass. Touring Car, 116-inch wheelbase	$1700	44-50 Battleship Roadster, 121-inch wheelbase	$2150
34-40 3-Pass. Colonial Coupe, 116-inch wheelbase	$2000	44-50 7-Pass. Limousine, 121-inch wheelbase	$3650
44-50 5-Pass. Demi-Tonneau, 121-inch wheelbase	$1975	Top, Windshield and Speedometer, $100 Extra	

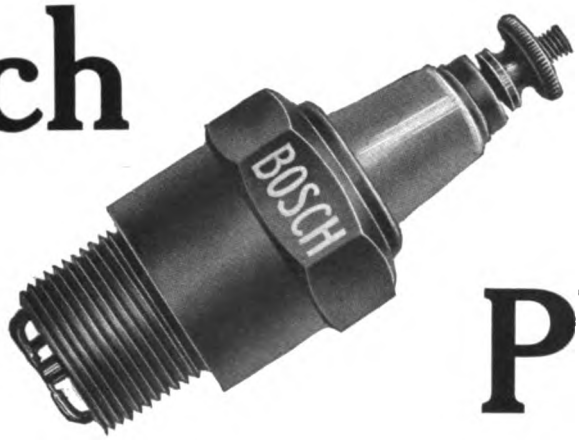
141 Waterloo Street ABBOTT MOTOR COMPANY Detroit, Mich.



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Bosch



Much Better
Than The
Price Implies

As Good
As Bosch
Magnetos

Plugs

fill a long felt want.---For years the ignition source, the magneto, has been perfected to the highest degree but the development of the spark plug, the "key-stone" of the ignition system, has been neglected, save to cheapen it in price to the consequent sacrifice of service and quality.

Extensive investigations into ignition problems have made possible the production of a proper spark plug, a scientific plug, in short, the Bosch Plug, one designed on correct principles, principles which eliminate the short-circuits, breakage, and loss of compression so commonly experienced with the average plug.

Bosch Plugs are designed to uphold the name they bear---they have all those attributes that characterize Bosch Magnetos as the standard ignition source of the world, all those qualities which are desired for the most excellent productions of automobile engineers.

The Peerless, Pierce-Arrow, Hudson, Mercer, Garford, Rambler, Fiat, Lancia, Metallurgique are a few examples of cars that regularly equip with Bosch Plugs.

WHY EXPERIMENT? SPECIFY BOSCH PLUGS.

"Locating the Spark Plug" is very instructive. Send for it today.

$1.00 EACH

Bosch Plugs are sold by reputable dealers throughout the United States and Canada, or they may be obtained via Parcel Post from Bosch Distributors, or any Bosch Branch.

Bosch Magneto Co., 204 W. 46th St., New York

CHICAGO :: DETROIT :: SAN FRANCISCO :: TORONTO

New England Distributors: Motor Parts Company, Boston—Maine Motor Car Company, Portland

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Studebaker

"35"

ALL WHO SEE THE $1290 STUDEBAKER "35" MARVEL AT ITS VALUE

An electrically lighted and started six-passenger car of high quality at $1290 is a sensation.

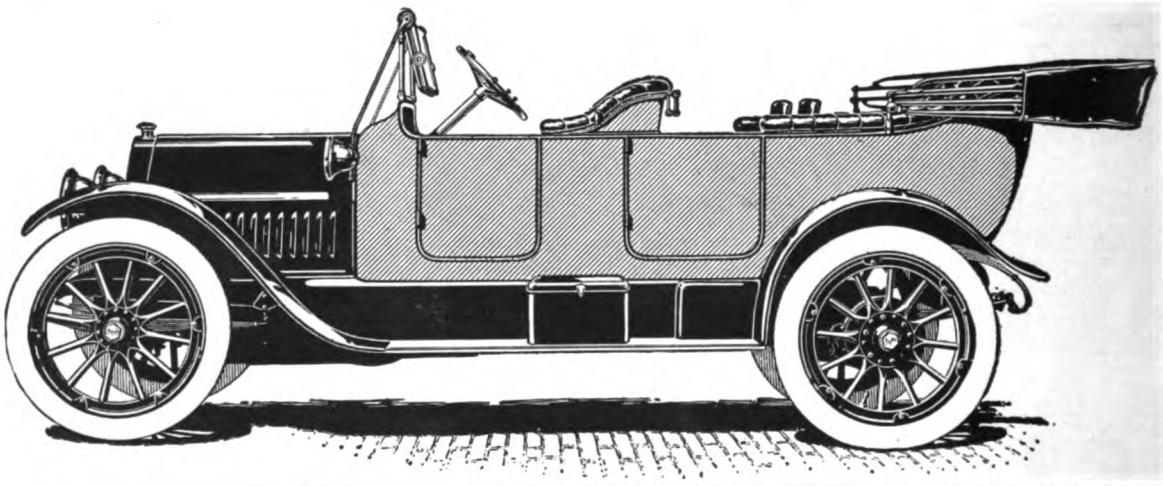
And the $1290 Studebaker "35" is sufficiently remarkable to have won the admiration of friends and competitors alike.

The astonishing price of $1290 would be too good to be believed if the world did not know that the Studebaker factories are the largest in the industry.

And the mechanical excellence of the car, its finish and equipment would seem also almost too good to be true, if it were not the product of the world's best, as well as largest, automobile plants.

The reasons for the remarkable worth of the $1290 Studebaker "35" are perfectly clear and the car itself is evidence no man can deny.

$1290



SIX-PASSENGER, FOUR CYLINDERS, 4 1/8-INCH BORE X 5-INCH STROKE, 116-INCH WHEELBASE

Electric self-starter
34x4 Goodrich tires
Detachable, demountable rims
Extra rim
Tire holders
Electric lights
Stewart & Clark Speedometer
Three-quarter elliptic springs
Full floating rear axle
Electric horn
Silk mohair top
Studebaker Jiffy curtains
Luxurious upholstery
Deep cushions
Clear vision ventilating windshield, rain vision type
Crowned fenders
Wide tool box
Full set of tools

THE STUDEBAKER CORPORATION - - - Detroit, Mich.

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ENGLEBERT

DEPOT

STE E CIE F

PNEU ENGLEBERT

"Made in Belgium"





TYRES

LOOK FOR THAT SIGN

NOW BEING DISPLAYED BY ALL LEADING DEALERS AND GARAGES

STRONGEST POSSIBLE PROPOSITION FOR TYRE AGENTS

Englebert Tyres are admitted to be the highest quality tyres in the world.

The best rubber, the best fabric and the best workmanship are responsible for Englebert quality. Englebert Tyres do not blow out or rim cut. In Continental Europe, England, South America and the United States they have given the thousands of motor car owners absolute relief from tyre trouble and needless tyre expense.

The Englebert is made at Liege, Belgium, and is known throughout the world as the tyre of 10,000 miles. In the first instance they cost no more and in the long run 50% less than any American made tyre.

DEALERS GET IN TOUCH WITH US

REGULAR AND Q. D. CLINCHERS

The following types are made: Round or Flat Tread, Rubber Anti-Skid, Steel Studded Anti-Skid.

AUTOMOBILE TYRES
MOTOR CYCLE TYRES

ENGLEBERT TYRE COMPANY

E. W. ELVERSON, President and General Manager 1916 BROADWAY, NEW YORK CITY

SOLE REPRESENTATIVE OF O. ENGLEBERT FILS & CIE, LIEGE, BELGIUM

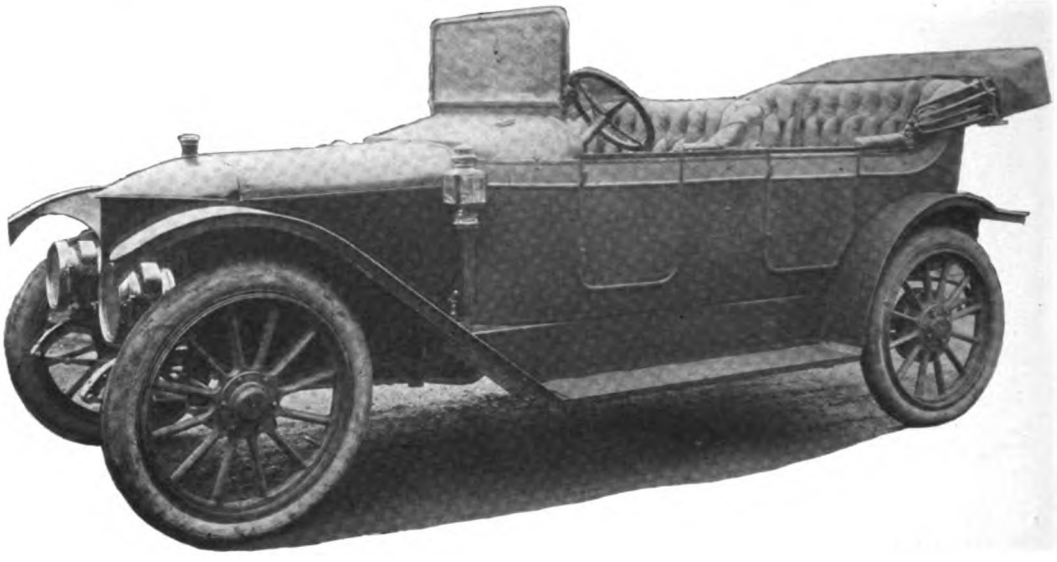
CHICAGO BRANCH: 2420 MICHIGAN AVENUE

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WATER COOLED MOTOR **CAMERON** FOUR SPEEDS FORWARD

"30"

5-Passenger Touring Car (Fully Equipped) $975



A distinctive car that has power, speed, durability, comfort, easy riding, and above all is ecomomical. The work of a master mind.

The Cameron motor is the **mechanical sensation** of the show. The engine is 3 5/8 bore x 5 in. stroke and delivers 30 H. P. It gives remarkable power and efficiency because it has side valves in the head with no pockets.

Another feature used only in cars selling from $4000 upward, is the four speeds selective type of transmission. Four speeds forward with a direct drive on all speeds.

The **car** is **cranked from** the **seat.** The crank is on the dash. This is connected by a chain to a gear that meshes with a gear on the fly wheel. This gear is slid into mesh with the fly wheel by a small foot pedal for starting, and throws out automatically. It requires little effort to start the engine.

In appearance the **Cameron** has a decided foreign aspect. It is low hung with a pointed radiator.

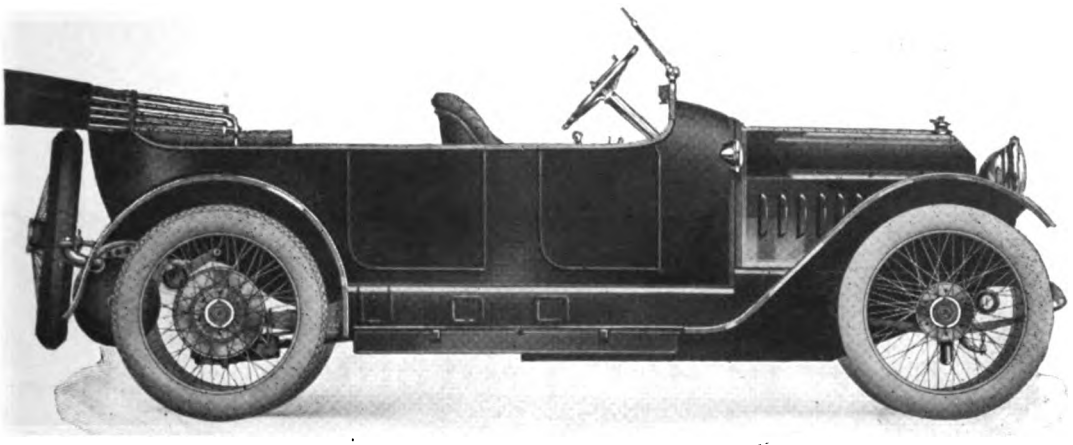
SPECIFICATIONS

MOTOR. 4-cylinder, 3⅝-in.x5 in., water-cooled.
VALVES. Rocker arms all on one side, driven from one cam shaft.
LUBRICATION. Automatic oiling system.
IGNITION. Splitdorf magneto, dual, throttle on top of steering wheel.
GASOLINE TANK. In cowl, 22 gal. capacity.
CLUTCH. Leather-faced cone on fly wheel, self-adjusting. Clutch pedal also operates brake.
TRANSMISSION. Cameron System, direct drive on all speeds, obtained selectively. Located on rear axle, operated by hand lever, four speeds forward.
TIRES. 32x3½-inch.
AXLES. Front, nickel steel tubular; rear, full floating type, annular ball bearings.
BRAKES. 12-inch internal expanding, with 2½-inch braking face, emergency brake operated by lever, operating brake attached to clutch pedal.
SPRINGS. Front, semi-elliptic; rear, full elliptic with scroll.
WHEELBASE. 112-inch.
CONTROL. Centre.
DRIVE. Left-hand.
RADIATOR. Tubular, almost double cooling capacity.
CARBURETOR. Kingston.
COOLING. Thermo syphon.
LAMPS. Gas or electric with Prest-O-Lite tank or battery.
STARTER. Starts from seat.
EQUIPMENT. Best silk mohair top, side curtains and top boot windshield, complete tool kit and tire repair outfit, pump and jack, speedometer, head, side and tail lamps.
BODY. Two or five-passenger.
WEIGHT. Approximately 2,200 lbs.
PAINT. Black with red or gray running gear, with similar striping.
WIRE WHEELS. Optional at $20 additional.
PRICE. $975 F. O. B. Beverly.

CAMERON MFG. CO. Beverly, Mass.

Distributors for Boston, HOLLANDER MOTOR CO., 1070 Boylston St., Boston, Mass.

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EDWARDS-KNIGHT

"The Achievement of Experience."

Designed by H. J. Edwards—one of the leading engineers of the automobile world with a record of ten years' successful accomplishment.

The elimination of experiment	Not a single untried unit in the entire construction. Every feature tested by years of use. The Knight Engine—Worm Drive Rear Axle—Four Speed Transmission, Direct on Third—Lanchester Spring Suspension—Wire Wheels—S. U. Carburetor and American Simms Magneto—Oil flow automatically increased as the throttle opens—these are some of the tried and proven features of the Edwards-Knight.
The elimination of expensive upkeep	A natural and safe ratio of power to weight is essential to reliability, sturdiness and economy. When the highest standard of materials and workmanship are combined with common sense in design a ratio of one-horse power per 100 lbs. weight is always safe—the ratio of the Edwards-Knight.
Economy in Gasoline Consumption	High priced gasoline compels attention. Comparatively small power units economize gasoline. A low gear ratio with direct on third makes a snappy car with high speed possible on fourth gear.
The elimination of exorbitant tire bills	That Wire Wheels add life to tires has been demonstrated by exhaustive tests in Europe, where they are universally used, and, when combined with the right Spring Suspension, maximum tire life is assured.
Silence	The Knight Engine, admittedly the most silent of all gasoline engines, combined with a Worm Drive Rear Axle, results in an elimination of noise which is only equalled by electrics.
Comfort	Silence, combined with a Spring Suspension which precludes the possibility of sudden jolts and jars, or the need of shock absorbers, means comfort. The Edwards-Knight is the easiest riding car in the world—yes, we mean just that and can prove it.

These points, combined with graceful body designs, elegant fittings and other features, make the Edwards-Knight the easiest selling car on the market.

Touring Car, $3500; 4-Passenger Torpedo, $3500
Speedster, $3500; Roadster, $3500; Limousine, $4600

Every Car fully equipped

Agents who follow closely the trend of the times, who are quick to take advantage of changing tendencies to increase their sales, will be interested in the Edwards-Knight proposition. Write today for full particulars.

The **EDWARDS MOTOR CAR CO., 1790 Broadway, New York (Entire Fourth Floor)**

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COES

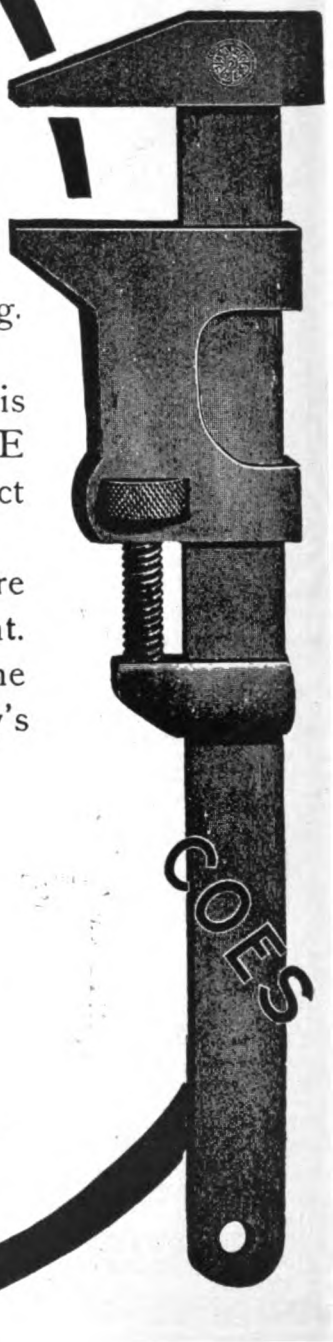
THE
Wrench Supreme

Strength without bulk or clumsiness.
Ease of handling without slipping or bruising.
Perfect balance and right grip

Everything the motorist desires in a wrench is to be found in the "COES" AUTOMOBILE MODEL, and you will never know perfect wrench service until you pin your faith to it.

It stands to reason that the 5 per cent. more you pay for a "COES" wrench goes for 60 per cent. more quality and service—put this wrench in the tool kit and shop. You will get your money's worth.

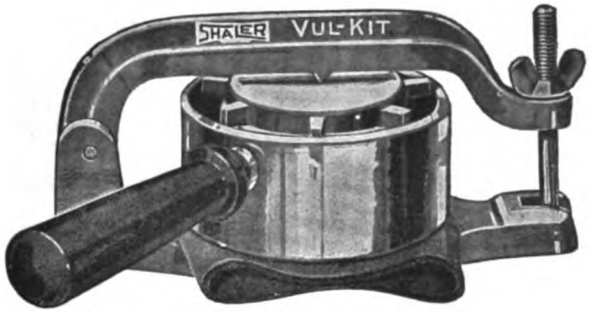
Send for Literature Now.



Coes Wrench Co.
WORCESTER, MASS.

J. C. McCARTY & CO.,
21 Murray St., New York City
JOHN H. GRAHAM & CO.,
113 Chambers St., New York City

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The Death-Knell of the Makeshift Tire Repair.

There's no excuse for ever using another cemented patch or any other substitute for vulcanized tube repairs. This vulcanizer makes ***permanent*** repairs wherever you are. Carry it in your tool box and be ready at a moment's notice to vulcanize a tube puncture as perfectly as the most elaborate garage plant could. Eliminate the delay and expense of tire repairing. The Vul-Kit is so simple that you can work it the first time. Fill the puncture with Para rubber, the generator with gasoline, clamp vulcanizer on tire and light it—and in ten minutes you have a repair that will outlast the tire. Isn't it worth a couple of dollars to be able to do this?

VULCANIZER REPAIR KIT

A real SHALER Vulcanizer for $2.00

That means that it's made by the largest manufacturer of vulcanizers in this country---a firm whose product is the acknowledged standard.

Note the exclusive features that make the Vul-Kit reliable and safe. (1) A generator that transforms the fuel, gasoline, into gas and maintains the vulcanizing temperature long enough to cure a repair clear through. (2) Handle for moving the vulcanizer while hot. (3) Clamp that adapts heater to tire, insuring smooth repairs. (4) Asbestos pad inlaid in tube plate to prevent pinching tube.

DEALERS:—

Every motorist is a customer. A fine chance to clean up on a necessity that you can back with your personal guarantee. Write today for trade proposition.

Garage and Repairmen:---

There's a line of Shaler Vulcanizers for every requirement—from the Vul-Kit shown above, to a garage vulcanizing plant. No garage can give complete service to its patrons without a tire repair equipment. Ask us how Shaler Vulcanizers will make money for you.

C. A. SHALER CO., 950 Fourth St., Waupun, Wis.

Send resale proposition on Vul-Kit [ ]

Send descriptions of outfits for public garage work [ ]

Name.....

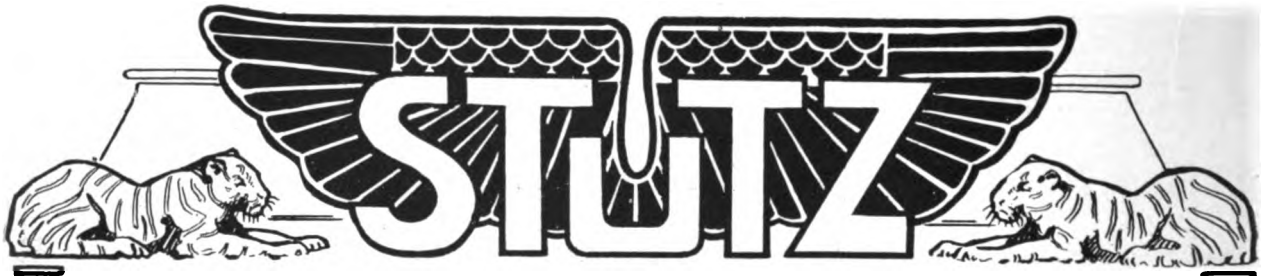
Address.....

C. A. SHALER CO.,

950 Fourth St., Waupun, Wis.

When Writing Advertisers, Please Mention The Automobile Journal.

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The Stutz Is Quality Built

EVERY STUTZ car is built with as much care and pains as the costliest watch. Every ounce of material—every detail of workmanship that goes into the STUTZ is absolutely the best.

There are so many satisfied STUTZ owners throughout the country that we are not spending a nickel for national magazine advertising—we have demands for more cars than we can produce under our careful painstaking system without it. We are putting that cost into STUTZ QUALITY.

We are building less than 1,000 cars—we have demands for three times that many.

If we built more cars we could not give the attention to the many details—such as are easily slighted in a great organization burdened with quantity production.

We could not build in quantities without sacrificing the QUALITY, and we would not sacrifice the QUALITY of one STUTZ car for the greatest quantity production in the industry. We would far rather be known as QUALITY producers.

There is no watered stock; no costly branches to maintain, in the STUTZ organization.

Every nickel of STUTZ purchase price is given back to the user in STUTZ QUALITY.

These are the reasons for the superior quality of STUTZ cars—the reasons why the STUTZ gives genuine service—the reasons why every STUTZ owner is proud of his car no matter in what company he associates.

Stutz Features

Full electric light equipment with dependable generator and storage battery.
Stutz special rear system.
Timken front axle.
Gemmer "A" grade steering gear.
Force feed oiling system through hollow crank shaft.
Over-size tires.
Water-jacketed intake manifold.
Black and nickel trimmings throughout.
4¼x5 T-head motor in six-cylinder models.
4¼x5½ T-head motor in four-cylinder models.

Stutz Models

STUTZ cars are made in five models

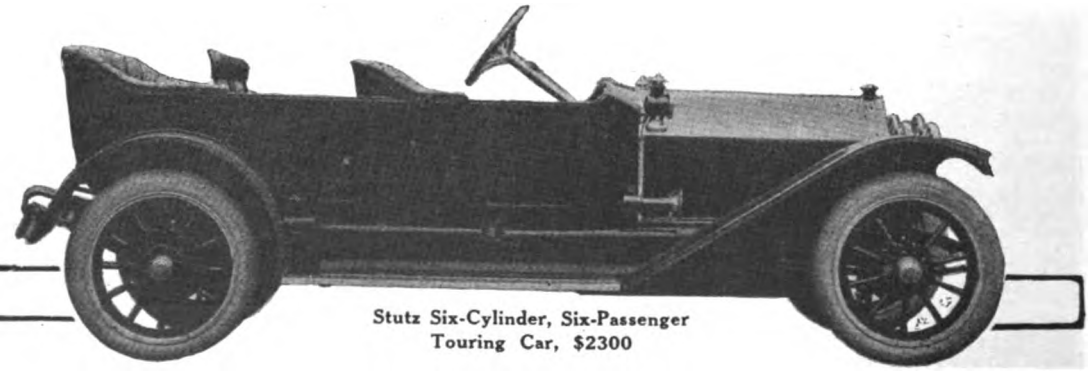
Six-cylinder, six-passenger touring car	$2300
Six-cylinder roadster	2250
Four-cylinder, six-passenger touring car	2050
Four-cylinder, four-passenger touring car	2000
Four-cylinder roadster	2000

Write today for advance Booklet A-2
Sturdy Stutz Announcement, Series B.

STUTZ MOTOR CAR CO.

895 Boylston Street, Boston, Mass.

Ideal Motor Car Company Manufacturers of Stutz Cars **Indianapolis, Indiana**



Stutz Six-Cylinder, Six-Passenger
Touring Car, $2300

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The New Jones Speedometer

A Non-Magnetic Speed Gauge

of Modern Construction, the Accuracy of which is Unaffected by Dynamos, Climate, Heat or Cold

Now Comes the Ultimate in Speedometers

Mr. Joseph W. Jones' Pride Work

This is a day of achievements in every line of work. In every field some man stands out as the maker of some superior product.

In the making of speedometers in 1913, this man is Joseph W. Jones. Mr. Jones invented the first Speedometer, the Taximeter, the Disc Record used on most talking machines, the Autolog (the Recording Speedometer), the Electric Horn and forty-five other patented articles.

But the New Jones Speedometer is his pride-achievement.

For, in the New Jones, his master instrument, a new standard of speed indication is set, to meet the new motor car conditions.

Dynamos Don't Affect It

The New Jones, being non-magnetic, is absolutely unimpaired by any influence from the dynamos now carried by modern cars. It is not affected by heat or cold or any kind of climate. It registers perfectly always and everywhere. It tells the actual speed of the car on the moment you attain it. No wavering. No tardiness. No doubt. No guess-work. Every man must prefer it, sooner or later, if he wants to know his car's actual speed.

What Some Tests Showed

Several rival speedometers tested out in the laboratories of Columbia University, Armour Institute and the United States Bureau of Standards, showed variation under different temperatures of from 20 to 35 per cent., or 13 to 17 miles per hour. The Jones variations in these same tests were practically imperceptible. Write for the records See what they show.

The World's Final Authority

The Jones, tested out with fourteen other makes in trials by the Royal Automobile Club of Great Britain and Ireland, and in which were American and foreign makes, won first prize on all points and obtained the club's gold medal. This club is regarded in Europe as the World's final authority on matters pertaining to motor cars. We will send you the club's report if you want it.



Double-Page Ads to 15,000,000 People

We are telling these facts to 15,000,000 people through the Saturday Evening Post and Collier's, and other magazines. Double pages each month. Think of that influence. Every motor car owner, before we get through, will read a double-page Jones ad. A general preference for the New Jones must be the inevitable result.

A World-Wide Jones Service

Ask about the Jones Service to car makers and users. Jones Branches and Agencies are established in all of the principal cities of the World, in charge of men of the highest type. They stand behind Jones instruments. They will insure every man's satisfaction.

Write for information about a few uncovered territories and the Jones proposition for closing them up.

There was never another speedometer so accurate, so carefully built or so carefully maintained in service.

Write "The Jones Speedometer" today, Broadway at 76th Street, New York.

Before you contract for any instrument, see where the speedometer demand is coming from in '13—see what speedometer the motorists want.

16404a

THE JONES SPEEDOMETER

Broadway at 76th Street **NEW YORK CITY**

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HEAVY CAR TYPE

FISK TIRES

A complete line of HEAVY CAR TYPE FISK TIRES, including the new Town Car Tread, and of Pure Para Tubes is on exhibition at the

Boston Show

(SPACES F 538 and F 539)

Fisk Tires are made in Plain, Bailey and Town Car Treads, and in Clincher, Fisk-Dunlop, Quick Detachable and Fisk Bolted-On *Styles*.

THE FISK RUBBER COMPANY
OF N. Y.

811-813 Boylston Street - - - BOSTON
PROVIDENCE—17 Dorrance St. WORCESTER—730 Main St.
Branches in 41 Cities

Section
Fisk Town Car Tread Tire

FISK PNEUMATIC TIRES ARE GUARANTEED WHEN FILLED WITH *AIR* AT THE RECOMMENDED PRESSURE AND ATTACHED TO A RIM BEARING EITHER ONE OR BOTH OF THE ACCOMPANYING INSPECTION STAMPS. WHEN FILLED WITH ANY SUBSTITUTE FOR *AIR* OR ATTACHED TO ANY OTHER RIMS THAN THOSE SPECIFIED, OUR GUARANTEE IS WITHDRAWN

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Holtzer-Cabot Automobile Accessories



The "REACTO" Horn

It has a clear, deep pleasing note---Insistant but not abruptly harsh. Equally satisfactory for country driving or city use. It clears the way.

Send for Booklet J158

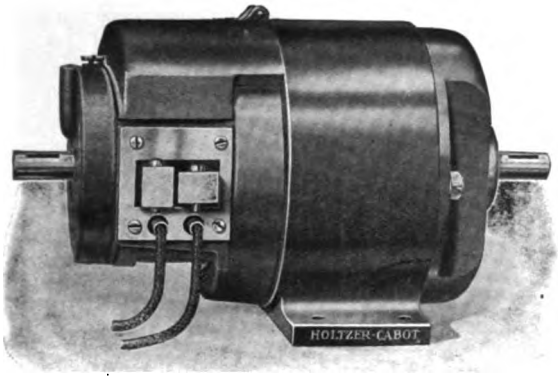


The "NEWCOMB" Carbureter

Delivers to the engine a mixture which is correct under all operating conditions.

Secures the highest degree of economy and flexibility.

Send for Booklet J160



The "H-C" Lighting Dynamo

Will give you perfect lighting at all times and under all conditions. Automatic in action, and no accessory apparatus is required.

Efficient---Durable---Reliable

Send for Booklet J161

See them all at the Boston Show---Space No. 618

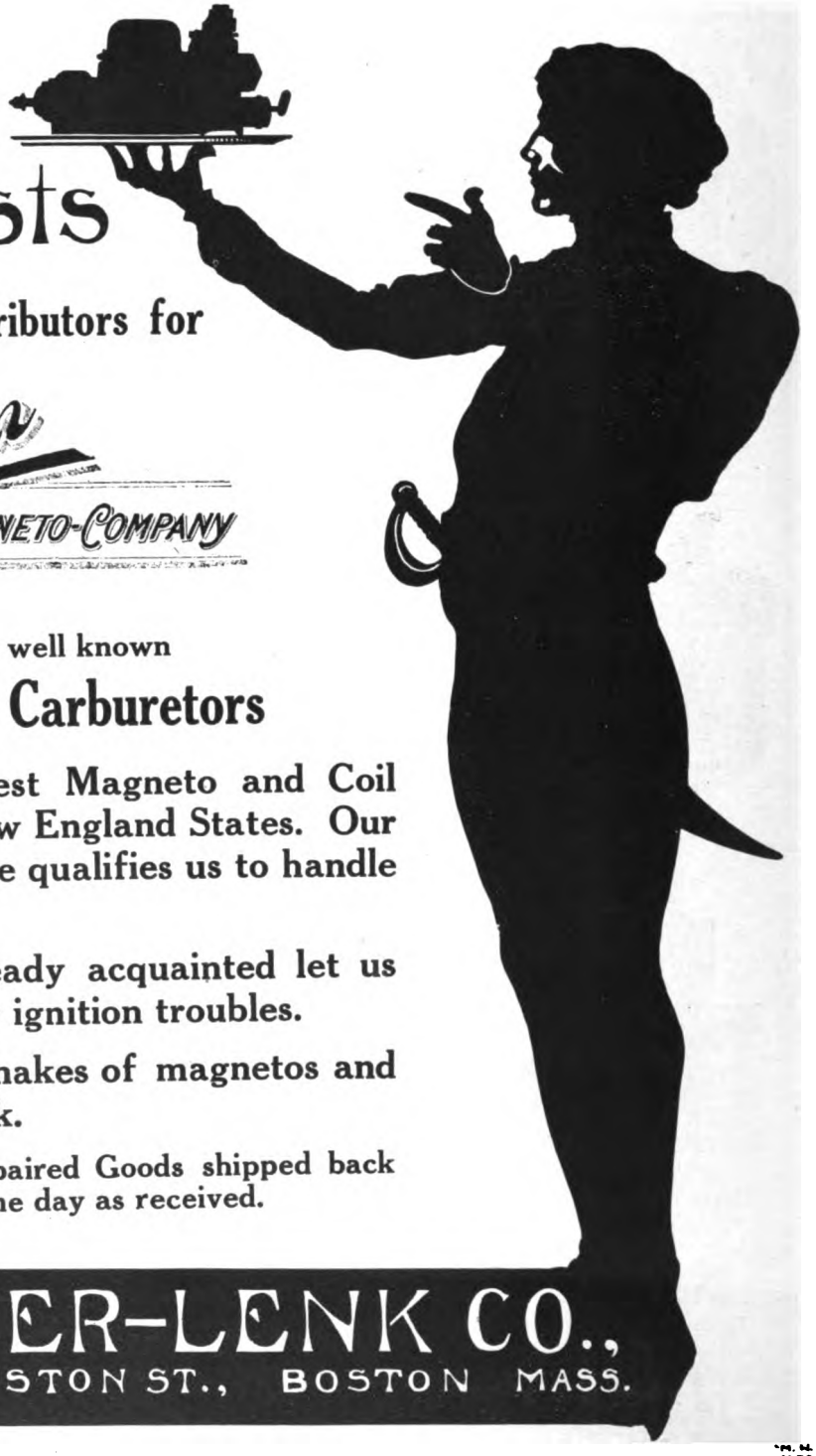
The Holtzer-Cabot Electric Co.

Chicago, Ill. *Brookline, Mass.*

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EISNER-LENK

Ignition Specialists



New England Distributors for

The Eisemann Magneto-Company

and the well known

Planhard Carburetors

We are the largest Magneto and Coil repairers in the New England States. Our 14 years' experience qualifies us to handle any and all work.

If we are not already acquainted let us help you solve your ignition troubles.

Spare parts of all makes of magnetos and coils always in stock.

NO DELAY Repaired Goods shipped back same day as received.

THE EISNER-LENK CO.,
1074 BOYLSTON ST., BOSTON MASS.

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20 Miles to Gallon

Lawrence, Mass., July 13, '12.

Gentlemen:—Enclosed find check for carburetor. I feel perfectly satisfied. It does 20 miles and over on a gallon. Can recommend it to any one. G. A. SCHMIDT.

20 miles to gallon is not unusual for Planhard.

Two Years Without Adjustment

Brenham, Tex., June 29, 1912.

Gentlemen:—Do you furnish extra gasoline needle valve for the "Planhard" carburetor? If so, please let me know what the price is. I have been using your carburetor for two years on a Sheffield motor car, and it is the first repair it has ever required. R. WEBB.

Cadillac Owners

Edgewater, N. J., May 21, 1912.

The Planhard Mfg. Co.

I am very much pleased with my new Planhard Carburetor. I made a test of gasoline consumption from Edgewater to Hyde Park, N. Y., and return, and got a fraction **over nineteen miles** to the gallon. This is on my Cadillac.

Yours very truly,
JOHN H. HINNERS.

Ford Owners

Chicago, O., July 1, 1912.

Please find draft enclosed to pay for "Planhard" carburetor for my model S Ford car. It is very satisfactory; in fact, I have never bought anything for the car that I paid so cheerfully for, as I have a smoother running engine with more power, and get **more mileage per gallon** of gasoline, and my engine runs much cooler. H. W. GRANDON.

Gallon Less Per Hour

THE GRAY & PRIOR MACHINE CO. (Portland Branch)

117 Commercial St., Portland, Me., Jan. 13, 1913.

Gentlemen:—I used one of your Planhard carburetors on the 20 H. P. model X, Hartford motor, in my semi-speed boat, "Hartford III," during the season of 1912. My boat is well equipped to make tests, as I use a tachometer.

I get better control with a Planhard and use practically one gallon of gasoline less per hour than when I used one of the most popular carburetors in use today.

I put a Planhard on my automobile as well. A. N. SMITH.

Improve Operation

SHERIDAN GARAGE,
Sheridan, Ind.

Planhard Co., July 8, 1912.

Gentlemen:—Herewith find check. The carburetors are O. K., displacing two others of well known make, and improving operation of car.

H. B. JOHNSON.

Superior to Ordinary

HOWE & MEEHAN,
Wellesley, Mass.

Planhard Mfg. Co.

Gentlemen: — Please find money order inclosed. Carburetor is far superior to the ordinary. Very truly yours,

W. E. MEEHAN.

3 3-4 More Miles Per Hour

When Planhard carburetors were put on the 6 cylinder 4 cycle Frisbie motor of the fast boat Delphi II, she increased 230 R. P. M. and 3¾ more miles per hour.

More Speed

Planhard Mfg. Co. Groton, Conn., Feb. 8, 1913.

Dear Sirs:—I have put a Planhard on my single cylinder 6-8 H. P. Goshen Engine. It is ahead of anything I know of. It gives 50 R. P. M. more than the ——— I took off. With the Planhard I can start cold or hot without priming, which few others can do. Yours truly, E. A. SCRIVEN.

Planhards were on the Loco-Victor, Emerson and Metropolitan motors, taking Old Glory II, The Dream, Emerson III, Alfred S., and Valiant II to victory; and the Holt Tractor winning the Argentine Government $3000 plowing prize.



PLANHARD Carburetors

Are Making Automobile History

SEE THEM AT THE BOSTON SHOW

DEALERS:

We don't want a single retail profit. Write for proposition, so you will get the profits that belong to you.

Send for Free Chart

We have charts (automobile), (motor boat), which show the saving in a given time on a 10 per cent. to 25 per cent. saving with 20-cent gasoline. You can locate the spot at which a Planhard will have paid for itself, and thereafter pay you a cash return if attached to your car or boat.

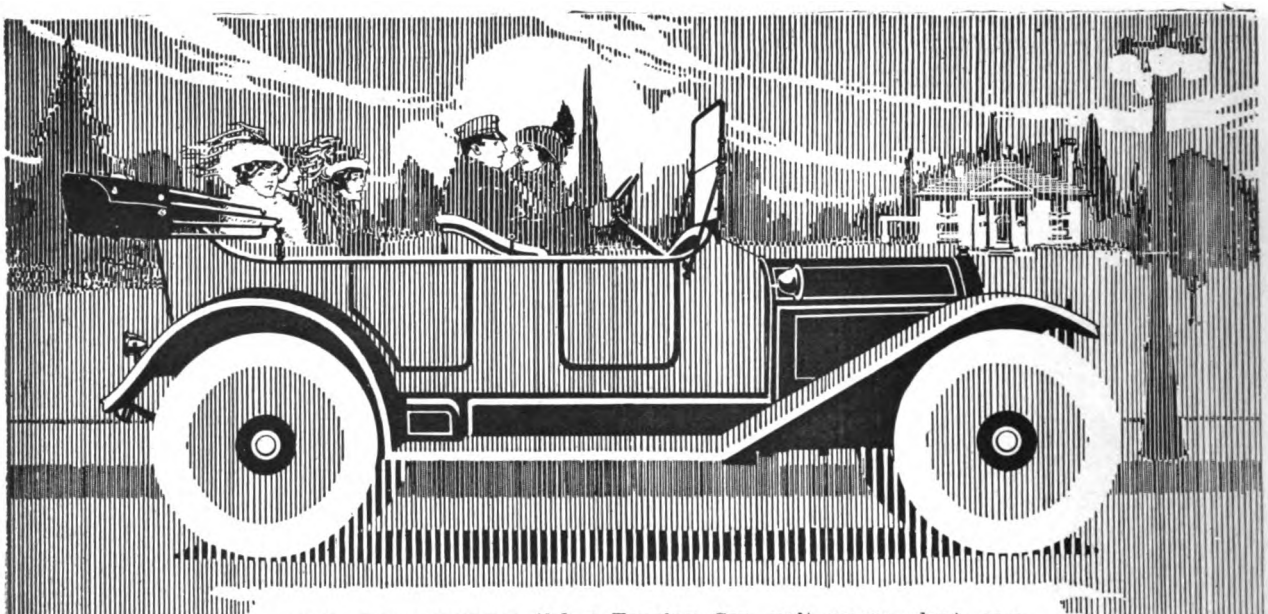
New England Distributors, Eisner-Lenk Co., 1074 Boylston St., Boston.
Southern N. J. & Eastern Penn., Gustave Muller, Jr., Bourse Bldg., Philadelphia.

PLANHARD MFG. CO., 1790 Broadway, New York.

Gentlemen:—Send at once your chart and book concerning Planhard Carburetor.

Name .....St.....
City .....State.....
Engine .....Carburetor....Size....in.
Threaded? Flanged? Horizontal? Vertical?

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B-40—Five-passenger, 40 h. p. Touring Car—unit power plant, complete equipment—$1475
A-40—Two-passenger roadster on same chassis—$1475

Real Evidence of the Unusual Value in

Cutting
MOTOR CARS

When you inspect the Cutting for the first time, you will find it fairly bristling with the evidences that stamp it the superior of cars of like price.

You will encounter them all through the car—all evolved by years of experience and all refinements that make for increased comfort, increased convenience and economy of operation, increased safety for the passengers, and longer life for the car.

For example, the rear crankshaft bearing is 4 inches long—quite unusual for a four-cylinder motor. The other two are correspondingly liberal—2¾ inches—and all are of Parsons white bronze.

The intake manifold is water-jacketed its entire length—always warm when the motor is running and making complete the vaporization of the low-grade gasoline now in use.

Motor cooling is assisted by longitudinal ribs on the exhaust manifold, the hottest part of the motor.

The self-contained force feed type of lubrication in connection with the Cutting is another feature of especial importance. This method of lubrication is not only the most practical, but the most efficient and economical ever devised, one gallon of oil averaging 500 to 600 miles.

Our brake equalizing system assures the same amount of brake pressure on each rear wheel which helps eliminate skidding, not only is the brake action smooth and easy, but always positive.

Forty horsepower motor, wheelbase of 120 inches, self-starter, electric lights, 10-inch cushions, 36x4-inch tires, complete equipment and black and nickel trimmings—these are some of the other evidences that will impress you in the sum total, with the Cutting's extraordinary value.

Sincerity of effect, and an organization that works as one man to attain one end—and that end an ideal of quality—these are responsible for the Cutting at $1475.

We want you to see the car—at one of the shows or at the Cutting dealers—and we want to send you the literature.

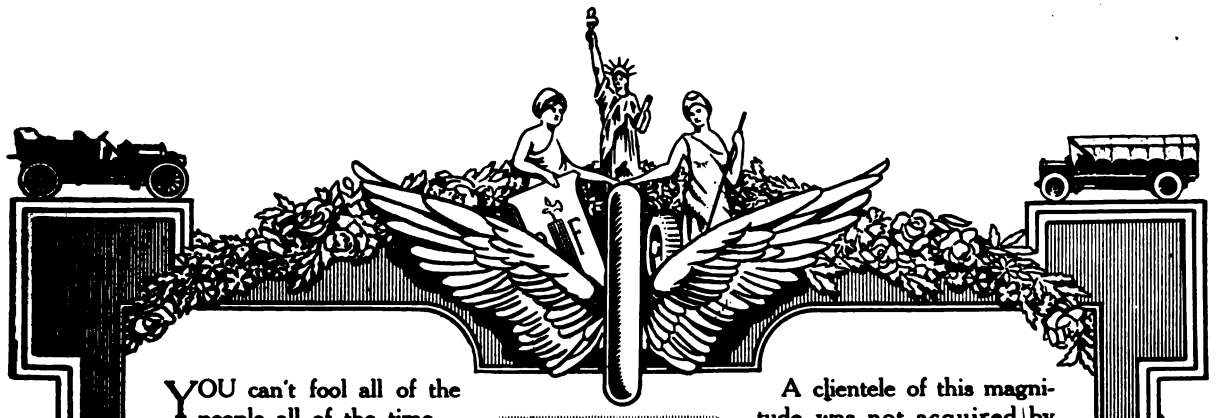
Boston Show---March 8-15

CUTTING MOTOR CAR COMPANY

311 MECHANIC STREET JACKSON, MICH.

Canadian Distributors, Cutting Motor Sales Co., Toronto, Canada

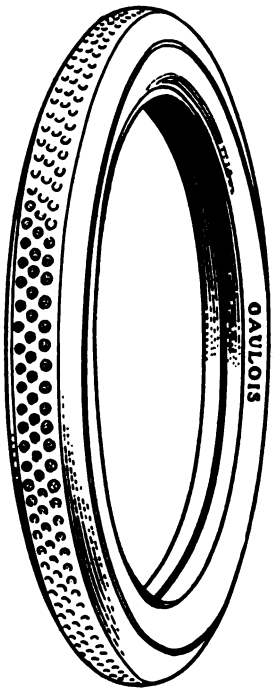
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YOU can't fool all of the people all of the time. The Etablissements Bergougnan, of Clermont-Ferrand, France, have been making Gaulois Tires for seventeen years. While most of the present day tire companies were still manufacturing rubber hose, this pioneer house had agencies and branches in all the capitals of Europe and in the chief cities of South America, Asia, South Africa and Canada.

Gaulois Tires have been tested over the steppes of Siberia and the pampas of of the Argentine and favorably known from the Danube to the Orinoco. Their popularity has grown from year to year, until at the present day the manufacturers are hard pressed to satisfy the public demand with an output of 1000 casings and 2000 inner tubes a day to say nothing of bicycle tires and solid tires for commercial vehicles

A Quality Tire for discriminating buyers



A clientele of this magnitude was not acquired by accident. It was built up through a reputation for quality born of years of experience.

Users of Gaulois Tires know through actual test that no other tire made can give the service and satisfaction put into the Gaulois by its makers.

There are cheaper tires then Gaulois Tires but none better. They are made to last. No extravagant guarantee goes with them other than that they are made of the finest material procurable and by the most improved process known.

Gaulois Tires represent the utmost in mileage, comfort, strength, resiliency and durability. All we ask you to do is to equip your car with two tires of whatever make you consider the best and with two Gaulois Tires. We will abide by the results.

GAULOIS TIRES

(Pronounced Goal-Wah)

Reliable Distributors Wanted in Principal Motoring Centers

SELLING HEADQUARTERS FOR UNITED STATES

1926 Broadway New York

Canadian Agency, 325 St. James St., Montreal

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ATTENTION

Truck Manufacturers
Makers of Parts

The New England agents for and dealers in wagons and trucks will do business of large proportions the next few months. The foundation of this business will be established at the Boston show. Those who have well known agencies will reap the benefit of the publicity they obtain; those who will introduce machines will profit to the extent that their connections are known.

The Boston shows have always been buying shows. The visitors are from all New England. The service wagon show is for business men. They are interested. They want to buy. They have decided they must use motor trucks and wagons, and the question is, Which will best meet the requirements?

Per capita New England owns more service wagons than any other section of the world. Yet the field has not been scratched. New England's business in the motor vehicle industry is greater than ever before. This is because the buyers and the capital to buy are here.

The MOTOR TRUCK, March issue, to be mailed prior to the show, will reach more owners of power vehicles and more who are investigating haulage problems than any magazine published. It will be largely given over to feature articles on actual service in New England. Not theory, not demonstration, but the real experience that is valuable, because the articles deal with practical work by practical men.

You can have representation in such a magazine at such a time but once a year. The time is the March issue. It will reach the right people at the right time. You want to sell, and the people want to buy. The MOTOR TRUCK IS WHERE YOU ALL MEET.

Last Form Closes March 15. No Proof Submitted After March 12. Wire Your Order and Send Your Copy.

MOTOR TRUCK

Times Building Pawtucket, R. I.

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Here's a lesson for all new owners of cars—especially new owners of new cars

We want to reach you and teach you before you start your motoring career.

Know this: A motor car is essentially a power plant plus a system of shafts, bearings and gears. The real wear which disables and destroys, falls upon these mechanical units. Beautiful paint and upholstery can fade or crack but still your car remains a valuable machine if the working parts are true and silent in operation.

The car manufacturer puts his brains and money chiefly into these working parts---bearings and gears. That is where you must use supreme prudence and care if you wish long service from your car.

Lubricate every bearing systematically with NON-FLUID OIL.

That is advice reiterated now for fifteen years---advice which has helped thousands and thousands of motorists to realize service value from their car investments.

It is advice which has been strengthened and spread by over seventy manufacturers of cars who have tested the failure of other lubricants and proved the success of NON-FLUID OIL.

We cannot prove to you with bald statements that NON-FLUID OIL reduces friction to a harmless degree nor that it removes the nightmare of wear and tear. Friction diagrams, chemical shop talk, claims, comparisons, disparaging statements about other lubricants---all these things are a worthless means to urge conviction upon you.

We simply invite you in your own interest to use NON-FLUID OIL this first year.

If your dealer does not sell it, you will have to look elsewhere. Don't be tempted to accept another kind of lubricant. Don't do it. Be sure you get genuine NON-FLUID OIL packed in orange colored cans bearing this trade mark.

TRADE MARK REGISTERED IN NON-FLUID OIL UNITED STATES PATENT OFFICE



Get it surely, or write us for it. We will ship it prepaid and arrange for your future supply with some dealer who will carry a stock.

NON-FLUID OIL is made in several grades and is sold in 3 lb., 5 lb., 10 lb., 20 lb. and 50 lb. cans.

K-000 Grade—for all the grease cups, for universal joints, steering knuckles, wheel hubs and for differentials requiring a heavy lubricant.

K-00 Special Grade is for sliding gear transmissions and for differentials which are oil tight. This lubricant has been so exceptionally successful for gears that it is regarded as a standard for this work. Other grades for timing gears, pump, etc.

Read "Lubrication of the Motor Car."

This is a complete treatise on lubrication, including a splendid LUBRICATING CHART, Write us for free copy. Read carefully. You may secure a copy of this booklet at our exhibit at the Boston Show. We are located in Space F-555. Address Motor Dept.

New York & New Jersey Lubricant Co.

165 Broadway, New York

CHICAGO—1430 Michigan Avenue PHILADELPHIA—1431 Vine Street

When Writing Advertisers, Please Mention The Automobile Journal.

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NEW DEPARTURE BALL BEARINGS

American Made for American Trade

A review of the 1913 models of American built cars exhibited at New York and Chicago demonstrates a marked increase in the use of ball bearings in preference to those of other type.

AMERICAN

If it is desirable to mount rotating parts upon a journal possessing less friction and requiring less work to drive than does the plain bearing, it is only reasonable to use that type of journal possessing the least friction, requiring the least power to drive, and, therefore, the most efficient.

GENIUS

The ball bearing is ten times as efficient as a roller bearing under same load conditions, and thirty to fifty times as efficient as a plain bearing.

ALWAYS

The American made New Departure is the quality bearing of the world. This bearing is to be found in 80% of the cars manufactured for 1913 selling.

WINS

See the New Departure demonstrated at the Boston Show, Space No. 430, Balcony, March 8th to 15th.

A pamphlet discussing the relative success of all types of bearings in eliminating friction is now on the press. Send for your copy today.

The New Departure Mfg. Co.

Bristol - - - Connecticut

WESTERN BRANCH---1016-17 Ford Building, Detroit

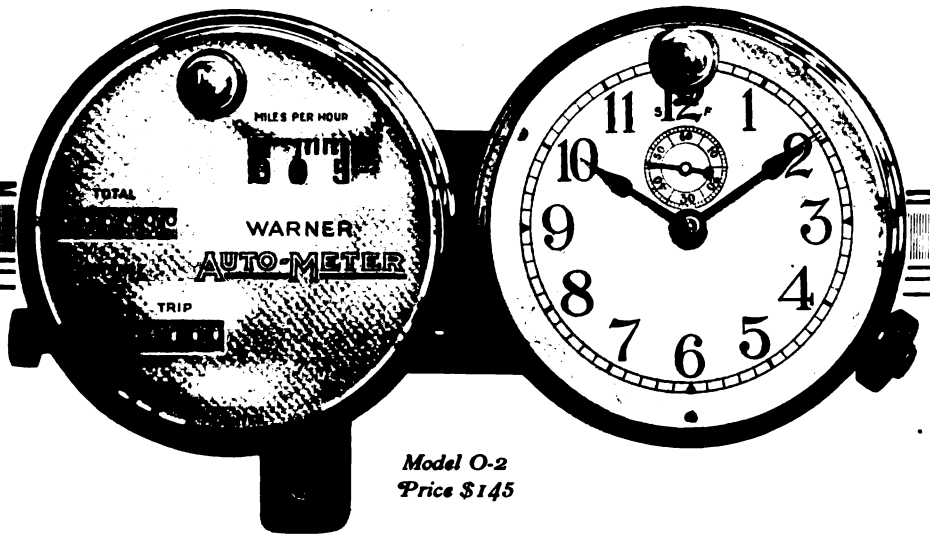
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Warner
AUTO-METER
(MAGNETIC PRINCIPLE)

SPEEDOMETER preference has become so pronounced and one sided that now you rarely find a high grade car that is not equipped with a Warner.

Warner Service Stations are permanently maintained in all large cities. Warner owners are thus assured of permanent satisfaction.

(Warner Auto-Meter Factory, Beloit, Wis.)



Model O-2
Price $145

When Writing Advertisers, Please Mention The Automobile Journal.

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Why Not A Hoffecker?

The "STEADY HAND" SPEEDOMETER, which has been built to New England *standard of efficiency*, is the honest endeavor of seven years' experience in the development and manufacture of speedometers, in which the primary essential has been *quality* FIRST, LAST and ALL THE TIME.



The 1913 product is the climax of *perfection* in speedometer refinements and improvements. The HOFFECKER PRINCIPLE—CENTRIFUGAL FORCE—eliminates all possibility of bad effects resulting from Electrical Starting and Lighting Devices so common now in motor car equipment.

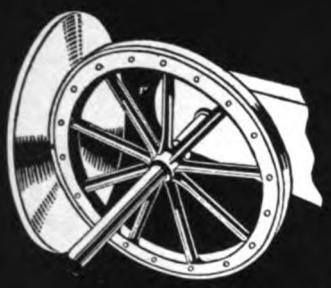
All our 1913 models will be on exhibition at SPACE F-503 at the BOSTON AUTOMOBILE SHOW, March 8th-15th. NEW DESIGNS—NEW FEATURES—NEW PRICES. Don't fail to see them—and note the display of original designs made for Manufacturers' Special Equipment.

HOFFECKER COMPANY

Motor Mart Boston, Mass.

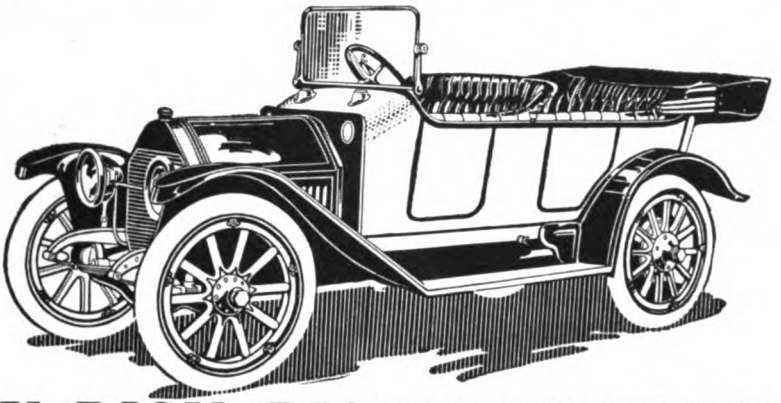
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The Gearless Transmission!

Cranked and Lighted Electrically



Model 5 A Completely Equipped $1700

WHY RISK DISAPPOINTMENT?

Why not purchase a motor car with a perfection pedigree while you are about it? There is ten years of reliability behind every CARTERCAR you buy. These ten years have been devoted to careful consideration of what constitutes the highest standards in motor car creations. The result is that an abundance of quality is admirably blended in the CARTERCAR.

In these ten years of brilliant achievement there have been but few simple changes. The vital features of the CARTERCAR of today are practically the same as those of a decade ago.

THE GEARLESS-TRANSMISSION is still the source of safety and satisfaction it was when the CARTERCAR was first introduced to the automobile buying public. It has withstood the assaults of time and is now the same perfect transmission it always has been. An unlimited number of speeds is attained by pushing one lever forward or backward.

But not only in CAPABILITY and POWER does the CARTERCAR stand preeminently alone, but also in the matter of Appearance and Luxury. It's generous wheelbase gives the occupants plenty of room to enjoy the wealth of deep upholstery. Everything which stands for motoring enjoyment and ease is included in the artistic makeup of the CARTERCAR.

It is offered in four excellent types: Touring Car, five passenger, Price $1700; Sedan, five passenger, Price $2000; Colonial Coupe, Price $1900, and the Roadster, Price $1600.

All CARTERCAR creations are ELECTRICALLY CRANKED and LIGHTED.

If CAPABILITY, COMFORT and CONSTANCY appeal to you, consider the CARTERCAR

CATALOGUE ON REQUEST

Cartercar

Cartercar Company

Pontiac, Mich.

Branches: New York · Kansas City
Detroit · Chicago · Atlanta

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BOSTONS' NEW ENGLAND SHOW

"Boston State-House is the hub of the solar system. You couldn't pry that out of a Boston man if you had the tire of all creation straightened out for a crowbar."

The Autocrat of the Breakfast-Table.
Oliver Wendell Holmes.

SPRING FEVER

"I want to go to Boston. There's something in the air:
The breath of spring, some restless germ unnamed—it's everywhere!"

"'Twixt you and me 'twere sweet to put a temporary gap
And go and sit awhile in Boston's calm, commodious lap."

"O Boston! sweet are your delights; and, though they may seem vain
To minds austere, my spirit craves the taste of them again."

"O heavenly town when one is tired! This good one may discern
In you that heaven has not: Since one may taste you and return."

Edward Sandford Martin.



E&S Ball Bearings

J. BRETZ COMPANY
Sole Importers
250 West Fifty-fourth
New York

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Climbing Hills
On The Level
Cold Weather
Hot Weather



You will always have the same perfect lubrication if you use

HARRIS
TRADE MARK REG. U.S. PAT. OFF.
OILS

We not only make oils for every part of your automobile, but every oil that comes from our factory is the best that can be made.

Our care in manufacture, backed by 27 years of experience, and the fact that we use only the best crude product, enables us to make oils of the highest quality. If you realize the importance of lubrication, you will at least TRY HARRIS OILS. That is all we ask because we are confident of your satisfaction.

A Little Goes A Long Way And Every Drop Counts.

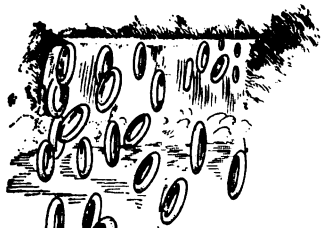
Be Sure To See Our Exhibit
At The Boston Show
Space 510 Dept. F.

A. W. HARRIS OIL COMPANY,
326 S. Water St., Providence, R. I. 143 No. Wabash Ave., Chicago, Ill.

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CATARACT

4000 Miles



MR. DEALER—

Our policy of permanent co-operation with the Jobber and Dealer for the betterment of the Consumer spells

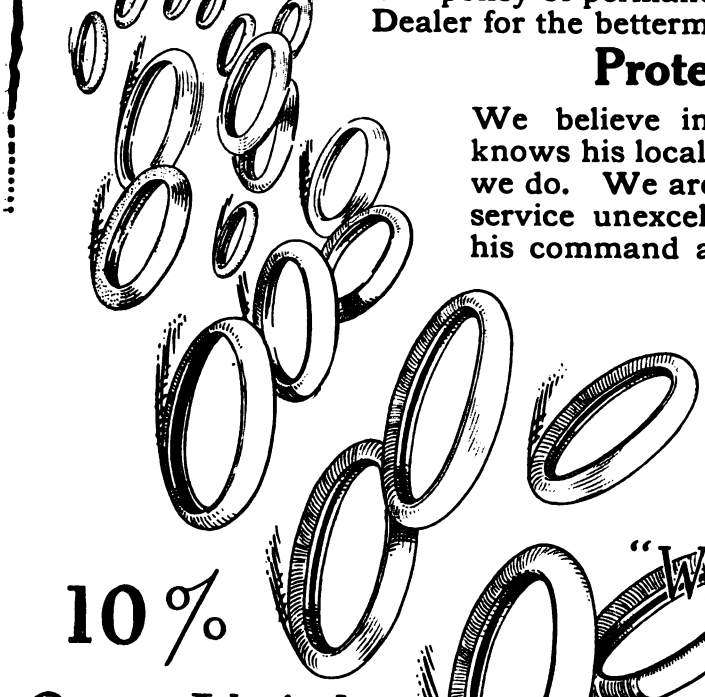
Protection and Profit

We believe in the local dealer---we feel that he knows his locality and the people in it better than we do. We are confident that he can give them service unexcelled---backed by our organization at his command at all times.

Do you want to represent a company which will do as they say and back their statements with a contract that cannot be duplicated?

Your District Needs A Cataract Dealer.

Meet us at the show—Space 241 C—let's talk the matter over and let's show you the goods.

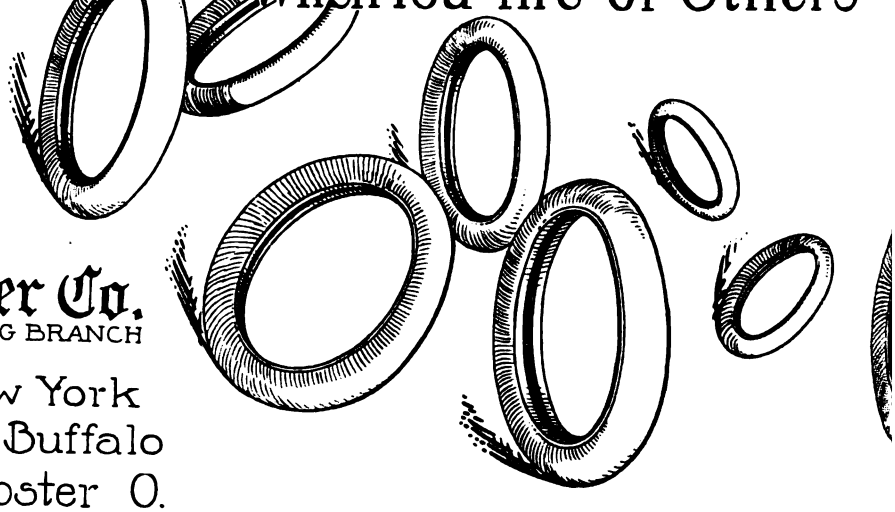


10%

"When You Tire of Others—

Over-Weight

All Quality



Cataract Rubber Co.

NEW ENGLAND DISTRIBUTING BRANCH
66 HEREFORD ST.,
Boston

New York

Providence

Buffalo

Factory - Wooster O.

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TIRES
Guarantee
MR. CAR OWNER

No item connected with the upkeep of your car is so momentous as your tire bill. You have tried them all---listened to all kinds of arguments---read lots of circulars---all with the same results---Poor tires---big bills.

As long as you run your car you will have to face the tire question. Why not turn over a new leaf and buy tires that are built right and perform right.

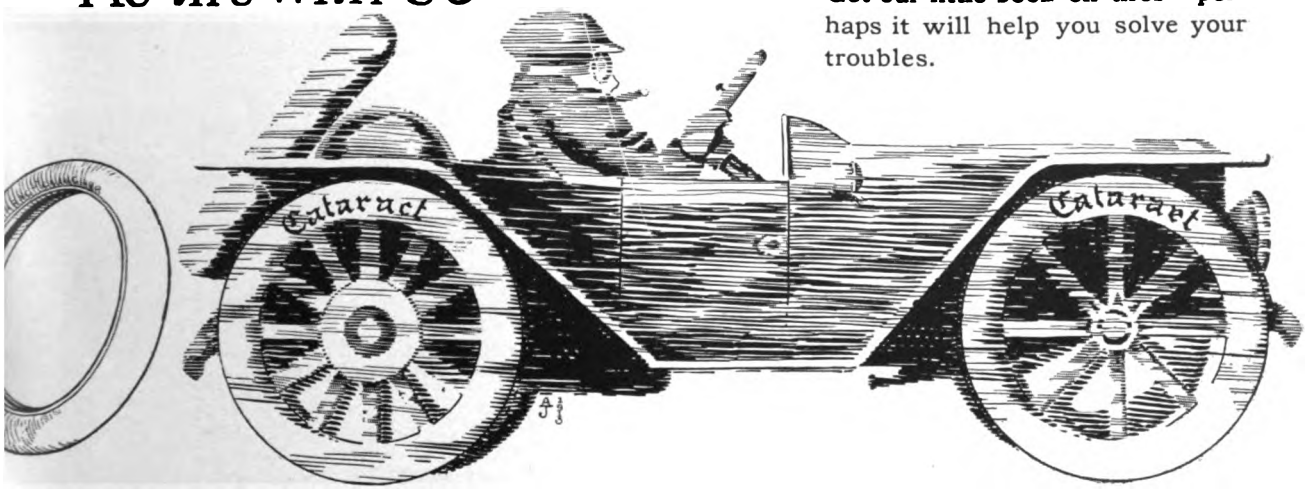
QUALITY TIRES

Cataract tires are produced from materials equaled by none on the market. Everything in their make up is of the best. It costs us more to produce Cataract Tires per pound than any other tires constructed in this country. They positively wear longer and give better service. BIG STATEMENTS BUT WE PROVE THEM.

4000 Mile Guarantee

Our goods are high quality goods built to give the best and longest service and for that reason we fear no guarantee---4000 miles we place on them, but read our testimonials and see what they have actually performed. Space 241 C is where you will find us at the Show. Drop in a few moments. Get our little book on tires---perhaps it will help you solve your troubles.

—Re-tire With Us"



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STOCK CHAMPION



Elgin victor—1911—last stock championship race held in America. Average 66.4 miles per hour. Entire race run without a tire change. Defeated cars of much greater cost.

National

Use Business Judgment in Buying a Car

DO you buy a motor car as you do theatre tickets? The old idea that you could not combine business judgment with pleasure in a motor car investment is wrong. You can if you get the right car. Buy something more than temporary enjoyment—buy a real tangible asset that will not only give you the desired pleasure and service, but still leaves you valuable property after the first, second and third season's work. Only a car of the National's quality can do this for you.

Money Cannot Buy Better Materials Nor More Elegant

Long stroke (4⅞ x6) flexible and noiseless Motor with enclosed valves.

Left Side Drive.

Center Control.

Gray & Davis Electric Starter, easily operated by simply touching a button with foot.

Gray & Davis Dynamo Electric Lighting System.

Bosch dual double Magneto.

12-inch Turkish Upholstery.

Full heavy nickel Trimmings.

Electric Horn.

Adequate Baggage-carrying Compartment concealed in body but easily accessible.

Powerful and reliable Brakes.

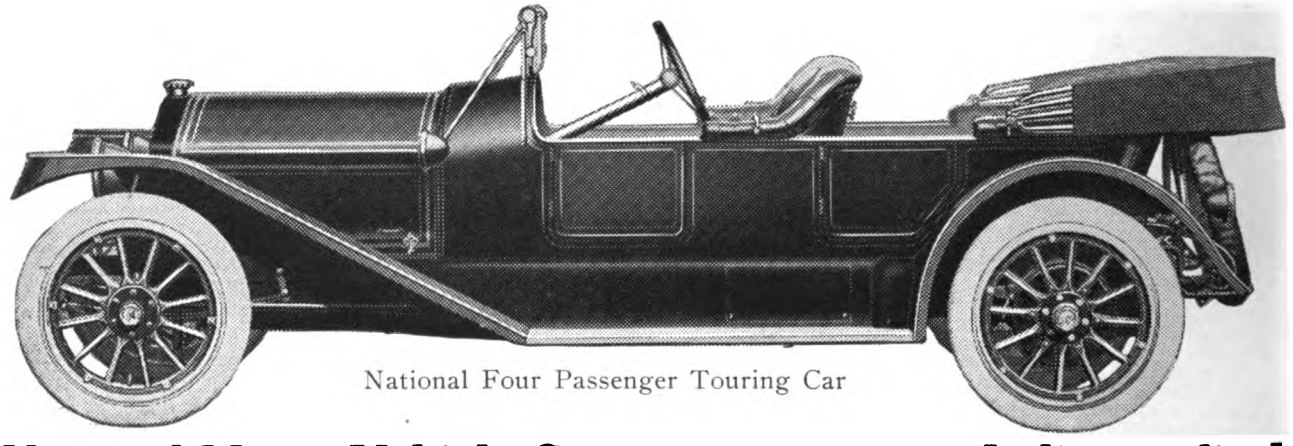
Spacious interior.

Tire Pump, integral part of motor. Inflates a tire in three minutes.

Truffault-Hartford Shock Absorbers on rear.

128-inch Wheel Base.

Gray & Davis 12-inch black and nickel bullet headlights.



National Four Passenger Touring Car

National Motor Vehicle Company, Indianapolis, Ind.

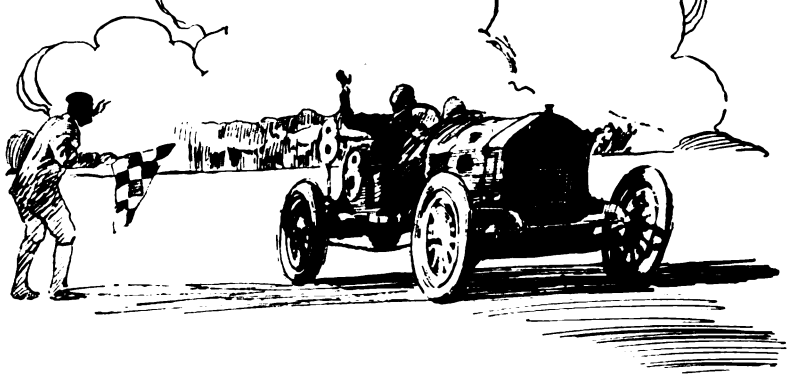
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National

You Ask—"How May I Know

THIS car equals the builders' claims?" Here IS a positive way, the only way in fact besides owning one yourself —Ask the owners of National cars what their experiences have been, and add to this the reputation of the builders of National cars for twelve years and you make no mistake. We will gladly supply you with letters of appreciation from National owners. Write us for a copy of "By Word of Mouth," a book of letters from private owners.

INTERNATIONAL CHAMPION

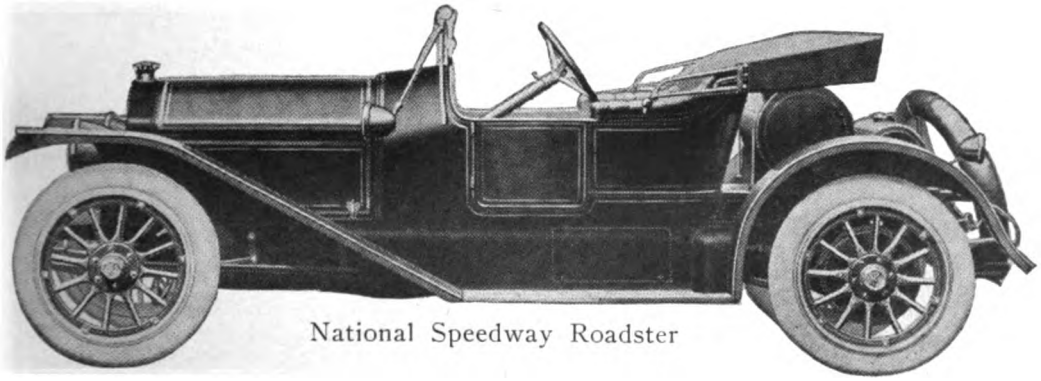


Fastest 500 miles ever traveled. Actua. running average 81.72 miles per hour—winning International Sweepstakes, defeating more costly American and European cars. Breaking previous record by 4.11 miles per hour.

nd Completely Equipped Car

Improved Series V. Five Models $2750 to $3400

Adjustable, ventilating and rain vision Wind Shield.
Multiple jet Carburetor.
Hoffecker steady-hand Speedometer.
Tire Carrier in rear.
Silk mohair Top, Cover and Curtains.
Full floating Rear Axle.
Resilient Springs, ¾ Elliptic in rear; Semi-Elliptic in front.
Large gasoline pressure-feed Tank with Gauge in rear.
Robe Rail and Foot Rest.
Foot Mat in Running Board.
Plain, continuous enclosed Metal Guards.
Easy riding qualities, unexcelled.
Oiling System, demonstrated to be only perfect Oiling System.
Tools and jack in box concealed by splash on running board.
One extra Firestone demountable rim.



National Speedway Roadster

SIGN, AND MAIL COUPON TODAY

National, Dept. A
Indianapolis.
Please send your catalog
Name .....
Address. .....

BOSTON, MASS.---W. H. Stevens, 1020 Boylston St.
SPRINGFIELD, MASS.---J. F. Whitaker, 22 Taylor St.
PROVIDENCE, R. I.---Peleg Brown Co., 83 Aborn St.
WORCESTER, MASS.---B. A. Lemont, 6 Tirrell St.
PORTLAND, ME.---F. A. Nickerson Co., 642 Congress St.

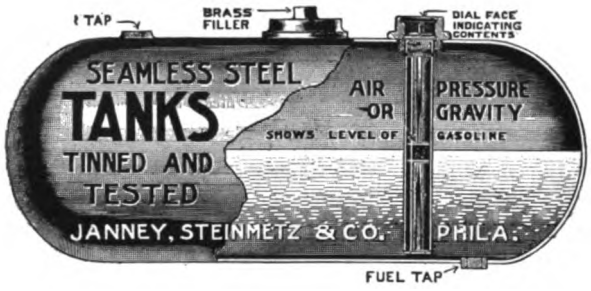
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GASOLINE & OIL TANKS

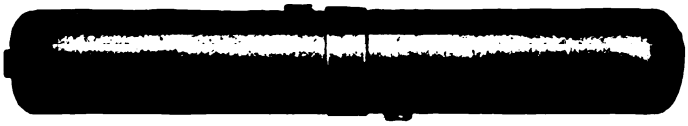
SEAMLESS TANKS

LEAKLESS TANKS

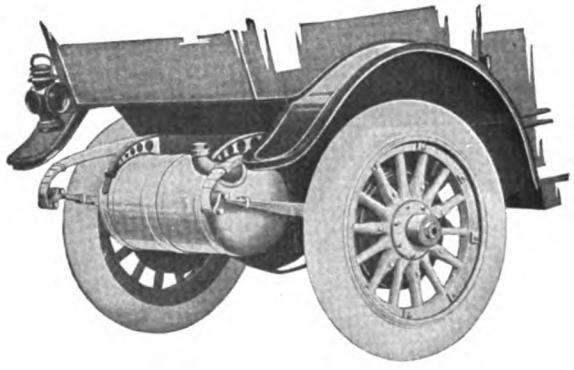
COMPARTMENT TANKS---GASOLINE CONTENTS INDICATORS



ALL SIZES---ALL MODELS BIG ONES AND LITTLE ONES



HIGH-PRESSURE AIR TANKS FOR MOTOR STARTERS



UNDER-HUNG PRESSURE FEED COMPLETE WITH FITTINGS, ETC. SQUARE, OVAL OR ROUND MODELS

JANNEY, STEINMETZ & CO.

PHILADELPHIA & NEW YORK

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Judge an Automobile

BY THE STARTER IT CARRIES

The surest indication of a *good* automobile is the fact that it is equipped with

GRAY & DAVIS

6 VOLT ELECTRIC STARTER

This is the best and most powerful Starter on the market. It is extremely simple, absolutely positive in operation and requires but a 6-volt battery. Spins heaviest engine 1½ hours. Starts any engine in zero weather.

The builders of *good* cars are particular about the equipment they buy. When you see the GRAY & DAVIS Starter on a car, you have visual evidence that it is a *good* car, because this Starter excels any other starting device.

Demand the GRAY & DAVIS Starter On the Car You Buy. ***See It at the Boston Show.***

GRAY & DAVIS, Inc., 55 Lansdowne Street Boston, Mass.

Manufacturers of Automobile Lamps, Dynamos and Electric Starters.

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AUTOMATIC IN ACTION Sager Shock Absorbers

60 DAYS' FREE TRIAL

Have proven for seven years to be mechanically correct; prevent recoil and bumping of springs. Saving of 40% on tires and machinery. Destroy all shocks of rough roads. Insure greater speed and at the same time greater comfort to car occupants.

ONE YEAR GUARANTEE

Regular equipment on Saurer, Stewart, KisselKar, Lippard-Stewart and Franklin Trucks.
ENDORSED BY THESE PROMINENT MANUFACTURERS:

OLDSMOBILE
"The 'Sager Device' presents advantages not found in other so-called 'shock absorbers.'"
OLDS MOTOR WORKS.

ELMORE
"We are entirely satisfied with them." ELMORE MFG. CO.

PIERCE-ARROW
"They make Pierce Cars ride like a cushion." S. K. PIERSON.

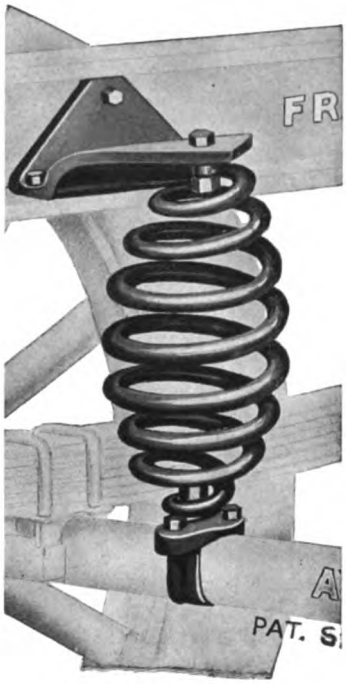
CRAWFORD
"They add greatly to comfort and reliability."
CRAWFORD AUTOMOBILE CO.

DORRIS
"Our customers are more than satisfied with them."
DORRIS MOTOR CAR CO.

RAMBLER
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"The success of your shock absorbers has interested us considerably."
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"We find them indispensable."
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"Sager Springs steady my Columbia wonderfully." W. B. LASHER.

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"Your springs make the car more substantial and easier to ride in, and make motoring a pleasure."
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"After trying a set of ———, and being sorely disappointed, I wish to say Sager Equalizers proved very satisfactory indeed."
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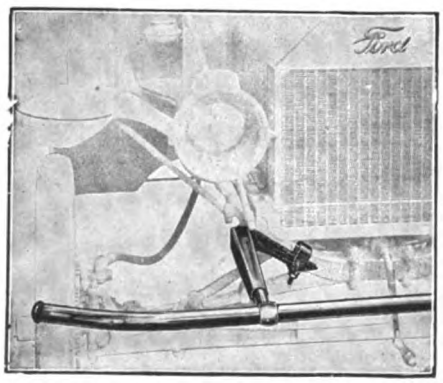
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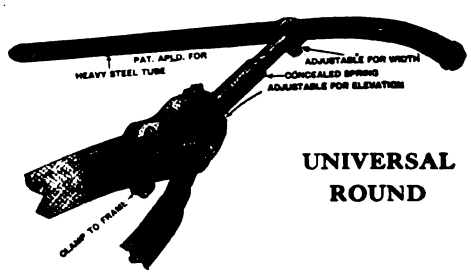
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Sager Bumpers Beautify a Car, also Save Expensive Repairs.

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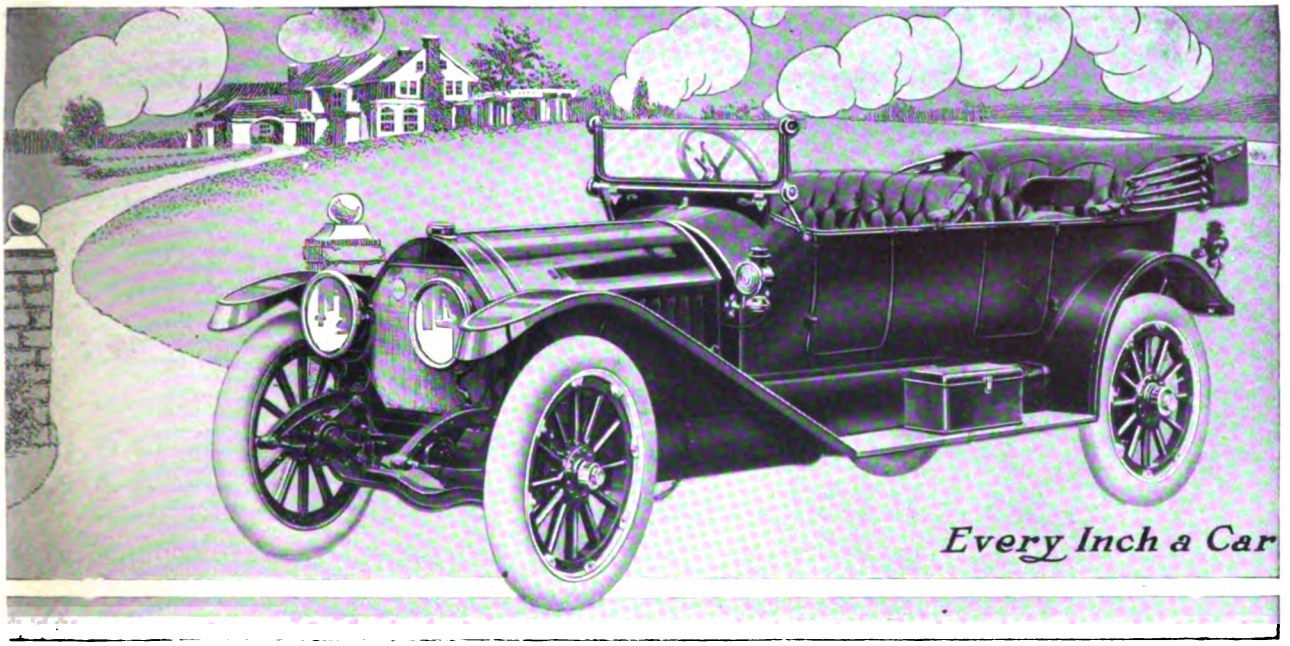
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J. H. Sager Company

271 South Ave., Rochester, N. Y.

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No other car has made such an impression on the industry as this $3150 KisselKar 60 H. P. "Six." This model has had much to do with the new trade-wide impetus toward sixes, and the readjustment of prices.

The KisselKar "Six" was early to disclose the effectiveness of manufacturing economies in producing the highest type automobile at from one to two thousand dollars less than the former price standards on six cylinder cars. It was the modern-priced "Six," and it set a new standard of value which the industry has accepted, and, while its price is approximated, it is still conspicuous because of advanced standards of comfort, roominess, flexibility and distinction.

KISSELKAR

The new favor of the "Six" is simply the appreciation of the smoothness of six cylinders—the steady stream of power obtainable only in a six-cylinder motor.

The generous wheelbase makes possible the roomy tonneaus and unusually deep seats, which give a new distinction and riding comfort to the KisselKar, and gives the car the perfect "balance" which makes it easy steering and "light on its feet" in picking the road.

Liberality of design extends to every part, providing bigger wearing surfaces and greater safety margin, which mean greater durability, and lower upkeep.

"Thirty"	$1700	"Forty"	$2000
"Fifty"	$2500	60 H. P. "Six"	$3150

Electric Lighted and Started—fully equipped and appointed.

Every KisselKar model offers a **distinctive** value, an advance standard of comfort, and an engaging individuality which belongs to the KisselKar exclusively.

1500 lb., 1, 1 1-4, 2, 3, 4, 5 ton Trucks, Delivery Wagons, Fire Department Apparatus, Hearses, Ambulances, Police Patrols, etc. Write for special truck catalog.

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KisselKar Service is supplied by the manufacturer through a national service organization, with specially equipped buildings as service-centers at principal points. The detailed care given every KisselKar, both pleasure model and truck, sets a new standard of obligation assumed by the manufacturers.

Write for KisselKar catalog, illustrating all models. It will give you a new standard for comparison, and aid you in judging automobile values.

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Opens Saturday Evening, March 8th, at 8.
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Our Average Profit $2.90 per Tire

Goodyear tires sell all the way from $15.55 to $104.95, according to size and type.

The most popular size—34x4—costs from $32.95 to $37.90, differing with type and treads.

And our average profit on all these tires last year was exactly $2.90 per tire.

This is why we tell you:

The worth of a tire depends, in large part, on what the maker puts into it.

Tires may be made at half our cost, yet the cost per mile is greater.

Tires may be skimped to increase factory profit, but the skimping shows up in your tire bills.

The best way to show what you get in the Goodyear is to state our profit, probably.

That's why you get tires built as we build them for what the Goodyears cost.

That's why, at this price, you get tires that can't rim-cut—tires 10% over the rated size.

That is why No-Rim-Cut tires, on legions of cars, have cut tire bills right in two.

And that is why Goodyears have come to outsell every other tire in existence.

We are the world's largest tire builders, yet our capital is only $10,000,000. We have no bonded debt.

Our mammoth output and our modern methods bring making cost down to the minimum.

What we save in these ways goes into tire mileage. And the meters on countless cars are showing what this means to users.

That's the only reason why our last year's sale exceeded the previous 12 years put together.

Write for the Goodyear Tire Book—14th-year edition. It tells all known ways to economize on tires.



THE GOODYEAR TIRE & RUBBER COMPANY, AKRON, OHIO

Branches and Agencies in 103 Principal Cities—More Service Stations than any other tire
We Make All Kinds of Rubber Tires, Tire Accessories and Repair Outfits
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The dealer who handles United States Tires benefits his customers by cutting down their tire bills.

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NOTE: As always the guarantee of the United States Tire Company attaches to its tires when filled with air at the recommended pressure only.

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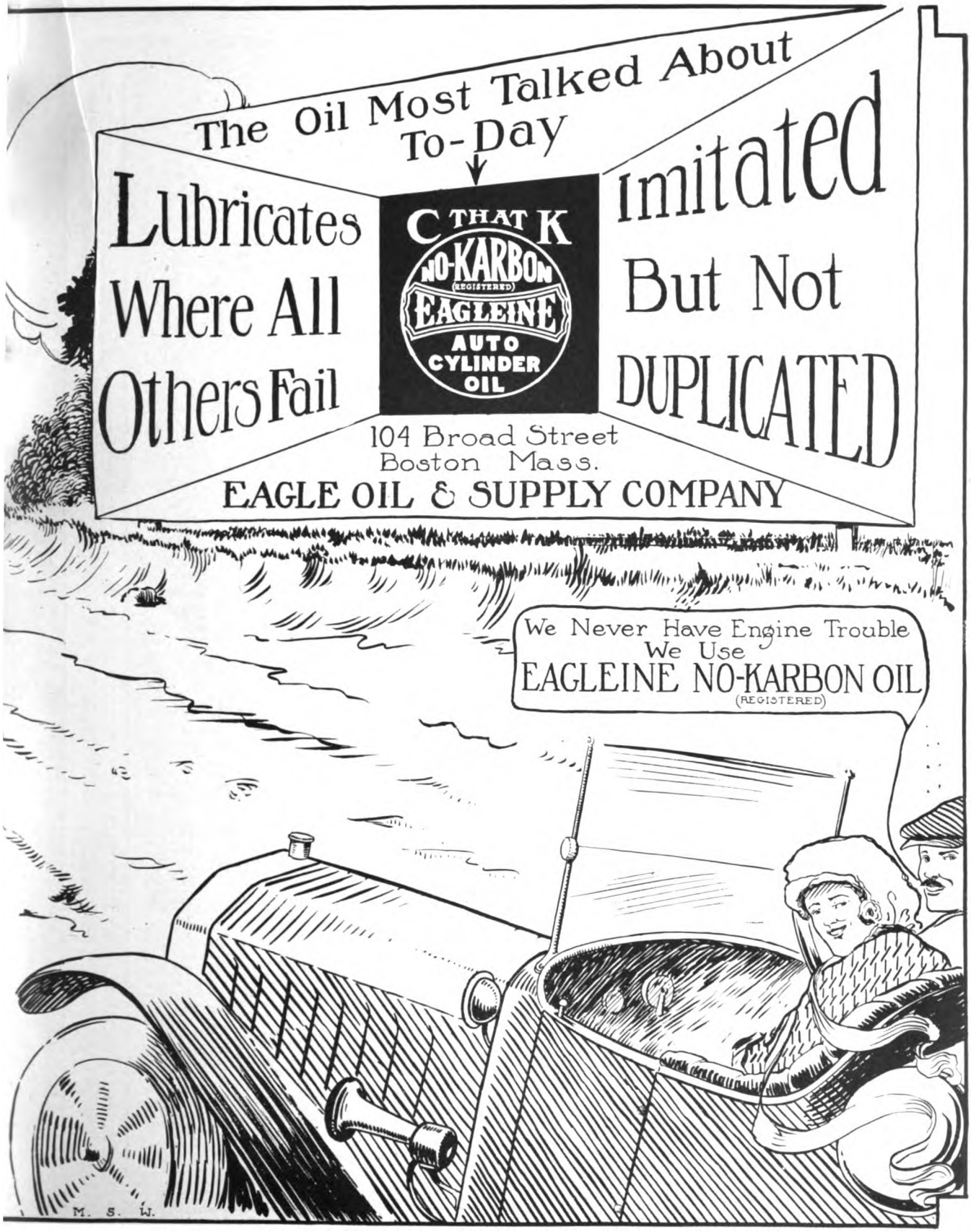
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The oil that gave me 10000 miles
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The Oil That Suits and Does Not Soot

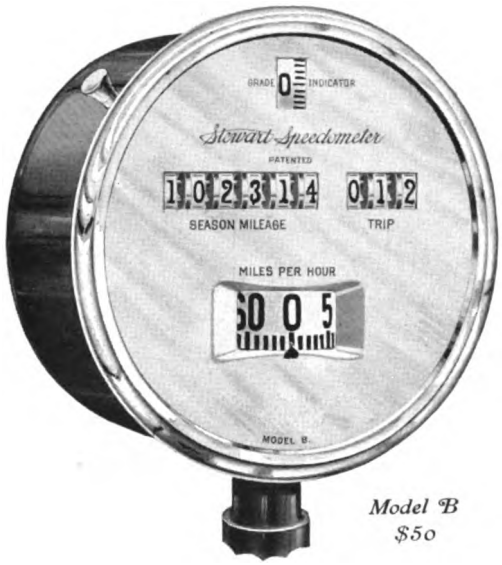
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Stewart Speedometer

MAGNETIC PRINCIPLE



Model B
$50

The Stewart Speedometer is built on the *magnetic* principle.

Two hundred and one out of two hundred and seven automobile manufacturers equip their cars with the *magnetic* speedometer.

Which is absolute evidence that the magnetic principle is the only practical one and proof that the Stewart is giving absolute satisfaction to users of motor cars.

Permanent service stations in all principal cities.

(Stewart Speedometer Factory, Chicago, Ill.)

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Rust eats tires; rusty rims increase tire trouble and expense



Outside tire protectors save you from most tire troubles; not from one of the worst: iron rust.

You can see for yourself how these destructive rust flakes on your rims have rotted the rubber in your casings. That's not all they do. They "freeze" the tire to rim or to the bolts of your demountable; make tire changes much harder work.

You can prevent all this; you can keep the rims from rusting; make tire changes easier, save money and trouble by painting your rims twice a season with

THOMAS' ANTI-RIM-RUST PAINT

This is a scientifically-compounded metallic paint, containing para rubber and graphite. Besides its wonderful usefulness in preventing destructive iron rust and making tire changes easier (especially when used on the rim bolts and lugs of motor trucks), it makes a lasting and efficient lubricant for spring leaves.

Get a can today from your dealer; if he is out of it, send one dollar to us; brings you full-sized can—enough for eight rims.

To Dealers

Thomas' Anti-Rim-Rust Paint will be a fast-moving item in your stock; all car owners will ask for it. Discounts are extremely liberal. Drop us a line if your jobber can't supply you.

The Anti-Rust Paint Company

Dept. 7, Akron, Ohio

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$985
F. O. B. Toledo
Completely Equipped

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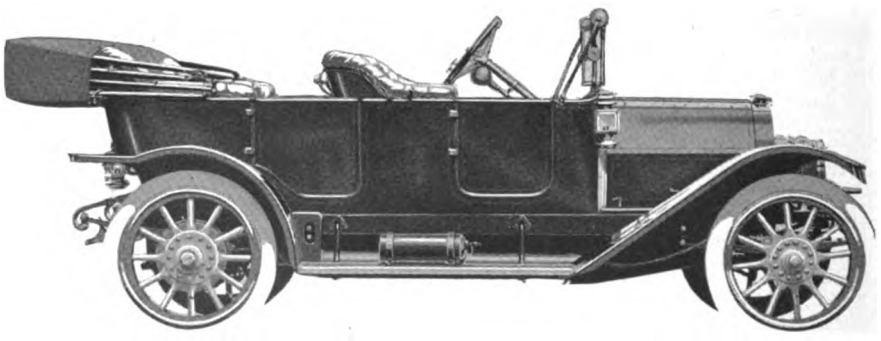
ONE Overland dealer alone will handle 4000 cars during 1913. This is as many cars as 90 per cent of the American factories make in a year.

Whenever you find the greatest demand you can depend on getting the greatest value. Remember that our entire 1913 output of 40,000 cars has already been bought or contracted for.

Catalogue on request. Please address Dept. 52.

The Willys-Overland Co.

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The Brake Lining which serves best through its reliability



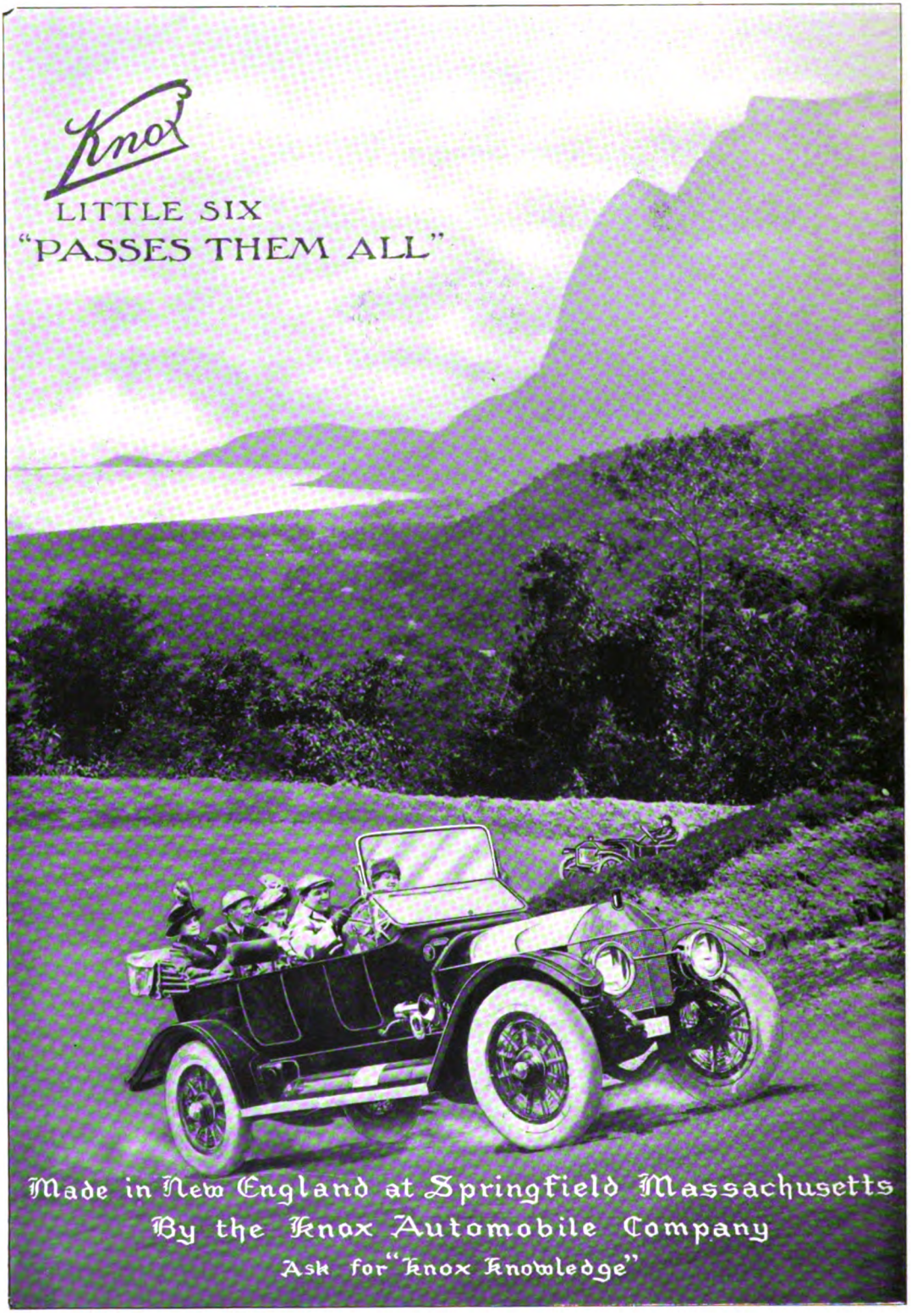
Safeguard yourself against dangers by using THE RIGHT BRAKE LINING—the one which always wears and brakes evenly and equally—which in its solid texture, powerful grip and flexible action is your guarantee of the greatest SAFETY IN DRIVING.
Be sure your brakes are equipped with MULTIBESTOS, "The Brake Lining of Quality."
If your dealer doesn't have the size in stock, write us. Give us his name also.
Send for book "Safe Within the Grip of Multibestos."

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The 8-DAY HIGH GRADE } **"BOSTON" AUTO CLOCKS**

☞ These superbly built 8-day, high-grade clocks have seven-jeweled escapements, Breguet hairsprings, cut steel pinions, compensation balances, dust and water proof cases, etc., and are dealt in and used by those demanding a first-class article.

QUALITY and PRICE — UNAPPROACHABLE

Ask Your Dealer for the "BOSTON" AUTO CLOCK

MODEL B



MODEL C



Adjustable to various angles by Ratchet and Nut at back. In general appearance it closely matches many makes of speedometers.

MODEL D



MODEL E



PRICE LIST— PER CLOCK	SIZE (Dial)	MODELS A, B, C.	MODEL D	MODEL E
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	3 1-2-inch . . .	20.00	24.00	27.00
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For (Patent Applied for) Outside Stem Winding and Stem Setting Device, ADD $3.00 to above prices.

Superior to other devices. A great convenience for winding clock and setting the hands without opening the clock case.

☞ All sizes stated are the approximate diameters of the dials

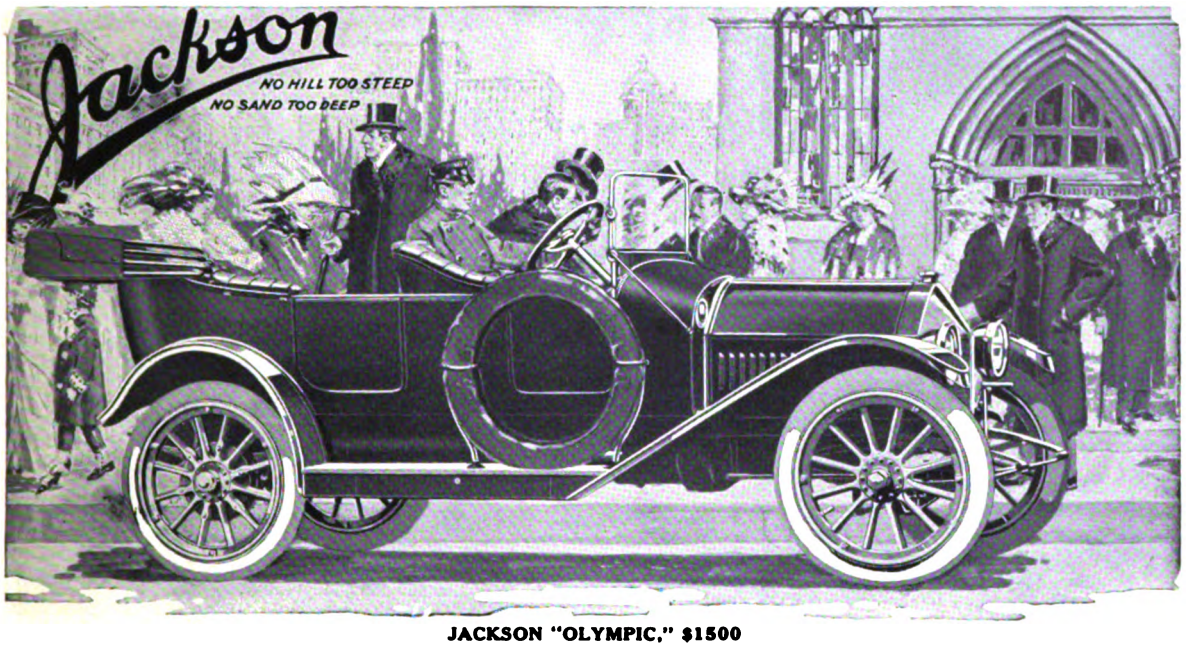
The 8-Day High Grade } **"BOSTON" AUTO CLOCK** { For AUTOMOBILES and MOTOR BOATS

On Sale By Leading Jobbers and Dealers.
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JACKSON "OLYMPIC," $1500

Thirty-five horse power, unit power plant; four cylinder, long stroke motor—4⅛x4¾ inches. 115-inch wheel base; 34x4 inch tires. Full elliptic springs, front and rear. Deep, roomy body, with 10-inch upholstery. Gasoline tank under dash, supplied from storage tank at the rear, with pressure pump. Total capacity, 20 gallons. Complete equipment, including Disco Self-Starter, mohair top, top hood, ventilating wind shield, speedometer, oil and gasoline gauges on dash. Prest-O-Lite tank, with automatic electric lighter. Firestone universal quick detachable demountable rims, extra rim, tire carrier, robe rail, foot rest, pump, jack, tire outfit and tools. Trimmings, black and nickel. Electric starter and lights, optional, at an extra cost of $225.

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Three models constitute the Jackson line for 1913—two four and the splendid new six.

Each is fitted to combat competition in the most telling way—competition in comfort, in ease of riding, in size and power—in everything that influences the buyer.

With three price figures—$1500 for the "Olympic," $1975 for the "Majestic" and $2650 for the "Sultanic" six—the dealer has another mighty weapon at hand.

Each model is equipped with a self-starter—Disco for the "Olympic"; and electric for the other two, with electric lighting systems as well.

But we do not stop there.

We help the dealer by advertising the comfort, convenience, riding ease and silence of Jackson cars in a big, generous way all over the country in the biggest and best national advertising mediums and in the metropolitan newspapers.

In other words, having given the dealer cars he can sell against anything in the market, we help bring prospects to his door.

The attitude of present Jackson dealers is interesting and enlightening.

They are all enthusiastic over the 1913 line.

Every one of them has increased his quota; because every one of them saw the wonderful sales possibilities in the new line.

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Most of these men have sold Jacksons for years. Some of them have grown up with the Jackson.

They are men of experience and good business instinct. And with unanimous approval they accept the new Jacksons as the best selling line we have given them.

Dealers who are interested should not delay getting in line for the big spring business ahead of the Jackson.

Jackson "Majestic," $1975

Forty-five horse power, unit power plant; four cylinder, long stroke motor, 4½x5¼ inches; 124-inch wheel base; 36x4 inch tires. Full elliptic springs, front and rear. Deep, roomy body, with 10-inch upholstery. Electric starting and lighting system, dynamo and storage battery. Equipment of mohair top, top hood, ventilating wind shield, speedometer, oil and gasoline gauges on dash, Firestone universal quick detachable rims, extra rim, tire carrier, electric horn, robe rail, foot rest, pump, tire outfit and tools. Black and nickel trimmings.

Jackson Automobile Company, 1203 East Main Street, Jackson, Michigan

BOSTON SHOW, MARCH 8-15.

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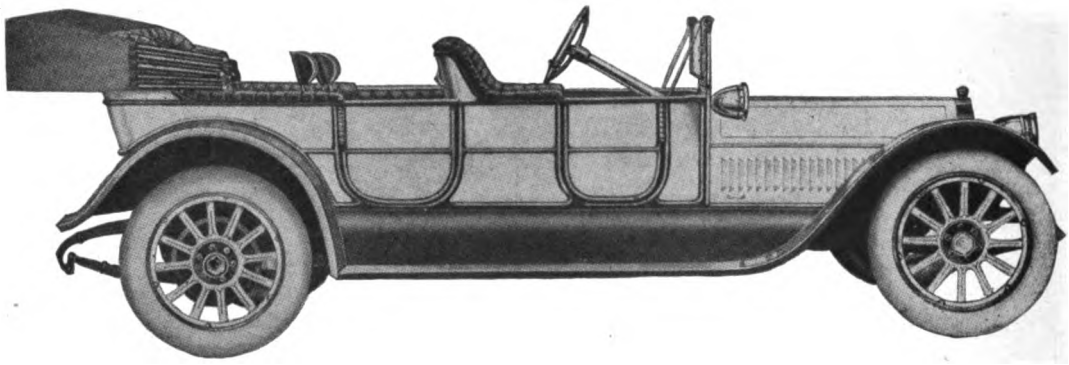
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We will (at small extra cost) furnish our Regular Models with the

AUSTIN

Two-Speed Axle

This axle provides two different gear ratios, both on direct drive, and in combination with a three-speed transmission gives six speeds forward and two reverse.



Model "77" has a Regular Direct Drive of 3 1-2 to 1, and a Special Direct Drive of 2 to 1.
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The Regular Direct Drive provides ample power and exceptional ease of control for hills, bad roads and crowded city traffic.

The Special Direct Drive for normal conditions, shows a gain of over 50% in mileage for the same fuel consumption and motor speed, eliminates the noise, wear and tear of running the motor at excessive speeds, adds materially to the life and durability of the car and pleasure of riding.

Model "77" Six Cylinders, 4 1-2 x 7 - - $6000.00
Model "66" Six Cylinders, 4 1-2 x 5 1-2 - $5000.00
Model "55" Six Cylinders, 4 x 5 - - - $4000.00

MORE NEW, IMPROVED and **DISTINCTIVE FEATURES** than any other car. Two-speed rear axle, high pressure air self-starting system, complete electric lighting system, left hand steer, center control, two-spark magneto, four-speed transmission, both brakes controlled by foot pedals, and our special nine passenger body.

Write for complete description and any information you may desire in regard to our two-speed axle.

Austin Automobile Company

GRAND RAPIDS, MICHIGAN

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is a PURE oil. It is distilled from Pennsylvania crude. It is filtered. It has a HIGH GRAVITY, and it is freer from carbon than any other oil made.

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SPLITDORF MAGNETOS are the most EFFICIENT because they are "always there with the goods."

Fundamentally correct, the low tension system is manufactured on a scale of thoroughness and perfection sponsors of the finished cars require.

No stone is left unturned to make this ignition unit dependable at all times for a hot, fat spark the racer demands and the tourist desires.

SPLITDORF MAGNETOS are the most economical because they are the most RELIABLE.

Self-starters are hardly necessary with SPLITDORF equipment, because you are always able to throttle down to a snail's pace with the positive certainty of starting on a quarter turn under all conditions.

Minor structural changes give the latest SPLITDORF models a more compact appearance—their reliability is guaranteed.

The non-vibrating "T S" SPLITDORF COIL—the latest and most finished of all types of coils, is notable in that it is equally effective with all the newer, as well as older models of the famous SPLITDORF low tension system.

Its neat appearance on the dashboard, with kick switch, ignition button for battery connection and lock and key for the whole operation, is only in keeping with its real effectiveness and durability.

SPLITDORF IGNITION devices are guaranteed for their efficiency---PLUGS, SPLITDORFLITE electric lighting generator as well as MAGNETOS and COILS. We will gladly shoulder all responsibility for a change over to our superior system.



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Still The Car

By R. E. Olds, Designer

Consider this:

After 26 years spent in car building—

After 62,000 of my cars have been run—

Reo the Fifth, my latest model, still stands at the top of its class.

Say what you will about my over-caution—

My analyzed steel—

Machine-tested gears—

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Tests and inspections.

About all the extremes which cost me, I judge, about $200 per car.

This fact remains:

There is a greater demand for cars of my building than ever before in my history.

For nearly two years, the demand for Reo the Fifth has averaged twice our factory output.

And you know the fate of many a car which wasn't built like this.

This New Car

Has a center control which is very unique and convenient—

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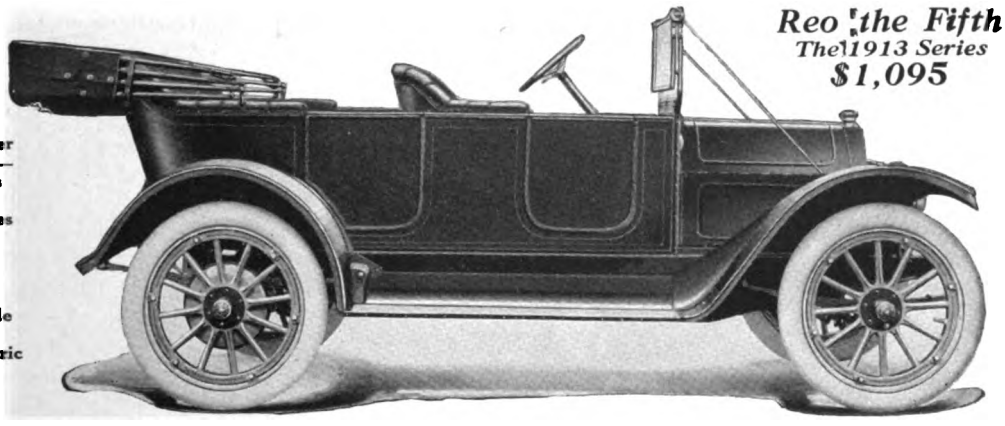
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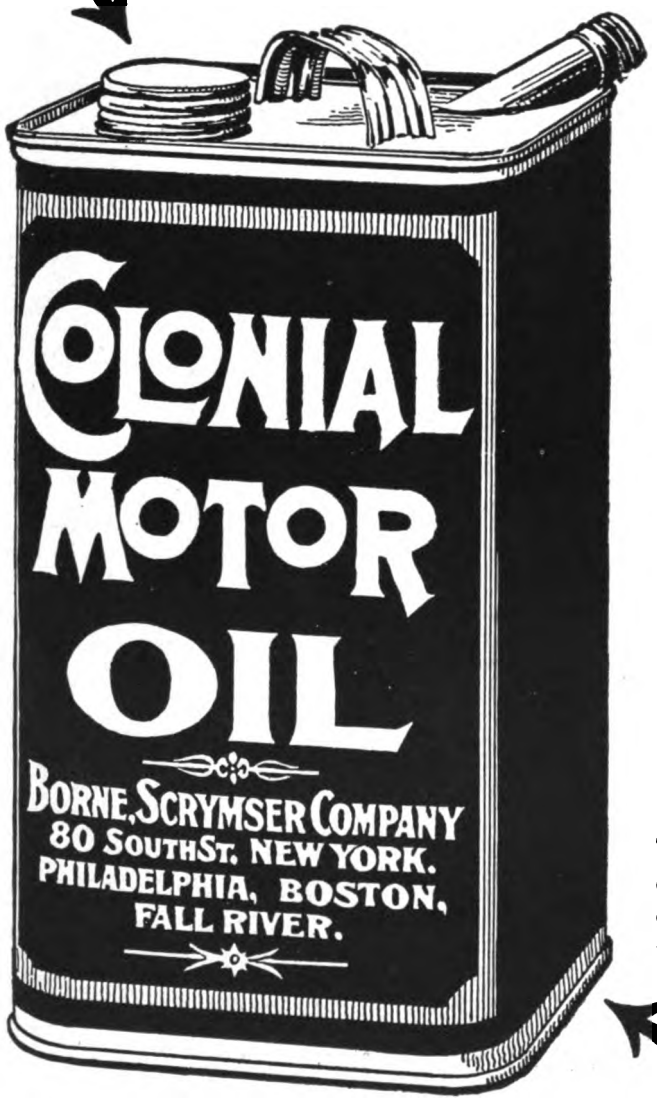
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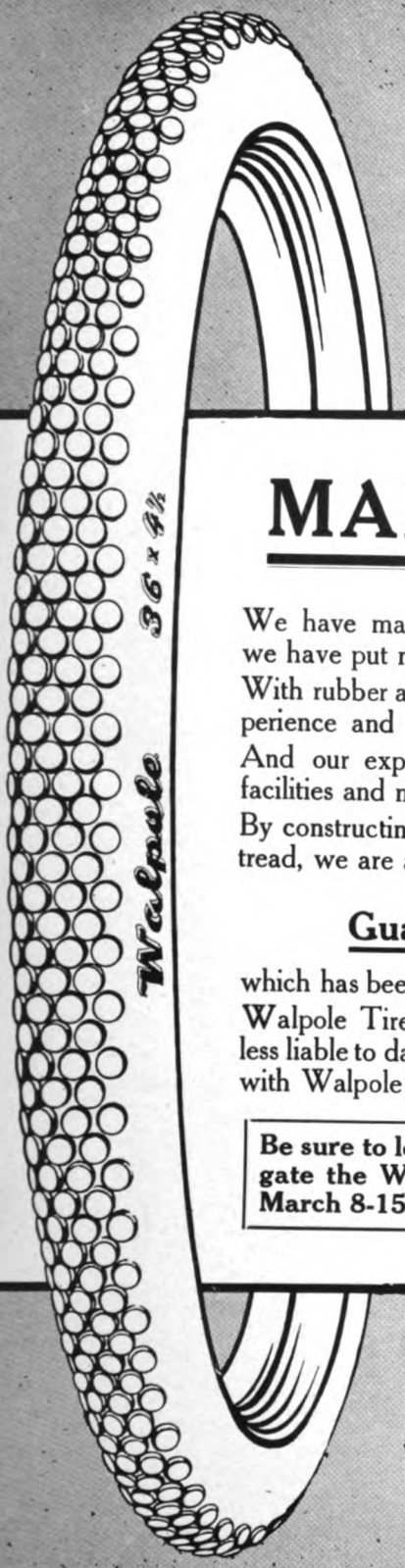
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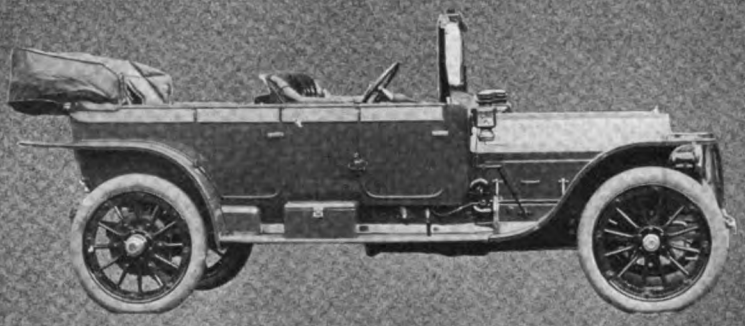
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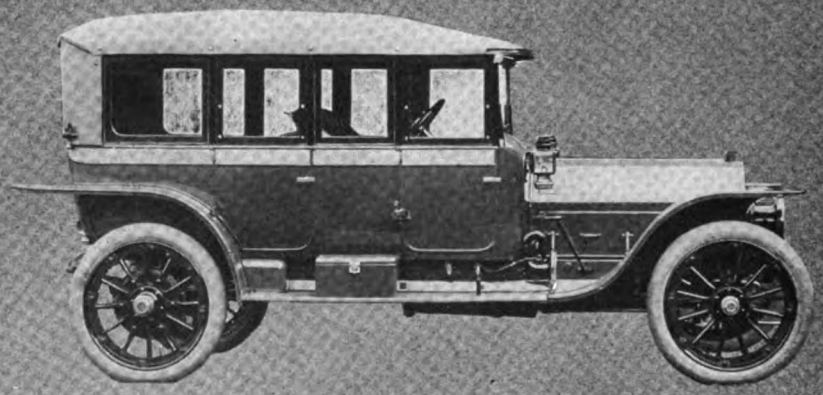
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Index To Advertisers

Abbott Motor Co..... 10
American F. N. Company..... 93
Anti-Rust Paint Co..... 51
Austin Automobile Co..... 58

Barrett Manufacturing Co..... 99
Beach Co., T. C.....106
Bi-Motor Equip. Co..... 69
Borne, Scrymser Company..... 62
Bosch Magneto Company..... 11
Boston Automobile Dealers' Ass'n. 44
Boston Clock Co..... 56
Boyd, F. Shirley..... 71
Bretz Company, The J. S..... 32
Buckeye Manufacturing Co.....106
Burn-Boston Bat. & Mfg. Co....105

Cameron Mfg. Co..... 14
Cartercar Company 31
Cataract Rubber Co.....34-35
Coes Wrench Company..... 16
Cole Motor Car Company.....108
Croxton Motor Car Co., The.....102
Cutter, Geo. A.....108
Cutting Motor Car Co..... 24

Dean Electric Company.....Cover
Dixon Crucible Co., Jos.....103
Dover Stamp. & Mfg. Co..... 55

Eagle Oil & Supply Co.....48-49
Eberly & Orris Mfg. Co.....105
Edwards Mfg. Co.....103
Edwards Motor Car Co..... 15
Eisner-Lenk Co..... 22
Emblem Manufacturing Co..... 89
Empire Automobile Co.....106
Englebert Tyre Co..... 13

Federation Amer. Motorcyclists. 89
Firestone Tire & Rubber Co....104
Fisk Rubber Company..... 20
Frontier Specialty Company.....104

Gaulois Tire Co..... 25
Geiszler Bros. Storage Bat. Co.104
Goodnow Mfg. Co.....106
Goodyear Tire & Rubber Co..... 45
Gray & Davis, Inc..... 39
Gray Specialty Co.....108

Harris Oil Company, A. W..... 33
Haws, Geo. A.....102
Hawthorne Mfg. Co.....104
Haynes Automobile Co.....104
Henderson Motor Car Co.....Cover
Herreshoff Motor Co.....107
Hoffecker Company, The..... 30
Holtzer-Cabot Electric Co..... 21
Hopewell Brothers.....108
Hotel Lenox.....103
Hupp Motor Car Co.....106

Ideal Motor Car Company..... 18
Indian Refining Co.....102
Invader Oil Co..... 59
Invincible Tire Co.....107

Jackson Automobile Co..... 57
Janney, Steinmetz & Co..... 38
J. M. Shock Absorber Co.....104
Johns-Manville Co., H. W.....106
Jones Speedometer Company.... 19

Keeton Motor Car Co.....2-3
Kissel Motor Car Company..... 41
Knox Automobile Company..... 54
K-R-I-T Motor Car Co.....104

Leavens & Co., William.....104
Lenox, Hotel.....103
Lenox Motor Car Company.....6-7

Marburg Bros.....103
McVey Mfg. Co.....106
Mea Magneto.....103
Mercer Automobile Company.... 67
Miami Cycle & Mfg. Co..... 91
Michigan Motor Car Co.....107
Miller, Chas. E.....Cover-42-43
Milwaukee Auto Spec. Co.....108
Moller Brothers Controller & Economizer Co.....102
Mosler & Co., A. R.....108
Motor Truck..... 26

National Motor Vehicle Co....36-37
New Departure Mfg. Co..... 28
Nordyke & Marmon Co.....4-5
N. Y. & N. J. Lubricant Co..... 27

O-Tak-A Tire Remover Co.....101
Owen & Co., R. M..... 61

Paige-Detroit Motor Car Co....106
Perfection Spring Co.....105
Pilot Car Sales Co.....106
Planhard Mfg. Co..... 23

Randall-Faichney Co.....102
Rath Co., Inc., Chas. H.....103
Remy Electric Company.....105
Reo Motor Car Company..... 61
R. I. V. Company..... 71
Royal Equipment Co..... 47

Sager Company, J. H..... 40
Selden Motor Vehicle Co.....104
Shaler Co., C. A..... 17
Speedwell Motor Car Co.....108
Splitdorf Electrical Co..... 60
Springfield Metal Body Co..... 64
Standard Co., The.....107
Standard Oil Company.....104
Standard Welding Co.....105
Standard Woven Fabric Co..... 53
Stewart-Warner Corp.....29-50
Studebaker Corporation..... 12
Stutz Motor Car Co..... 18
Sumner, George, Inc.....103
Swenson, B. A..... 93

Texas Company, The.....8-104

United States Tire Co..... 46

Vacuum Oil Co.....Cover
Valvoline Oil Company.....102

Waite Auto Supply Co..... 65
Walpole Tire & Rubber Co..... 63
Warren Motor Car Company....106
Weed Chain Tire Grip Co..... 9
White Co..... 72
Willard Storage Battery Co..... 1
Willys-Overland Company..... 52

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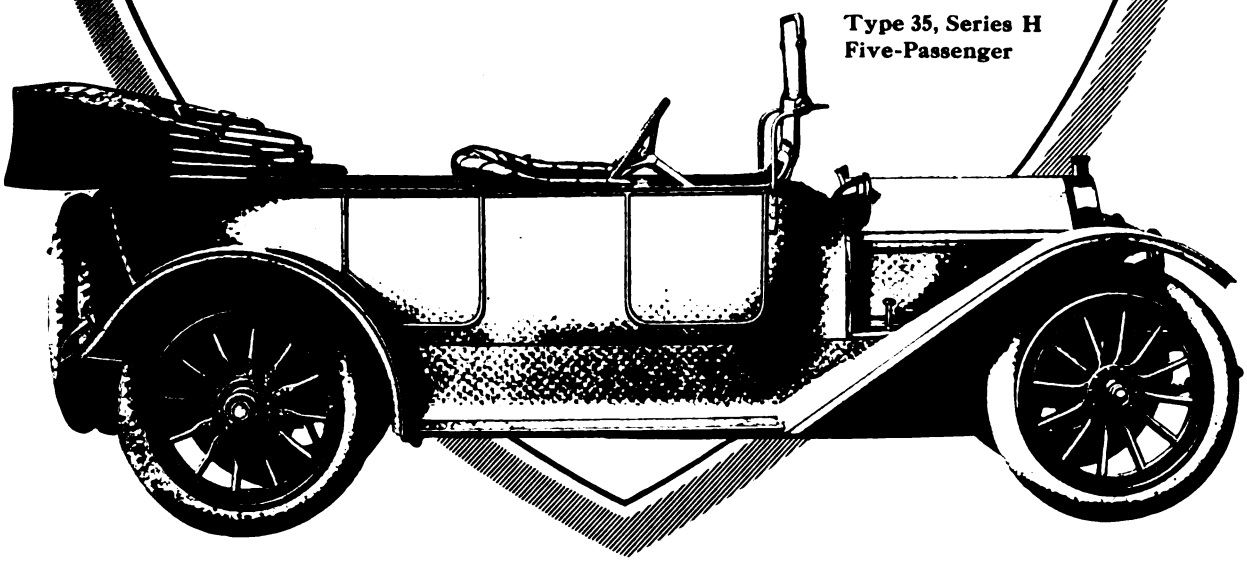
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	Page
*The Biggest and Best Boston Show	1
Exhibitors at Annual Boston Show	7
The Fully Equipped Car	9
*Motor Starting and Lighting Batteries	10
*Mechanical Notes for Owners—	
A Starting Suggestion	16
Care of Tire Chains	16
Graphiting the Rims	16
Vulcanizing Inner Tubes and Tires	17
*Correspondence with the Reader—	
Flexible Couplings	18
Ford Transmissions	19
Imperial and U. S. Gallon	19
The Metric System	19
Renovating Timer	19
Parts for Parry Cars	19
Bore-Stroke Ratios	19
Editorials—	
The Boston Show	20
Concerning Registration Fees	20
The Automobile Show Situation	21
*Automobile Aids Surgery	23
*New and Novel Accessories	24
*News of the Industry—	
Holland with Detroit Electric	28
Re-Elects Old Board	28
New Truck Concern	29
To Produce Hoff Car	29
Added Manufacturing Facilities	29
Is Purchasing Agent	29
Factory Addition Completed	30
Goodyear Interests Involved	30
Capt. Lewis Resigns	30
Pneumatic Tires Unnecessary	31
Streator Plant Reopened	31
Responsible for Lenox Sales	31
*1913 Pleasure Car Specifications	32-65
Taunton's Second Show	65
Visit of British Engineers and Makers	66
Coming Events	67
To Standardize Rims	67
*Buick as Motor Sleigh	67
*Principles of Motor Starting Systems	68
Automobile Club Holds Tests	75
Selling National Cars	75
*Many Successful Dealer's Shows—	
Two Buildings Necessary in Toronto	76
Tri-City Automobile Show	76
Brooklyn Display Successful	77
Many Contracts at Albany	77
New Cars at Pittsburg	78
Third Annual in Elmira	78
Sales in New Orleans	79
Attendance in New Haven	79
Big Show in Omaha	79
Portland's Second Show	80
Topeka Dealers Successful	80
Ten Days in Cincinnati	80
An Attractive Setting	81
Miller's Parcel Post	81
*The Garage and Repair Shop—	
Making Distributor Terminals	82
Soldering Aluminum	82
Hardening Lathe Centres	82
A Pattern Hint	82
Improper Use of Reamers	82
*Garage and Repair Shop Equipment—	
Vulcan Drop Forged Clamps	83
Ingersoll-Rand Compressor	83
Taps and Dies	83
*Racing vs. Touring Contests	84
*Opens New York Branch	85
*Value of Proper Focal Adjustment	86
*Activities of Motorcyclists—	
Jacob De Rosier Passes On	88
Planning Joint Tour	88
Motorcycle Vacation Trip	88
Co-Operating with Rural Drivers	89
In Memory of Col. Pope	89
Providence Club's Annual Banque	89
New Merkel Buildings	90
Pope to Add New Building	90
Middletown Club Opens Season	90
Douglas Visits Indian Chief	92
Additional Merkel Distribut	92
Yale Proves Economical	92
The Sturdy Emblem	92
More Than 20,000 Members	93
Latest F. A. M. News	93
New Department Heads	93
Will Hold 24-Hour Run	93
*Activities of Manufacturer and Dealer	94
*Aggressive Sales Campaign	96
The Exhibit in Concord	96
*Lighting the Car by Battery System	97
Packard Claims Record	101

*Indicates that article is illustrated.

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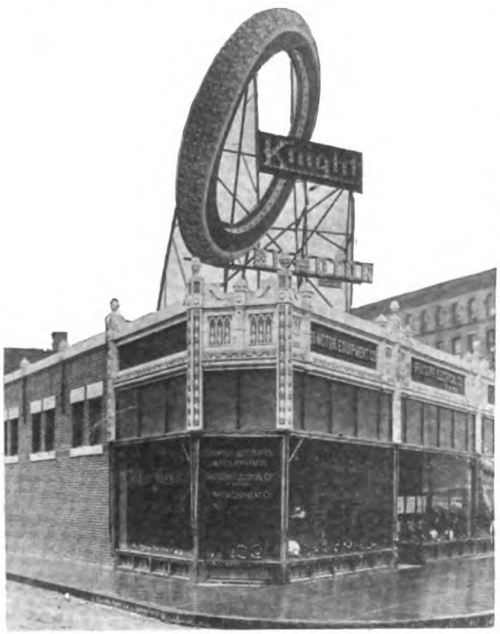
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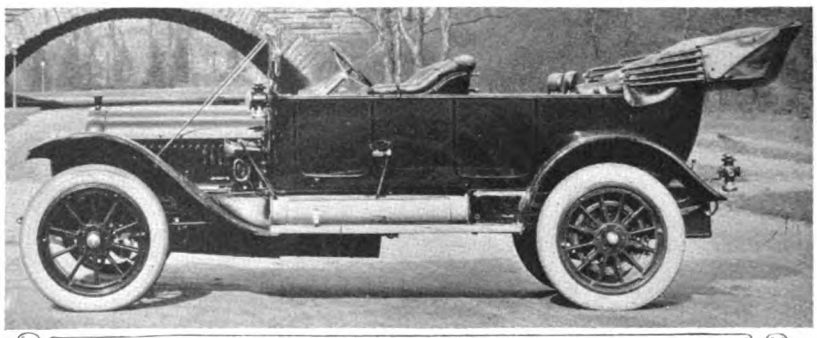
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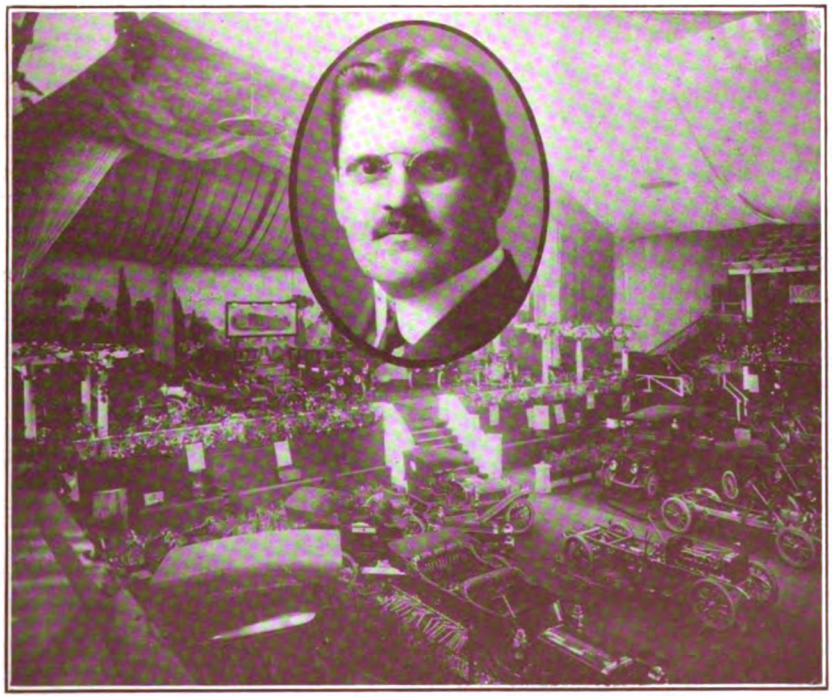
THE AUTOMOBILE JOURNAL

VOL. XXXV, No. 3 MARCH 10, 1913 Price, $1.00 the Year

THE BIGGEST AND BEST BOSTON SHOW.

A Dealer's Exhibition That Exceeds All Others in Business Transacted--How Manager Campbell Stages America's Greatest Automobile Display.

WHEN any enterprise has achieved a reputation that can be regarded as placing it in a superior position, it becomes necessary to put forth even greater efforts in order to retain that supremacy. The annual display of the Boston Automobile Dealers' Association has long been conceded the biggest and best show of the year — biggest in number of exhibitors and in attendance, and best in the matter of business transacted. It follows that every effort has been put forth to make the 11th annual Boston show for pleasure cars, which opened in Mechanics' building for one week, March 8, bigger and better than ever before. The separate exhibition of business vehicles will take place amid the same surroundings, March 19-26, under the auspices of the Boston Commercial Motor Vehicle Association. Chester I. Campbell is manager of both displays.



Interior of Grand Hall, Mechanics' Building, During the Progress of the Fifth Annual Boston Show, 1907—Insert, Chester I. Campbell, General Manager of All the Boston Dealer's Displays.

Although the present show is announced as the 11th annual event, this is somewhat in the nature of a misnomer. The first showing of horseless carriages in America was in connection with the Mechanics' fair in Boston in the fall of 1896. There were three

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Display of Steam, Electric and Gasoline Cars in Symphony Hall, During First Annual Boston Show, March, 1903.

vehicles, one propelled by steam, a second by gasoline and the third an imported tricycle. They formed a portion of the bicycle exhibit in the basement of Mechanics' building. Two years later, for the Mechanics' fair was held only every alternate year, another showing of horseless carriages was made under similar auspices and the number on display was increased to five or six.

It will be remembered that the first showing of automobiles in New York City was in the fall of 1899, this also being held as a section of the annual bicycle exhibition in Madison Square Garden. The following year the first national automobile show was organized and held in that building. There does not appear to have been any Boston automobile show in 1900, but early in 1901 there was an exhibition, more or less private in nature, in Automobile Headquarters on Stanhope street. It was held in connection with the formal opening of this garage by the Underhill Company, then as now, agent for Knox cars. No admission fee was charged.

Perhaps the success of the New York display encouraged the then recently organized Massachusetts Automobile Club to conduct the fourth Boston show in Grand hall, Mechanics' building, in connection with the Mechanics' fair of 1902. At least some of the features of the national display were incorporated in this exhibition, notably the demonstration track and the provision for accessory booths under the balcony, with the cars occupying positions in the centre of the floor.

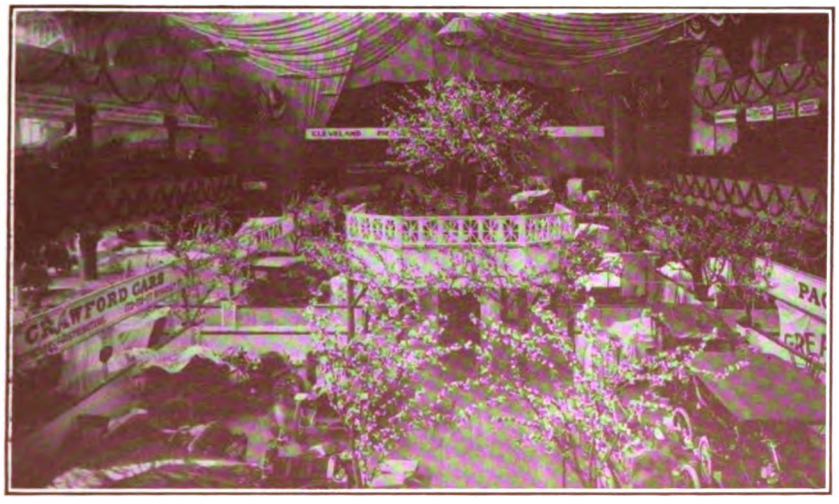
When these four shows are added to the others which followed the present display becomes the 15th instead of the 11th, and besides antedating the automobile show history of any other city in the country by four years, Boston can lay claim to one more exhibition than any other city. But the 1913 Boston show is the 11th annual display given under the auspices of the dealers in Boston, and therein it is maintained lies the secret of its reputation as biggest and best.

Those who are at all well versed in automobile history are aware of the highly important part that New England has played in the development of the present day motor car. There is little doubt that the early shows did much to encourage the adoption of the newer type of vehicles by the general public, and from the first the Boston show has been a big business producer. The Massachusetts Automobile Club had its own garage on Boylston street as early as 1903, and possibly in 1902, being the first club in America to conduct a garage on practically a co-operative



Simple Decoration of Grand Hall, Mechanics' Building, Boston, for the Third Annual Exhibition in 1905.

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Floral Treatment of Grand Hall, Mechanics' Building, for the Fourth Annual Boston Show in 1906.

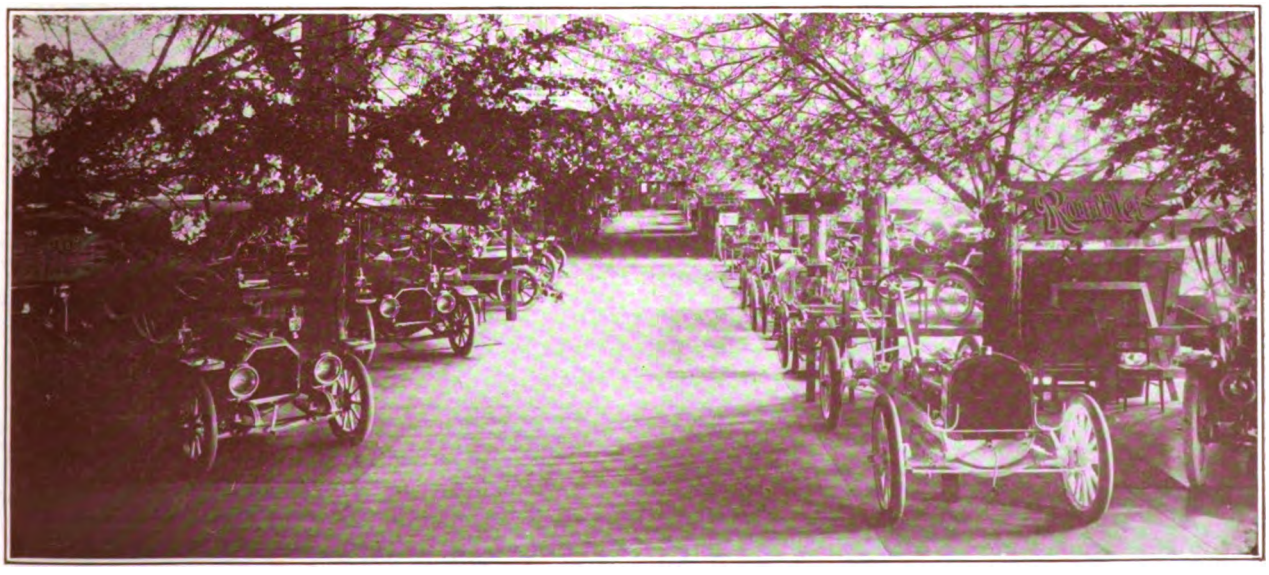
basis, thus indicating the early demand created.

By 1903 interest in motor vehicles had reached a point where the dealers of Boston were convinced it was wise to inaugurate further means for their exploitation. Ten of the principal agents deposited $100 with the following committee: W. E. Eldridge, George H. Lowe, Harry Fosdick, J. H. MacAlman and Chester I. Campbell. Mr. Campbell was not a dealer, but had had considerable experience in managing successful bicycle shows in Providence, R. I., and he was selected as the managing member of the committee.

The first annual Boston dealer's show was held for one week in Symphony hall. Twenty-one different makes were shown and the attendance was 17,360. In the absence of a definite statement it may be assumed that the 10 dealers who posted their money as a guarantee that the bills should be paid did not lose by the venture.

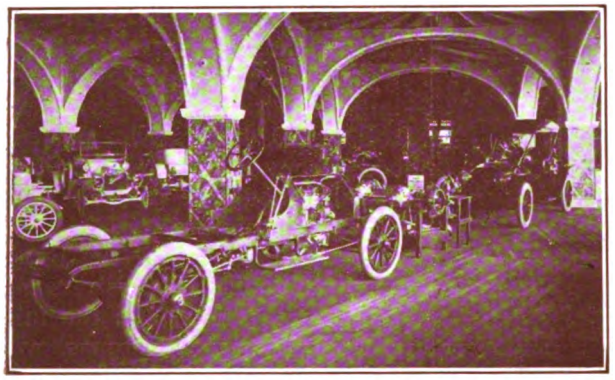
The following year the Boston Automobile Dealers' Association was formed and the future policy of the Boston show was decided upon. The first annual display was held in March, because the dealers were convinced that this was the period of the year—just before the opening of the actual driving season—when the public was most likely to become interested in the purchase of cars. The association has steadfastly maintained this position throughout, and the results each year have been such as to justify it.

Mr. Campbell was retained as general manager of the new association, a position he has held ever since. At the second annual show in 1904 manufacturers of motor boats and their accessories were permitted to join with the automobile dealers. The display of motor vehicles was much larger than heretofore, however, and the attendance was over 30,000, this being made up more largely of those who were ready to purchase cars. This was in Mechanics' building, where all subsequent shows have been held.



Exhibition Hall, Mechanics' Building, Presenting a New England Orchard Scene in Springtime, with Singing Birds Among the Tree Branches—The Eighth Annual Boston Show of 1910.

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Elaborate Treatment of Exhibition Hall for Seventh Annual Boston Show in 1909.

The number of exhibitors grew rapidly until in 1907, when the total of makes on display was 121, of which six were commercial types. The first national show in New York that year had but 85 different makes, and the second 45, making a total of 130 for the two exhibitions. Chicago had but 96. These facts served to bring the Boston dealer's show into prominence as the biggest of the year, and the decoration scheme—this being the famous apple blossom display—was conceded to be the best ever produced. But above all else was the record of business transacted, and while it is impossible to give an accurate estimate, it was such as to establish the exceptional value of New England as a market for machines.

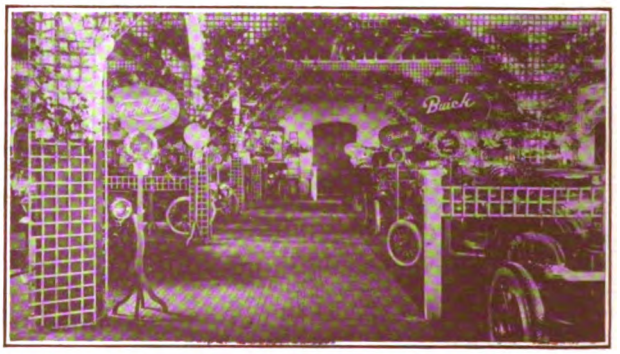
Later in the year the industry passed through one of the most trying periods of its history. Many names appeared on the list of exhibits in 1907 which were not to appear on another similar list. The motor boat section was eliminated in 1908, and while the number of makes on display was reduced to 84, largely because of the financial depression from which the country had emerged but recently, the business transacted was such as to indicate a quick recovery by the purchasing public.



Colonial Setting of Grand Hall During Ninth Annual Boston Show in 1911.

The success of the dealer's show in Boston, even in the face of what appeared to be such unfavorable conditions, resulted in the display of no less than 106 makes in 1909. Of these, 18 were commercial cars. In 1910 there were 122, of which 25 were business vehicles, and again the Boston show was the biggest in the country. In number of completed cars and chassis on display, 650, it exceeded any motor car exhibition that had been held, the previous record being 597 at the Olympia show in London in 1909.

In 1911, both New York and Chicago held separate shows for pleasure cars and trucks. There was some demand for such a division in Boston, but Mr. Campbell and the officers of the association held that conditions were not yet sufficiently developed to warrant a change of policy. The number of exhibitors was such that additional room was secured in Horticultural hall.

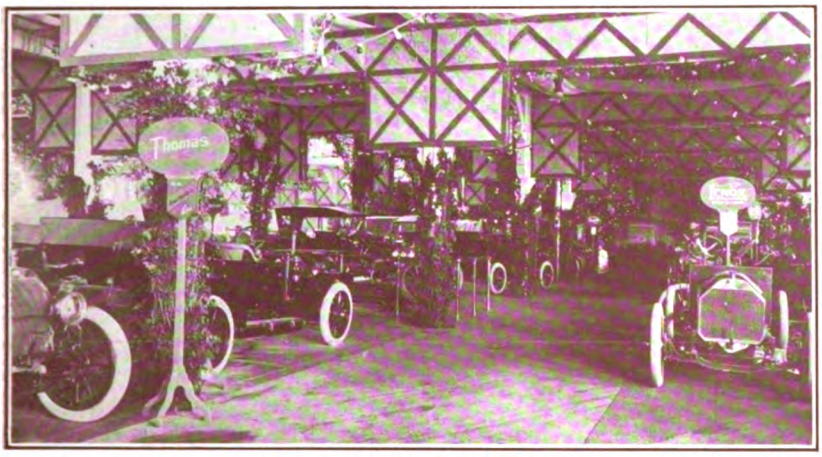


Lattice Design as Worked Out in Exhibition Hall for 1911 Display.

The total of makes was 143, of which 41 were commercial. The records revealed an attendance of 146,363. There were 70 makes of pleasure cars and 35 of trucks at the two shows in New York and 94 and 44 respectively in Chicago. Again the Boston dealer's show was the biggest and best of the country.

For some reason there was a feeling among the manufacturers that New England had reached its highest importance as a market for motor vehicles, and in 1912 it was freely predicted that the Boston show would lose some of its prestige. When the doors closed on the pleasure car display the dealers reported they had sold, in round numbers, $2,000,000 worth of automobiles during the week. The attendance had been between 225,000 and 226,000. The Boston Commercial Motor Vehicle Association was organized and took over the business wagon display as a separate show, following that of the first week.

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Exhibition Hall Was Characterized as an English Garden During the Tenth Annual Boston Display in 1912.

There were 107 makes of pleasure cars represented in the Boston show of 1912, as against 98 for Chicago and 91 for the two shows in New York.

This year there has been so much discussion of the relative merits of the national and local dealer's show that the Boston Automobile Dealers' Association has felt compelled to establish still further its reputation of biggest and best. The list of exhibitors on subsequent pages reveals a total of 91 makes of pleasure cars, as against 90 in New York and 102 in Chicago. But this list was compiled a week before the opening of the display and it always has been true that a number of makes are added during the last few days. Last year there were no less than 14 added in this manner. At least nine of the cars shown have not been exhibited at the national shows this year, making an added feature of importance.

In the commercial vehicle section there will be 54 different makes, according to the list, but as the show will not open until three days after the close of the pleasure car section, there is time to increase this total very materially. Of the 54, eight have not been shown at a national display this year, and at least four of these have not been exhibited heretofore at any time.

Concerning the accessories and supplies, it must be stated that figures cannot do full justice to the situation. So many manufacturers who make display direct at the national shows are represented in Boston by jobbers that it is safe to say that practically all of the prominent lines seen at the New York and Chicago displays are included in the list, besides a large number of new lines which have not been exhibited previously.

Those who will visit the 11th annual Boston display understand little of the necessary work in organizing, financing and running a trade exhibition devoted to the interests of a single industry. Few men have had as much experience in this line as Chester I. Campbell, and a brief statement from him concerning the methods that have made for the success of the biggest and best Boston show undoubtedly will prove of interest. He outlines the necessary steps as follows:

By success is meant not only the profitableness of the exhibition to the management thereof, but also its value as a business getter and advertising medium to the exhibitors as a whole. Then again, a trade exhibition cannot be made to pay a profit from the gate receipts; indeed, there are few exhibits of any kind that would draw enough receipts during the course of a week, or a month, to meet expenses, and it is the return from exhibit space that makes possible such ventures as automobile shows.

The more successful the show is to the exhibitors as a business getter, the more the management can charge for space; and the greater the receipts from the sale of exhibit space, the greater the possibility of a successful show from all points of view. Therefore, it is plain to be seen that much depends upon the enthusiasm of the general trade in that particular line and upon the willingness of that trade to invest its money liberally with the prospect of pro rata returns in the form of either cash business during the show or advertising value that will follow show results after the show.

Immediately after the results of one show are declared the date for the next annual exhibition is decided



Grand Hall with Its Southern California Mission Setting as Arranged for Tenth Annual Boston Show in 1912.

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upon. It may be mentioned here that applications for exhibit space are filed in no small number a full year ahead, in order to be assured of precedence in securing a desirable location. The building is then leased and the office force of the management begins to get busy for the next show. This office force is somewhat reduced in summer, yet a certain amount of work is proceeding constantly, and the bookkeeper, manager, press agent, system man and some assistants are kept busy all the year around. Lists of old exhibitors and prospective new exhibitors are compiled, envelopes and circular matter addressed, new printed matter and stationery prepared, etc., in addition to the work of collecting bills and making settlements of the last show, until August or September, when the circulars are sent out and preparations begun for the allotment of space, and a full office force is again kept on the hustle until the following spring.

Old exhibitors are given preference in order of the number of times they have exhibited consecutively at the annual shows, insofar as possible, and former exhibitors also are given first choice for the same location which they have regularly occupied in the past. Then, preference for any special locations is regulated by prior application for that space. It can safely be said that it requires just as much attention and a good deal more good nature and diplomacy to handle an exhibition when demand exceeds supply for exhibit space, as when some effort must be made to dispose of space.

As each allotment is made, card file records, as well as bookkeeping records, are necessary, and the application blanks and all correspondence must be filed so as easily to be available. One must be prepared to find out at a moment's notice when application was filed, or what space so-and-so has been alloted, or who occupies such-and-such location. In the meantime, hundreds of inquiries regarding the show must be answered and lists and partial lists of exhibitors are required for various purposes. It also must be remembered that artists and

GROWTH OF BOSTON SHOW.

Year	—Makes on Display— Pleasure	Commercial	Totals	Attendance
1903.....	21	*	21	17,360
1904.....	..	..	..	30,000
1905.....	..	..	..	47,000
1906.....	..	..	..	52,165
1907.....	115	6	121	57,213
1908.....	77	7	84	69,000
1909.....	88	18	106	92,000
1910.....	97	25	122	107,600
1911.....	102	41	143	146,363
1912.....	107	66	173	225,000

*Commercial vehicles not listed separately.

architects are working at the same time on decorative ideas and preparing the details in order to be ready for erection in two days' time.

When finally every exhibitor has been alloted his location; has been furnished with all necessary notices and information, and has filed his information blank regarding his exhibit as well as his signed application, contract and deposit, the manager and his office force move bodily, with all necessary effects, to the building where the show is to be held, and where the decorators already have been working for a day or two in preparation for erecting the "scenery."

From two or three days before the opening of the show until two or three days after, the manager and his assistants work from early morning until midnight, and sometimes later. There are complaints to adjust, mistakes to rectify, patrons to satisfy, queries to answer, extra signs to order, carpenter work to be done for some exhibitor, and a thousand other things. The counting and sorting of tickets alone requires four or five smart assistants. However, there is much satisfaction to these competent and untiring routine workers, as well as to the manager himself, in the fact that the more work required the greater must be the amount of business done and the consequent success of the show from every standpoint.

The setting for the 11th annual Boston show is by far the most elaborate yet attempted. Architect E. W. Campbell, brother of the manager, has succeeded in developing a general plan which is expected to meet with decided approval.

Grand hall is particularly pleasing with its realistic scenic effects representing the Hanging Gardens of Babylon, one of the seven wonders of the world. According to the ancient story, the Babylonian king, in order to satisfy the yearnings of his bride, the daughter of the Median king, for the luxurious foliage and tropical scenery of the gardens of her youth, transformed the barren wastes of Babylon about the gilded palace by causing thousands of slaves to erect huge terraces of stone, covered with soil and mould on sheets of lead supported by columns and arches, which enabled him to imitate nature's hills, woods and waterfalls and satisfy his tropically reared wife, Amyris.

The main floor scene is that of a tropical garden with real palm trees 25 feet high from the Bermudas. The balconies form the various terraces, covered with foliage, and the most unique feature of all is the waterfalls on either side, rippling down from the second terrace with foundation pools on the main floor. Glass, electricity and rock foundations lend their aid in producing charming effects in the cascades which spring from shrubbery 60 feet above the floor level.

The stage effects typify the entrance to the palace, or rather a view through the outer portals to the wonderful gardens beyond. The terraced approach to the stage is flanked by the winged and bearded lions of the period represented, while from this viewpoint may best be seen the magnificent painting on the rear wall, entitled, "Nebuchadnezzar's Tribute to His Median Bride," the work of Walter Burrage.

Exhibition hall also is treated as an outdoor setting, the motive being a garden of a century ago. The white picket fences of the forefathers serve as dividing lines for the various exhibition spaces. Old fashioned hollyhocks, honey flowers and blue bells cling to the fences, while the entrance to each separate garden is through a colonial arched portico, over which decorative vines and flowers are entwined.

More attention also has been paid to the basement, which has been found a difficult proposition heretofore. The various spaces are set off with architectural effects representing green marble and thousands of electric lights of various colors help in creating the impression desired. Other departments make use of fireproof foliage from Japan and electrical effects from Germany and France.

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EXHIBITORS AT ANNUAL BOSTON SHOW.

(Where No City Is Given, Address Is That of Boston Agent, Distributor or Branch.)

Gasoline Pleasure Cars.

Abbott-Detroit, F. A. Dutton Motor Co., 76 Huntington Ave.
Alco, American Locomotive Co., 576 Boylston St.
American, American-Marion Motor Co. of Boston, 563 Boylston St.
Bergdoll, Bergdoll Motor Co. of Boston, 171 Huntington Ave.
Buick, Buick Motor Co., 97 Massachusetts Ave.
Cadillac, Cadillac Auto Co. of Mass., 372 Boylston St.
Cartercar, Williams & Co., 998 Boylston St.
Case, J. I. Case Threshing Mch. Co., 8 Columbus Ave.
Chalmers, Whitten-Gilmore Co., 907 Boylston St.
Chevrolet, Republic Motor Co. of Boston, Motor Mart.
Cole, G. E. & H. J. Habich Co., 117 Massachusetts Ave.
Columbia, J. H. MacAlman, 96 Massachusetts Ave.
Cutting, Cutting Motor Car Co., Jackson, Mich.
Davis, Geo. W. Davis Carriage Co., Richmond, Ind.
Detroiter, Andrews-Dykeman Co., 18 Columbus Ave.
Edwards-Knight, Edwards Motor Car Co., New York City.
Fiat, Fiat Motor Sales Co., 839 Boylston St.
Ford, Ford Motor Co., 650 Beacon St.
Franklin, Franklin Motor Car Co., 733 Boylston St.
Garford, R. & L. Co., 915 Boylston St.
Havers, Havers Motor Car Co., Port Huron, Mich.
Haynes, W. L. Russell Co., 11-12 Park Square.
Henderson, J. A. Binney, 587 Boylston St.
Hudson, Henley-Kimball Co., 893 Boylston St.
Hupmobile, H. J. Koehler S. G. Co., 1074 Boylston St.
Imperial, Imperial Automobile Co., Jackson, Mich.
Inter-State, Inter-State Automobile Co., 153 Mass. Ave.
Jackson, Jackson Motor Car Co., 821 Boylston St.
K-D, K-D Motor Co., 1902 Beacon St.
Knox, Underhill Co., 885 Boylston St.
K-R-I-T, Harrington-Thompson Motor Cars, 188 Columbus Ave.
Lenox, Lenox Motor Car Co., 16 Columbus Ave.
Little, Republic Motor Co. of Mass., 372 Boylston St.
Locomobile, Locomobile Co. of America, 700 Commonwealth Ave.
Loring, Benjamin P. Loring, Providence, R. I.
Lozier, Lozier Motor Co. of N. E., 682 Beacon St.
Marathon, Armstrong & Curtis Co., Somerville, Mass.
Marion, American-Marion Motor Car Co. of Boston, 1022 Commonwealth Ave.
Marmon, F. E. Wing Motor Car Co., 12 Columbus Ave.
Maxwell, United Motor Boston Co., 100 Massachusetts Ave.
McFarlan, Middleboro Auto Exchange, Middleboro, Mass.
Mercedes, Alfred Cutler Morse & Co., Motor Mart.
Mercer, Fred S. Smith, 38 Columbus Ave.
Metz, Hollander Motor Co., 1070 Boylston St.
Michigan, Michigan Motor Co., Boston.
Mitchell, Lawrence & Stanley Co., 157 Massachusetts Ave.
Moline, Treat Hdw. & Supply Co., Lawrence, Mass.
Moon, Andrews-Dykeman Co., 18 Columbus Ave.
Moyer, H. A. Moyer, Syracuse, N. Y.
National, W. H. Stevens, 1020 Boylston St.
Nyberg, C. B. Lewis, Cambridge, Mass.
Oakland, Oakland Motor Co., 823 Boylston St.
Oldsmobile, Oldsmobile Co. of Mass., 626 Commonwealth Ave.
Overland, Connell & McKone, 555 Boylston St.
Packard, Packard Motor Car Co. of Boston, 1089 Commonwealth Ave.
Paige, Paige-Detroit Motor Car Co., Detroit, Mich.
Pathfinder, Motor Car Mfg. Co., Indianapolis, Ind.
Peerless, Peerless Motor Car Co. of N. E., 660 Beacon St.
Pierce-Arrow, J. W. Maguire Co., 745 Boylston St.
Pope-Hartford, Pope Mfg. Co., Hartford, Conn.
Premier, Premier Motor Car Co. of N. E., 652 Beacon St.
Pullman, George H. Procter, 1008 Commonwealth Ave.
Rambler, Thos. B. Jeffery Co. of N. E., 640 Commonwealth Ave.
R-C-H, R-C-H Corporation, 911 Boylston St.
Regal, W. L. Russell Co., 11-12 Park Square.
Renault, Alfred Cutler Morse & Co., Motor Mart.
Reo, Linscott Motor Co., 163 Columbus Ave.
Speedwell, Curtis-Hawkins Co., 162 Columbus Ave.
S. G. V., J. W. Bowman Co., 91 Massachusetts Ave.
Stearns-Knight, J. H. MacAlman, 96 Massachusetts Ave.
Stevens-Duryea, J. W. Bowman Co., 91 Mass. Ave.
Stoddard-Dayton, United Motor Boston Co., 100 Massachusetts Ave.
Studebaker, Donovan Motor Car Co., 889 Boylston St.
Stutz, Stutz Motor Car Co., 895 Boylston St.
Velie, Velie Boston Branch, 92 Massachusetts Ave.
Westcott, Westcott Motors Co., 1070 Boylston St.
White, White Co., 320 Newbury St.
Winton, Winton Motor Car Co., 674 Commonwealth Ave.

Electric Pleasure Cars.

Bailey, S. R. Bailey & Co., 895 Boylston St.
Baker, A. F. Neale, 801 Boylston St.
Borland, Borland-Grannis Co., Chicago, Ill.
Buffalo, Dodge Motor Vehicle Co., Cambridge, Mass.
Columbus, Tyler Bros. Corp., Motor Mart.
Detroit, Anderson Electric Car Co. of Boston, 903 Boylston St.
Grinnell, Underhill Co., 885 Boylston St.
Hupp-Yeats, R-C-H Corporation, 911 Boylston St.
Rauch & Lang, D. C. Tiffany Co., 136 Chestnut St.
Standard, W. H. Stevens, 1020 Boylston St.
Waverley, J. W. Bowman Co., 91 Massachusetts Ave.
Woods, Whitten-Gilmore Co., 907 Boylston St.

Steam Pleasure Cars.

Stanley, Stanley Motor Carriage Co., Newton, Mass.

Gasoline Business Vehicles.

Adams, Power Truck Sales Co., Worcester, Mass.
Alco, American Locomotive Co., 567 Boylston St.
Atterbury, Leslie G. Rawding, 585 Boylston St.
Autocar, Autocar Co., 642 Beacon St.
Bessemer, Bessemer Motor Truck Co., 58 Church St.
B. M. C., Boston Motor Co., Boston.
Buick, Buick Motor Co., 97 Massachusetts Ave.
Chase, Chase Motor Truck Co., Syracuse, N. Y.
Decatur, Grand Rapids Motor Truck Co., Cambridge, Mass.
Federal, Whitten-Gilmore Co., 907 Boylston St.
Flanders, Flanders Motor Co., 589 Boylston St.
Garford, R. & L. Co., 915 Boylston St.
G. M. C., General Motors Truck Co., 753 Boylston St.
Hupmobile, H. J. Koehler S. G. Co., 1074 Boylston St.
I. H. C., International Harvester Co. of America, Somerville, Mass.
Kelly-Springfield, Kelly-Springfield Motor Truck Co., Cambridge, Mass.
Knox, Underhill Co., 885 Boylston St.
Koehler, H. J. Koehler S. G. Co., 1074 Boylston St.
Lauth-Juergens, Myer Abrams & Co., Cambridge, Mass.
Little Giant, Chicago Pneumatic Tool Co., 191 High St.
Lippard-Stewart, Whitney-Barney Co., 34 Merchants Row.
Locomobile, Locomobile Co. of America, 700 Commonwealth Ave.
Mais, Mais Motor Truck Co., Indianapolis, Ind.
Marmon, F. E. Wing Motor Car Co., Motor Mart.
Mercury, Mercury Mfg. Co., Chicago, Ill.
Overland, Connell & McKone Co., 555 Boylston St.
Packard, Packard Motor Car Co. of Boston, 1089 Commonwealth Ave.
Peerless, Peerless Motor Car Co. of N. E., 660 Beacon St.
Pierce-Arrow, J. W. Maguire Co., 745 Boylston St.
Pope-Hartford, Pope Mfg. Co., Hartford, Conn.
Reo, Linscott Motor Co., 163 Columbus Ave.
Sanford, Sanford Motor Truck Co., Syracuse, N. Y.
Schacht, Whitney-Barney Co., 34 Merchants Row.
Selden, Boston Motor Co., Boston.
Smith-Milwaukee, A. O. Smith Co., Milwaukee, Wis.
Sowers, Sowers Motor Truck Co., 126 Massachusetts Ave.
Speedwell, Curtis-Hawkins Co., 162 Columbus Ave.
Standard, Whitten-Gilmore Co., 907 Boylston St.
Stewart, H. Ross Maddocks, Medford, Mass.
Sullivan, Sullivan Motor Car Co., Rochester, N. Y.
Universal, Universal Motor Truck Co., 193 Pleasant St.
Velie, Velie Boston Branch, 92 Massachusetts Ave.
Victor, Victor Motor Car Co., 75 Haverhill St.
Vulcan, Vulcan Motor Car Co., Boston.
White, White Co., 320 Newbury St.

Electric Business Vehicles.

Atlantic, Atlantic Vehicle Co., New York City.
Buffalo, Dodge Motor Vehicle Co., Cambridge, Mass.
Couple-Gear, Eldridge Mfg. Co., 178 Devonshire St.

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Edison, Edison Electric Vehicle Co., Lawrence, Mass.
Eldridge, Eldridge Mfg. Co., 178 Devonshire St.
G. M. C., General Motors Truck Co., 753 Boylston St.
G. V., General Vehicle Co., 84 State St.
Waverley, J. W. Bowman Co., 91 Massachusetts Ave.

Steam Business Vehicles.

Stanley, Stanley Motor Carriage Co., Newton, Mass.

Motorcycles.

Boyd Motor Co., 27 Stanhope St.
Grady & Co., J. W., Worcester, Mass.
Holden, George N., 188 Massachusetts Ave.
New England Motorcycle Co., 178 Columbus Ave.

Accessory Jobbers, General Line.

Auto Parts Co., Providence, R. I.
Bell, Bayers & Woodbury, 187 Massachusetts Ave.
Bennett & Ricker Co., North Cambridge, Mass.
Boyd, F. Shirley, 903 Boylston St.
Coward Auto Supply Co., 222 Eliot St.
Daniels, Smalley, 22 Motor Mart.
Dunn Ray Co., 40 Central St.
Forbes, Walter J., 243 Columbus Ave.
Ford Supply Co., Percy, 226 Columbus Ave.
Kelleher, J. J., Dorchester, Mass.
Kilham, J. W., Beverly, Mass.
Linscott Supply Co., 161 Columbus Ave.
Miller, Chas. E., 202-204 Columbus Ave.
Russell & Co., T. F., 170 Summer St.
Standard Auto Supply Co., 239 Columbus Ave.

Air Compressors.

Randall-Sargeant Drill Co., 32 Oliver St.

Anti-Skidding Devices.

Leather Tire Goods Co., Niagara Falls, N. Y.
Never Skid Mfg. Co., New York City.
Weed Chain Tire Grip Co., 28 Moore St.

Ball Bearings.

Marburg Bros., New York City.
New Departure Mfg. Co., Bristol, Conn.

Batteries.

American Storage Battery Co., Cambridge, Mass.
Burn Boston Battery & Mfg. Works, 9 Doane St.
Edison Storage Battery Co., West Orange, N. J.
Electric Storage Battery Co., Philadelphia, Penn.
Vesta Accumulator Co., Chicago, Ill.
Willard Storage Battery Co., Cleveland, O.

Brake Lining Materials.

Standard Woven Fabric Co., Worcester, Mass.

Cans, Funnels, Etc.

Dover Stamping & Mfg. Co., Cambridge, Mass.

Carburetors and Carbureting Devices.

C. R. G. Mfg. Co., Saugus, Mass.
Findeisen & Kropf Mfg. Co., Chicago, Ill.
Hoyt Carburetor & Auto Co., 1008 Boylston St.
Motor Parts Co., Philadelphia, Penn.
Schoen-Jackson Co., Media, Penn.
Stromberg Motor Devices Co., Chicago, Ill.

Chains.

Baldwin Chain & Mfg. Co., Worcester, Mass.
Federal Chain & Mfg. Co., Springfield, Mass.

Clothing.

Moore Smith Co., 250 Devonshire St.

Dictionaries.

Adams & Co., J. Q., 120 Boylston St.

Electric Charging Plants.

Lunt Moss Co., 43 South Market St.

Fire Extinguishers.

Pyrene Co. of N. E., 176 Federal St.

Gloves.

Morrison Ricker Mfg. Co., Grinnell, Ia.

Grease Guns.

Randall-Faichney Co., Jamaica Plain, Mass.
Townsend & Co., S. P., Orange, N. J.

Grinding Wheels.

Norton Co., Worcester, Mass.

Horns and Signalling Devices.

Automobile Supply Mfg. Co., Brooklyn, N. Y.
Dean Electric Co., Elyria, O.
Gabriel Horn Mfg. Co., Cleveland, O.
Holtzer-Cabot Electric Co., Brookline, Mass.
Lovell-McConnell Mfg. Co., Newark, N. J.
Piel Co., G., New York City.
Randall-Faichney Co., Jamaica Plain, Mass.
Tyer Rubber Co., Andover, Mass.

Insurance.

Aetna Life Insurance Co., 4 Liberty Square.

Lacquer Work.

Hillman Auto Supply Co., 98 Massachusetts Ave.

Lamps and Lighting Equipment.

Dean Electric Co., Elyria, O.
Gray & Davis, 57 Lansdowne St.
Holt & Beebee Co., 51 Chardon St.
MacDonald, Donald N., 400 Northampton St.
Splitdorf Electrical Co., Newark, N. J.
Tobey, Wm. L., East Boston, Mass.
U. S. Light & Heating Co., New York City.

Locking Devices.

Blackledge Mfg. Co., John W., Chicago, Ill.

Lubricants.

Albany Lubricating Co., New York City.
Columbia Lubricants Co. of New York, New York City.
Dixon Crucible Co., Jos., 49 Federal St.
Eagle Oil & Supply Co., 104 Broad St.
Harris Oil Co., A. W., Providence, R. I.
Havoline Oil Co., New York City.
Haws, Geo. A., New York City.
International Acheson Graphite Co., Niagara Falls, N. Y.
Invader Oil Co., 284 Columbus Ave.
Keystone Lubricating Co., 284 Franklin St.
N. Y. & N. J. Lubricant Co., New York City.
Philadelphia Grease Mfg. Co., 170 Summer St.
Robinson & Sons Co., Wm. C., 43 Commercial Wharf.
Sawyer Oil Co., Howard B., 65 Long Wharf.
Shannon, T. R., Hartford, Conn.
Texas Co., New York City.
Underhay Oil Co., 73 Batterymarch St.
Vacuum Oil Co., New York City.
White & Bagley Co., Worcester, Mass.
Wolverine Lubricant Co., 899 Boylston St.

Magnetos and Ignition Devices.

Champion Ignition Co., Flint, Mich.
Dean Electric Co., Elyria, O.
Eisner-Lenk Co., 1074 Boylston St.
Heinze Electric Co., Lowell, Mass.
Holtzer-Cabot Electric Co., Brookline, Mass.
K-W Ignition Co., Cleveland, O.
Marburg Bros., New York City.
National Coil Co., Lansing, Mich.
Pittsfield Spark Coil Co., Dalton, Mass.
Remy Electric Co., Anderson, Ind.
Simms Magneto Co., New York City.
Splitdorf Electrical Co., Newark, N. J.
U. S. Light & Heating Co., New York City.

Maps.

Walker Lithograph & Publishing Co., 400 Newbury St.

Metals, Castings, Etc.

Baldwin Steel Co., New York City.
Clark Foundry Co., Rumford, Me.
Cramp & Sons Sh. & Eng. Bldg. Co., Wm., Philadelphia, Penn.
Doehler Die Casting Co., Brooklyn, N. Y.
National Tube Co., Pittsburg, Penn.
Ward & Co., Edgar T., 25 Purchase St.

Motors.

Elliot Motor Engine Co., Waltham, Mass.
Fairbanks Co., 42 Pearl St.
K-D Motor Co., 1902 Beacon St.

Motor Starters.

Dean Electric Co., Elyria, O.
Gray & Davis, 57 Lansdowne St.
Hartford Suspension Co., Jersey City, N. J.
Holtzer-Cabot Electric Co., Brookline, Mass.
U. S. Light & Heating Co., New York City.

Name Plates and Monograms.

Macdonald, Donald N., 400 Northampton St.
Salman, John A., 21 Bromfield St.

Paints and Varnishes.

Valentine & Co., New York City.

Shock Absorbers.

Flentje, Ernst, Cambridge, Mass.

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Gabriel Horn Mfg. Co., Cleveland, O.
Hartford Suspension Co., Jersey City, N. J.
J. M. Shock Absorber Co., Philadelphia, Penn.
Peacock & Co., Clarence N., New York City.

Soaps, Polishes, Etc.

Arnold, N. B., Brooklyn, N. Y.
Baum's Castorine Co., Rome, N. Y.
Crowell Chemical Co., Beverly, Mass.
Eavenson & Sons Co., J., Camden, N. J.
Hopewell Bros., Newton, Mass.
International Metal Polish Co., Indianapolis, Ind.
Justice Co., A. H., 20 High St.

Speedometers and Recorders.

Hoffecker Co., Motor Mart.
Jones Speedometer Co., Brooklyn, N. Y.
Reliance Speedometer Co., 134 Eliot St.
Service Recorder Co., Cleveland, O.
Standard Thermometer Co., 65 Shirley St.
Stewart & Clark Mfg. Co., Chicago, Ill.
Veeder Mfg. Co., Hartford, Conn.
Warner Instrument Co., Beloit, Wis.

Tanks and Storage Systems.

Bowser & Co., S. F., Fort Wayne, Ind.
Wayne Oil Tank & Pump Co., 146 Summer St.

Tires, Rims, Etc.

American Kushion Kore Tire Co., Buffalo, N. Y.
Ajax-Grieb Rubber Co., New York City.
Batavia Rubber Co., Batavia, N. Y.
Boston Tire & Rubber Co., 182-184 Friend St.
Cataract Rubber Co., 66 Hereford St.
Columbia Tire & Top Co., 1014 Commonwealth Ave.
Dayton Airless Tire Co., 585 Boylston St.
Diamond Rubber Co., Akron, O.
Double Fabric Tire Co., Auburn, Ind.
Durable Tread & Auto Sales Co., New York City.
Empire Tire & Rubber Co., Trenton, N. J.
Endurance Tire & Rubber Co., New York City.
Expansion Spring Ring & Tire Co., 120 Boylston St.
Federal Rubber Mfg. Co., Cudahy, Wis.
Firestone Tire & Rubber Co., Akron, O.
Fisk Rubber Co., Chicopee Falls, Mass.
Gibney Tire & Rubber Co., Philadelphia, Penn.
Goodrich Co., B. F., Akron, O.
Goodyear Tire & Rubber Co., Akron, O.
Hood Rubber Co., Watertown, Mass.
Houk Co., Geo. W., Philadelphia, Penn.
Lee Tire & Rubber Co., Conshohocken, Penn.
Kelly-Springfield Tire Co., New York City.
Michelin Tire Co. of Mass., 901 Boylston St.
Motz Tire & Rubber Co., Akron, O.
Pennsylvania Rubber Co., Jeannette, Penn.
Perfection Filler Co., Somerville, Mass.
Polack Tyre & Rubber Co., New York City.
Presto Inter Rim Co., 53 State St.
Republic Rubber Co., Youngstown, O.
Seamless Rubber Co., 534 Congress St.
Standard Tire & Rubber Co., 104 Portland St.
Standard Welding Co., Cleveland, O.
Swinehart Tire & Rubber Co., Akron, O.
United States Tire Co., 836 Boylston St.
Voorhees Rubber Mfg. Co., Jersey City, N. J.
Walpole Tire & Rubber Co., 757 Boylston St.

Tire Covers.

Hopewell Bros., Newton, Mass.

Tire Tools.

O-Tak-A Tire Remover, Le Roy, N. Y.
Tobey, Wm. L., East Boston, Mass.

Top and Upholstery Materials.

Earnsdale Worsted Co., Clinton, Mass.
Laidlaw, Wm. R., Jr., New York City.
Pantasote Co., New York City.

Trunks and Bags.

Hopewell Bros., Newton, Mass.
Sage, O. F., Jr., 134 Summer St.
Winship, W. W., 71 Summer St.

Vacuum Cleaners.

Duren & Kendall, 34 Summer St.

Vulcanizers.

Shaler Co., C. A., Waupun, Wis.

Wheels, Cushion.

Sewell Cushion Wheel Co., Detroit, Mich.

Wheels, Wire and Wood.

Houk Co., Geo. W., Philadelphia, Penn.
McCue Co., Buffalo, N. Y.

Windshields.

Cox Brass Mfg. Co., Albany, N. Y.

Wrenches, Machine Tools, Etc.

Allen Wrench & Tool Co., Providence, R. I.
Bartlett, Edwin A., 326 A St.
Chandler & Farquhar Co., 419 Atlantic Ave.
Coes Wrench Co., Worcester, Mass.
Globe Wrench Co., Ipswich, Mass.
Lapoint Co., J. N., New London, Conn.
Mossberg Co., Frank, Attleboro, Mass.

Unclassified.

Cordtmeyer, F. H., New York City.
Decatur Hopkins Co., 20 High St.
Great Hardware & Supply Co., Lawrence, Mass.
Harding, W. A., 79 Milk St.
Kearney Co., T. F., 27 School St.
MacDonnell Co., Webster, Haverhill, Mass.
Meyer Bros., New York City.
Orona Mfg. Co., 36 Bromfield St.
Rhoades, H. T., 79 Milk St.
White, Harry C., 146 Massachusetts Ave.

THE FULLY EQUIPPED CAR.

Chas. E. Miller Makes Some Pertinent Suggestions for Benefit of Prospective Purchasers.

According to Chas. E. Miller, 97-103 Reade street, New York City, the well known accessory man, a much more insistent query of the motor car buyer this year than ever before is: "What do I get for my dollars?" Commenting upon this, he says: "The year, therefore, becomes more than ever before the year for the accessory dealer, for, after the buyer has selected the car that suits him in material, design and workmanship, he must next consider the equipment, and this for 1913 consists of speedometers, clocks, windshields, starters, electric lights, tire holders, etc.

"Supposing, for a moment, that the buyer has made a list of the equipment that the car he buys must possess, and if he does, he will find himself up against a difficult proposition. One car may have all these equipment features and another only a part of them. It is just here that the dealer in accessories comes to the front because after the car is bought the selection of extras may be made at the buyer's leisure and convenience that will give him entire satisfaction and allow him to provide the necessities that will be consistent with his idea of a fully equipped car."

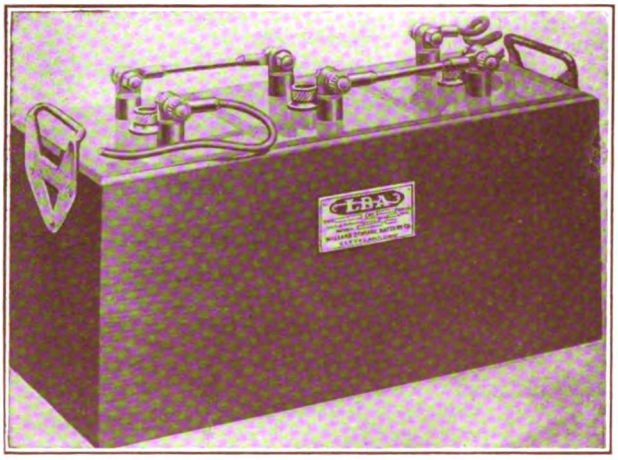
An Automobile Trades Association has been organized at Columbus, O. The constitution is modelled after those governing the chapters founded in many of the eastern cities.

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MOTOR STARTING AND LIGHTING BATTERIES.

Why Efficiency Depends Upon Systematic Care---Effects of Improper Charging and Use of Impurities---How to Increase the Life of the Cells.

EFFICIENCY with electric lighting or electric motor starting systems as applied to the automobile, depends wholly upon the storage bat-



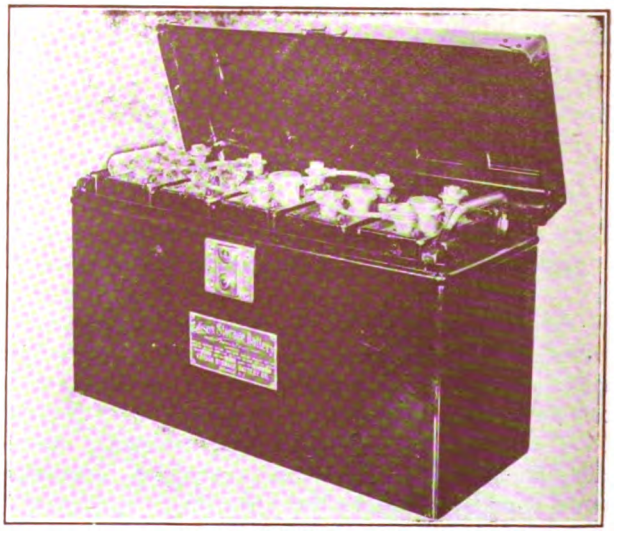
LBA Lighting Battery of the Individual Unit Cell Type, Constructed in Various Capacities.

tery. Regardless of the type of equipment, whether it be one in which the generator supplies current to the lamps or the electricity is drawn from the battery, there are periods when the cells are called upon to furnish current not only for lighting and starting, but for signalling, and in some installations for ignition. When it is considered that the electricity derived from storage batteries is due to chemical action and reaction, it follows that the cells must be given proper attention if satisfactory results are to be secured. This holds true of any lighting or motor starting system, even with the equipment including a mechanical generator, the function of which is to charge the cells.

The utilization of storage batteries is not new to the motorist. Before the very general adoption of the magneto they were employed for ignition and these sparking batteries, as they were termed, differed from the lighting units now in use in that they were discharged at a very slow rate. In ignition service they were generally fully discharged and the charging was performed at the battery station or by the expert who had the proper facilities for their care and maintenance. With the lighting and motor starting systems the charging of the cells is accomplished by the generator actuated by the power plant of the car, and the battery is not removed except for repairs or in the event of an accident. The care of the cells, therefore, must be assumed by the motorist or by the battery expert.

Need of Systematic Care.

Regardless of the system, whether it be lighting, motor starting or ignition, systematic care should be given the batteries. Instructions are provided both by the maker of the lighting equipment and of the battery, which are adequate if observed. The advice of those having a smattering of electrical knowledge is not to be preferred to the practical judgment of battery makers' engineers whose instructions are based upon years of experience, and which if followed will result in maximum efficiency. It is not the purpose of the writer to discuss the construction of batteries other than to state that the lead type consists briefly of positive and negative plates, separators, sulphuric acid and hard rubber containing jars. The positive plates comprise supporting and current conducting grids, and active material in the form of red-brown lead peroxide, while the negative plates are similar grids and a peculiar amor-



The Active Material of the Edison Batteries Is Nickel Hydrate and Iron Oxide in an Alkaline Solution.

phous form of metallic lead known as sponge lead. During the discharge a reaction takes place, the plates absorbing sulphuric acid from the elec-

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trolyte and part of the lead sponge changes to lead sulphate. To secure maximum efficiency from the cells both of the elements must be main-



Exide Lighting, Starting and Ignition Battery, Employing Lead Plates.

tained in good condition with the same charging treatment, because, apparently, treatments which are beneficial to the positive are harmful to the negative, and vice versa. Conditions may be so adjusted, however, as to keep both positive and negative in perfect shape.

Dealing first with the matter of correct lead storage battery charging, it may be summed up in the one rule—get enough current into the battery and get it in with a minimum of gassing. James M. Skinner, engineer of the Philadelphia Storage Battery Company, Philadelphia, calls attention to this rule in the following discussion of the subject of storage batteries:

Increasing Life of Batteries.

There is no doubt that the general observance of the above rule, particularly the latter part, would increase the average life of lead batteries 20 per cent. or more, but this fact does not seem to be generally appreciated. Much of the improper charging which batteries receive today is harmful, not because the wrong thing is done, but because it is done at the wrong time and in the wrong way. Overcharging and undercharging are good or they are bad, depending only upon when and how they are applied. The first essential toward the betterment of conditions is a thorough understanding of the effects of each, so that they may be used with proper discrimination.

Effect of Undercharging.

Consider undercharging first. Undercharging to a moderate extent is not detrimental to a battery, and if mixed with proper overcharging is highly beneficial. Details on this point will be given later. On the other hand persistent undercharging with too few overcharges will result in a great deal of trouble. It is very seldom that something can be secured for nothing, and no battery will deliver more power than has been previously supplied to it. If the charges are unduly shortened the capacity will fall off and the battery will develop sulphated plates.

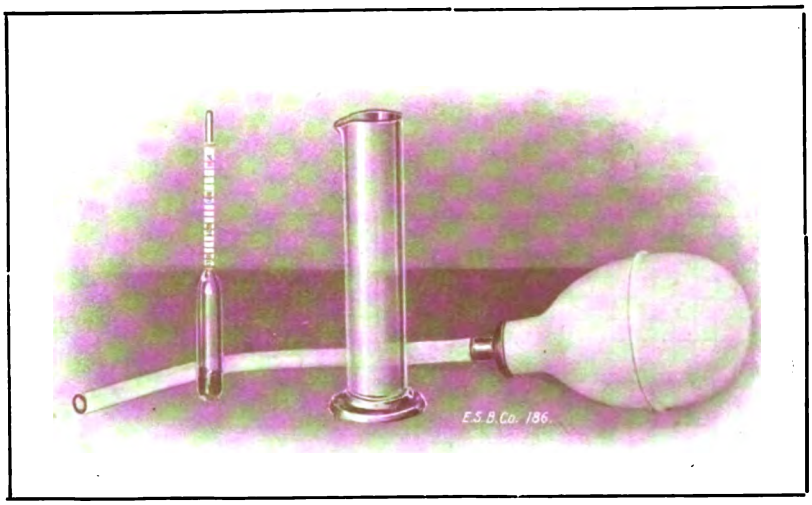
Troubles from undercharging manifest themselves chiefly in the negative plates. When in good condition charged negative plates have a soft, velvety texture, easily indented by the finger nail. This appearance is characteristic of sponge lead. As previously pointed out in the discharge this changes to lead sulphate. Lead sulphate is hard. Consequently a discharged plate feels harder than a charged one. When the battery is recharged the acid comes out of the plates again and the material assumes its velvety texture. If an insufficient amount of current is supplied to the battery some of the hard lead sulphate is not changed back to sponge, but remains upon the plate when the charge is stopped.

If undercharging is persisted in an additional small amount of sulphate is left and the quantity will be augmented with each charge, and will be considerable in time. The sulphate particles are very small when first formed. If allowed to remain in the plate they steadily grow larger, since the solubility of the lead sulphate in the acid is sufficient to permit of their slow, but continual solution and redeposition, during which process the smaller particles, whose solubility is greater because of their greater surface a unit weight, dissolve more quickly and redeposit on the slower dissolving, large particles, causing these to continually increase in size. The larger the particles the harder it is to reduce them back to lead sponge.

Sometimes they grow so large as to be entirely unreducible except by special and time-consuming methods. As long as it remains in the plates this accumulation of lead sulphate subtracts just that much from the active material, and by clogging the pores with a non-conductor, adds just that much obstruction to the passage of the current to the material in good condition. Moreover, being possessed of little cohesion, it is likely to fall from the plate, and perhaps carry with it or loosen some good active material. It should be perfectly evident from this how undercharging, if persisted in, will do great harm to the negative plates.

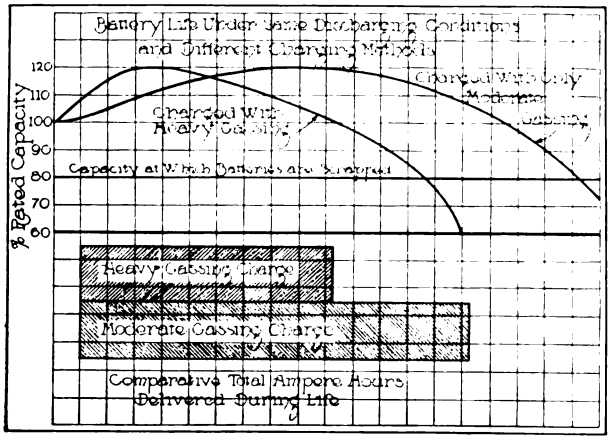
Benefits of Overcharging.

Regarding overcharging: Every battery needs some overcharging to keep it in good condition. But care should be taken how these overcharges are given. They should not be carried out at a high current rate because of the gassing that accompanies them. Gassing is the greatest factor in wearing out a positive plate. Eliminate or reduce it and the life of the positives shows an incredible increase. As batteries are usually charged a gassing occurs, not only during the overcharge, but at the end of ordinary charges. The passing of the charging current tends to decompose the electrolyte into hydrogen and oxygen. In fact these substances in nascent form do travel toward the electrodes, hydrogen with the current toward the negatives and oxygen in the opposite direction toward the positives. Lead sulphate has the property of absorbing them as they are driven against it. During the early stages of the charge there is an



Electrolyte Testing Outfit, Which May Be Used Instead of the Hydrometer.

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abundance of lead sulphate in the plates and the hydrogen and oxygen react with it as follows:

Positive Plate.

$PbSO^4 + O + H^2O = H^2SO^4 + PbO^2$

Lead Sulphate + Oxygen + Water = Sulphuric Acid + Lead Peroxide

Negative Plate.

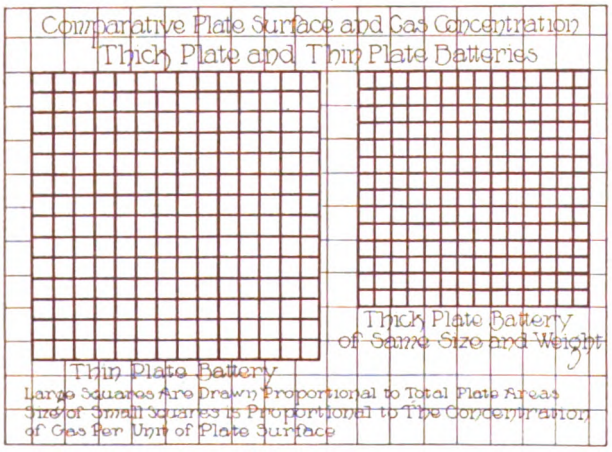
$PbSO^4 + H^2 = H^2SO^4 + Pb$

Lead Sulphate + Hydrogen = Sulphuric Acid + Sponge Lead

As the charge continues the amount of sulphate grows less and less. If the current rate is maintained at its original value the same quantities of hydrogen and oxygen are generated a minute, but with a decreasing amount of sulphate it becomes more and more difficult for them to find material on which to act, until finally the rate of absorption falls below the rate of production. In this case some hydrogen and oxygen pass over into the gaseous form and force their way through the active material into the electrolyte. The longer the charge continues the greater the proportion of current used in generating gas.

Action on Positive Plates.

The hydrogen bubbling out through the negative plate pores is not particularly dangerous. It may dislodge or blister a little material, but sponge lead possesses a high degree of coherence, and is further protected by the flat face of the wood separator pressing against it. It requires pretty hard and continuous gassing to harm a negative by overcharging. On the other hand the lead peroxide of the positive is not so blessed. It possesses comparatively little coherence of its own and heavy gassing is apt to destroy that put in by the battery manufacturer. The face of the active material is constantly washed off, falling to the bottom of the cells as mud, and the whole mass is opened up and softened. In very extreme cases the peroxide becomes of the consistency of mush and of just about as much coherence. Thus the life of a positive plate is directly dependent upon the amount of gassing, and the importance of a systematic charging procedure which will minimize this can hardly be overestimated.

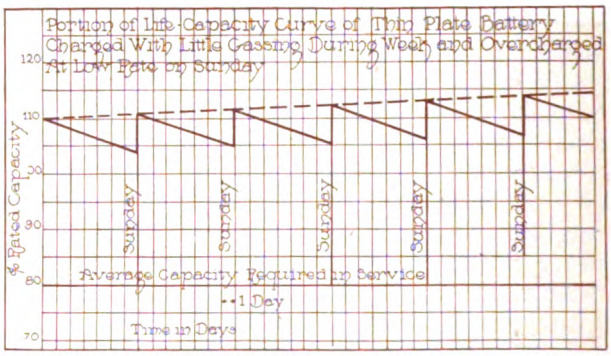


To recapitulate a moment, a battery contains two very dissimilar elements; positive plates, harmed by overcharging, and demanding a minimum of current for long life, and negative plates, suffering from undercharge and requiring plenty of current for good service. Evidently a combination of moderate undercharging on most charges with special care toward keeping the current below the gassing point at all times, and occasional overcharging at a very low current rate, so as to again minimize gassing, will meet the requirements of both. In actual practise the procedure has given remarkable results.

Effect of Tapering Charge.

For example: With a vehicle battery the ordinary daily charge is started at a moderately high current rate, not over the normal six-hour discharge rate, and the current is maintained at this point until towards the end of the charge gassing commences. The rate is then lowered below the gassing point, and the charge continued until the evolution of gas again commences. Tapering the current so as to keep it always below the gassing point is continued until a very low figure, about one-tenth of the normal six-hour discharge rate, is reached. At this point the charge is usually stopped, although there is no danger in continuing this low rate for a few hours more. After a very long and thorough discharge it may indeed be a good thing.

An ampere-hour meter may be used to advantage in connection with this charging method since a few experiments will determine points on the scale at which



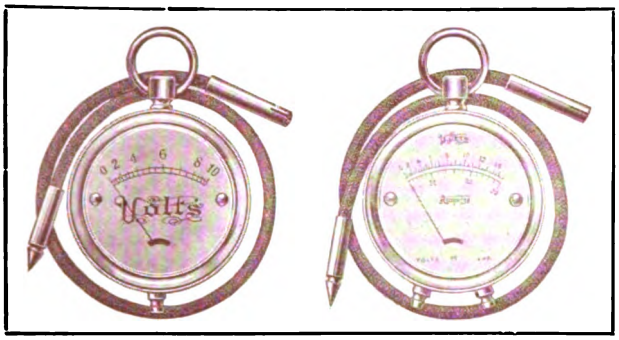
the current should be reduced to certain values. As to the total charge ampere-hours necessary, 105 per cent. of the discharge will be sufficient, although this figure should be varied somewhat according to the character of the previous discharge. For a very short discharge it may be necessary to put back only 100 per cent. of the ampere-hours taken out; for an ordinary discharge, 105 per cent. is about right, while for a very long and thorough discharge 110 per cent. may be necessary. Such details are easily worked out when a given set of conditions is at hand. If an ampere-hour meter is not in use, it is possible to determine the voltages at which gassing commences with various current rates, and to reduce the current to the next lower figure as the battery voltage rises to each of these predetermined points. Temperature and age of the battery have, of course, a slight effect on the voltage figures. Better still, the battery may be watched, and the proper reductions of current made when gassing begins.

Small Battery Losses.

It is well worth while to consider how to eliminate losses even of the small battery such as is utilized in connection with lighting and motor starting with automobiles. These are the result of local action, a rather broad term covering several kinds of internal and therefore wasteful discharge. Local action may be divided into three very general classes: Mechanical, chemical and electro-chemical. The three types will be considered separately.

Mechanical local action has no part in the normal working of a battery. It is the result of short circuit between negative and positive plates in a cell. In rare cases this results from poor lead burning, a "run-down"

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Hoyt Pocket Type Instruments: At Left, Voltmeter; at Right, Combined Ammeter and Voltmeter.

from the positive group touching the negative group or vice versa. This, however, is the result of inexcusable carelessness, since a simple inspection of the groups after burning and assembling is sure to reveal it. A short circuit from a piece of lead dropped into a cell is in the same category. In some batteries short circuits occur, due to growth of the negative active material over the tops of the negative plates until it touches the lead apron separator hold-down on the positive group or bridges over the separator tops onto the adjacent positive plates. In cases where a battery is abused by overheating trouble is sometimes experienced with the wood separators. These when properly used generally last the whole life of the battery, due to a proper preliminary treatment.

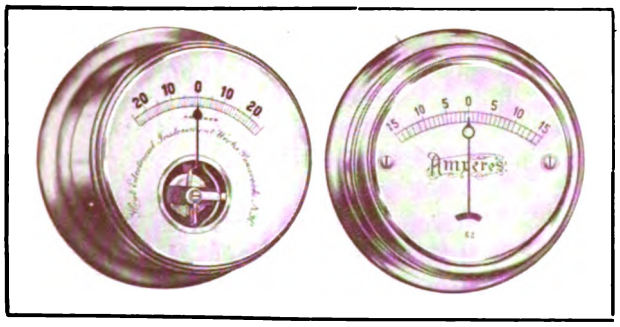
Chemical Local Action.

Under the head of chemical local action will be considered here the effect of too strong sulphuric acid upon the capacity of the battery. A battery nominally discharges by absorbing acid from the electrolyte, forming lead sulphate in the plates, and delivering over the external circuit an amount of current proportional to the amount of lead sulphate formed. In order that lead sulphate shall not form without the production of current the specific gravity of the electrolyte is limited to a maximum of 1.300 at full charge; 1.300 electrolyte contains about 40 per cent. of sulphuric acid.

If the electrolyte contains more than 40 per cent. of sulphuric acid, that is, if its specific gravity is above 1.300, it will attack the negative plate, forming lead sulphate from the sponge lead, but in this case without the production of current. In other words the battery discharges without doing any useful work. Moreover, the strong acid is detrimental to the wood separators, and the lead sulphate formed is sometimes hard to reduce back to sponge lead.

Danger of Using Acid.

The precaution against any such trouble is exceedingly simple—merely be sure never to add acid to a battery under normal conditions. It is never safe to add acid to a storage battery except upon the advice of a competent expert. No acid is ever lost during the normal working of a battery. The acid which was put in it when it was new is used over and over again. On each discharge it is absorbed by the plates; on each charge it is returned by the plates to the electrolyte. Unless some is spilled out it is sufficient, without any replenishing, to serve during the whole life of the battery. After the battery has been charged several times it may seem as if acid has been lost, because the electrolyte level gradually falls. This fall is due to the loss of water by gassing and by natural evaporation, not to the loss of acid, and it should be compensated for by adding distilled water only, whenever the hydrometer readings show that by the increased density of the electrolyte such addition is necessary.

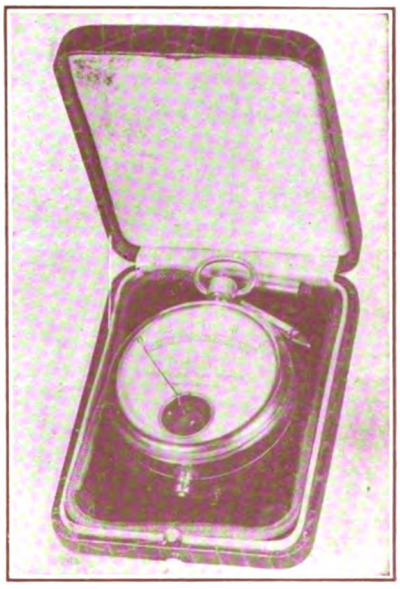


Types 22 and 1 F Hoyt Ammeters Utilized in Connection with Lighting Systems on Automobiles.

Electro-chemical local action results from impurities in the electolyte. Such impurities may be acids other than sulphuric acid, or metals other than lead. Neither has any place in a normal battery. Acid trouble is rather infrequent except through the introduction of hydrochloric acid in the form of common salt or salt water. If it will just be remembered that salt and salt water should not be allowed to get into a battery, the subject of acid impurities may be dismissed.

Metallic Impurities.

Metallic impurities are more common, but just as easy to avoid. They are of two classes. Some, such as iron, can exist in the electrolyte in two states of oxidation, and, by travelling between the positive and negative plates, being oxidized to the higher state of oxidation by the former and reduced again to the lower state of oxidation by the latter, can cause the formation of lead sulphate and consequent useless discharge of both positive and negative plates. A small amount of iron, given enough time to travel back and forth and to oxidize and reduce, can completely discharge the battery.



New Hoyt Pocket Voltmeter of the Coil Type, Designed for Accurate Reading of Storage Batteries.

Other metals such as copper and platinum are not so active in travelling between positive and negative plates, but confine their attention more to discharging the negatives. As a battery cannot work with discharged negative plates, this is almost as bad as discharging both plates. During charge the impurities deposit on the negative plates in the metallic state. When the charge is stopped the deposited impurity forms with the sponge lead a little internal primary battery. A complete circuit being made by the conducting sponge lead, this little cell starts immediately to discharge. The copper (or other metal) dissolves and lead sulphate is formed in the sponge lead just as during a normal discharge of the battery, although in this case as in other cases of local action cited, no useful work is performed.

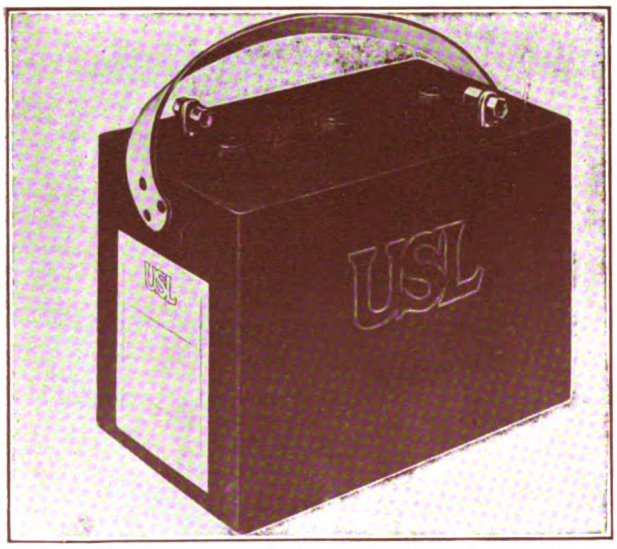
Reliable battery makers are extremely careful to use nothing but the purest materials in the manufacture of their batteries. The companies maintain extensive laboratories and employ trained chemists to do nothing but constantly supervise the purity of all materials entering into the construction of their batteries. They are absolutely sure that when a battery leaves their hands it is free from impurities as it is possible to make it. To keep it in this condition it is necessary to observe practically only one simple precaution—use only distilled water for maintaining the electrolyte level one-half inch over the plates.

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Inspection of Battery.

Relative to the inspection of the cells, the Willard Storage Battery Company, Cleveland, O., maker of the LBA batteries, advises the examination of each cell at least once a week in the summer and once every two weeks in the winter, replacing lost solution with distilled water only. Acid should never be added except under conditions previously pointed out and it is best to secure the electrolyte from the nearest service station of the maker. This will insure against impurities.

Specific gravity readings should be taken at the time of the inspection, and before water is added, especially where the cells are charged by the generator on the car as the readings will check the performance of the dynamo, indicating



Type of Battery Employed with United States Light & Heating Company's Lighting and Starting System.

whether the machine is performing properly and is keeping the cells fully charged. The specific gravity is taken with a hydrometer syringe or the testing equipment illustrated herewith. These instruments may be secured from the maker of the battery and are not expensive. The Willard Storage Battery Company advises the use of a low-reading voltmeter in conjunction with the hydrometer, stating that the former shows the electrical pressure at the time of reading and only partially indicates chemical conditions. The hydrometer is the more reliable source of information.

Specific Gravity.

When the battery is fully charged the specific gravity should read between 1.280 and 1.300 as indicated on the hydrometer, and it should be approximately the same in all cells. In charging, the temperature of the electrolyte should never be allowed to rise to a point higher than 100 degrees Fahrenheit. The rise in temperature is usually due to the rate at which the cells are being charged. The lower the rate the lower the temperature of the battery for the same room temperature. Low temperatures are in no way injurious to the cells, but they have the effect of temporarily reducing the battery's discharge capacity. This is noticeable in cold weather when the capacity is reduced in proportion to the temperature and at zero, Fahrenheit, the loss in capacity is about 50 per cent. A return to normal temperature, however, restores the capacity. For the benefit of those not familiar with batteries it is stated that they should never be discharged below the point of exhaustion—1.80 volts a cell when the current is flowing. Thus with a three cell the voltage should not be allowed to fall below 5.40 volts.

Care of Cells and Containers.

In charging a battery removed from the car care should be taken to remove the vent plugs and to see that the vent holes of these members are free when they are replaced. The top and sides of the case should be wiped until dry and if moisture be present, due to the acid, apply a solution of bicarbonate of soda (cooking soda) and water to neutralize the acid, then wipe the case with a cloth dampened with water, and when dry rub down with linseed oil. Another method is to employ a piece of waste dipped in ammonia for removing the acid.

Regardless of the method of charging the battery, whether it be by the generator on the automobile, by lamps on a direct circuit, through a rheostat, or by an alternating current with a rectifier, the rates advised by the maker as well as his instructions, should be followed to the very letter. By fulfilling these conditions maximum efficiency will be secured and economy effected. The very general establishment of service stations by the leading battery manufacturers enables the motorist to secure equipment essential to the upkeep of the cells and provides a place where the batteries may be properly cared for at a minimum of expense when they are not to be used for a considerable period.

Care of Edison Batteries.

The Edison batteries, made by the Edison Storage Battery Company, Orange, N. J., differ from those previously described in that the active material of the positive plates is a nickel oxide in perforated steel tubes reinforced by eight

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steel bands, equidistantly spaced. The tubes are flanged at both ends and held in contact with a steel supporting grid. The negative active material is iron oxide tightly packed into perforated steel pockets, these being inserted in a grid and subjected to great pressure between dies which corrugate the surface of the pockets and force them into practically integral contact with the grid. The jar or container is of cold rolled sheet steel with seams welded by the autogenous process and the protective coating of nickel is fused into the metal.

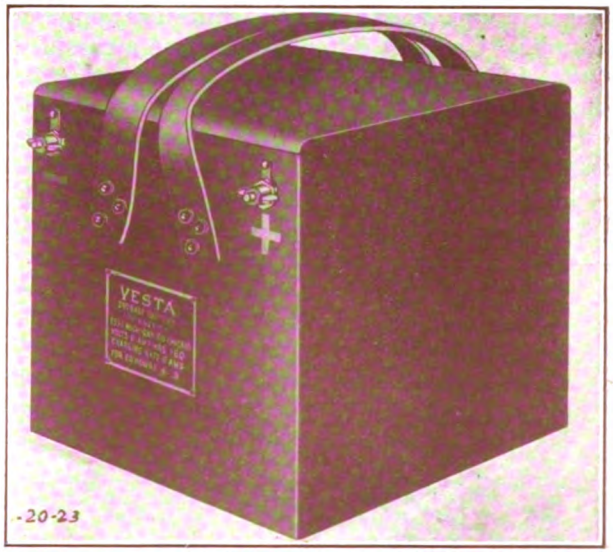
The electrolyte is a 21 per cent. solution of caustic potash in distilled water with a small quantity of lithium. Charges or discharges have no effect upon the density of the electrolyte and the condition of the cells may be ascertained fairly accurately with a voltmeter. The battery may be overcharged without injury and given boosting charges, as well as discharged at high rates. One of its qualities is that it may be left for a considerable period in a discharged condition without impairing its efficiency and is restored to its normal capacity by charging and discharging. After 250 charges and discharges the electrolyte should be renewed. It requires no other attention than the addition of distilled water in sufficient volume to keep the plates submerged.

Measuring Instruments.

Accurate reading instruments are essential in the upkeep of storage batteries. In testing the cells an ammeter is not practical on account of the exceedingly low resistance of the circuit which would cause rapid discharge of the battery and injury. In addition an ammeter connected across the terminals would not serve any useful purpose. When the cells are being charged a chemical action is set up which increases the pressure or potential between the positive and negative plates. As long as this circuit is open this pressure continues, but as soon as a circuit is made between the two elements chemical action takes place in an opposite direction, reducing the pressure or difference of potential between the two plates. For this reason it is customary to utilize a voltmeter having high resistance and requiring practically no current to operate it. Very often a condition exists in a battery that will cause it to maintain its voltage when idle, but this voltage will drop instantly when the cells are in service. Therefore it is more satisfactory to test a battery with a voltmeter when performing its work.

The Hoyt Electrical Instrument Works, Penacook, N. H., maker of current indicating devices, announces the perfection of a pocket voltmeter of the coil type which the company holds is superior to the conventional type which has an iron moving element. With the latter type there is considerable heating error, and the range between a fully and partially charged battery is so slight that the indication of such an instrument is misleading. The new meter averages about 40 ohms a volt, is dead beat in action, is slightly larger than a watch and is moderately priced.

An ammeter is utilized for showing the rate at which the battery is being charged or the amount of current that is being drawn from it. It is connected in series in the circuit, usually close to the battery and between the latter and the dynamo. One of the leads to which the load is connected is usually tapped off from this wire



The Vesta Lighting Batteries Are Constructed with Different Voltages and Capacities.

between the ammeter and the dynamo so that when the latter is charging the battery the ammeter reads in one direction marked "Charge." When the battery is supplying current for the load the instrument reads in the opposite direction marked "Discharge." The various instruments, including those employed in testing batteries as well as those utilized in connection with lighting systems, are illustrated herein.

The Atlanta Automobile & Accessory Association has appointed a committee to co-operate with a similar committee of the Jacksonville Automobile Club in promoting a run from Jacksonville, Fla., to Atlanta, Ga., in April.

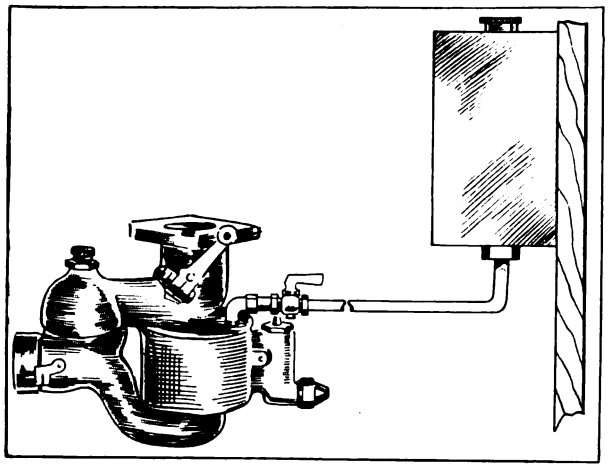
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A STARTING SUGGESTION.

Various methods are employed for starting a cold motor such as priming the cylinders or intake manifold, flooding the carburetor, applying heat, etc. One that differs from those mentioned is that followed by a reader of The Automobile Journal and the device is depicted in an accompanying illustration. It is inexpensive and is installed easily.

The principle involved is that of priming or flooding the carburetor with a high test gasoline,



A Suggestion for Priming the Carburetor for Starting a Cold Motor.

but the user of the system states that he employs a mixture of sulphuric ether and ordinary motor fuel, using about 25 per cent. of the latter. The mixture being considerably lighter than the fuel in the carburetor it rises to the top, and flooding the vaporizer produces a condition similar to that obtained by priming, or "tickling" the float. Being highly volatile the fluid vaporizes easily.

As will be noted by the drawing a small container, holding about a quart, is secured to the inside of the dash and a pipe is led to the top of the float chamber. Inserted in the line and near the carburetor is a petcock. In installing the float chamber is drilled and then tapped to take an elbow, the pipe connected and petcock attached. The container should be provided with a filler cap which should have a small air vent.

To utilize the device the petcock is opened for a brief period and the carburetor flooded with the mixture. The inventor states that he has been very successful in starting his motor on the coldest of mornings and that it is an easy matter to determine when the float chamber is flooded by the dripping of the fluid as when priming in the usual manner. As outlined it is necessary to raise the hood, but this could be eliminated by placing the petcock on the driver's side of the dash if desired.

CARE OF TIRE CHAINS.

It is an excellent plan to examine the tire chains from time to time and note the condition of the cross links. These members will wear, especially when employed in city driving. Links worn thin should be replaced with new members. Never drive with the chains so loose that they strike the fenders. They not only injure the mudguards, but the shoes are likely to become damaged. After removing the chains from the wheels they should be cleaned and allowed to dry before being replaced in the bag.

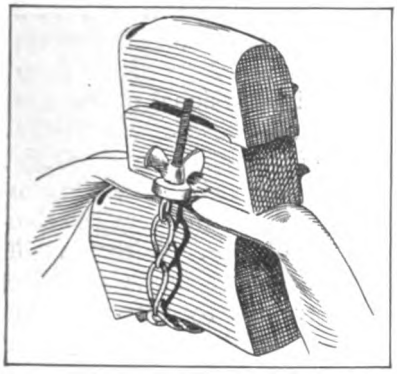
GRAPHITING THE RIMS.

Tire rims require more attention in the winter and spring than during the summer as the thoroughfares are more or less wet and the rims are subjected to moisture. The tires should be removed from the rims and the latter cleaned, then covered with a mixture of graphite and oil. This will also prevent the entrance of water.

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VULCANIZING INNER TUBES AND TIRES.

VULCANIZING inner tubes and even shoes is now being taken up by many motorists who formerly relied upon the tire expert for work of this nature. The marketing of a large number of vulcanizers which automatically perform the repair and with a minimum of attention, has led many to undertake the maintenance of both tires and tubes. Aside from the matter of convenience, making it possible as it does for the owner to obtain his work promptly, a considerable economy is effected. When it is considered that it costs about 50 cents to have a fair sized puncture vulcanized and the motorist is obliged to make two trips to secure the tube, the home or garage outfit is an attractive proposition.



McVey Vulcanizer Using Gasoline.

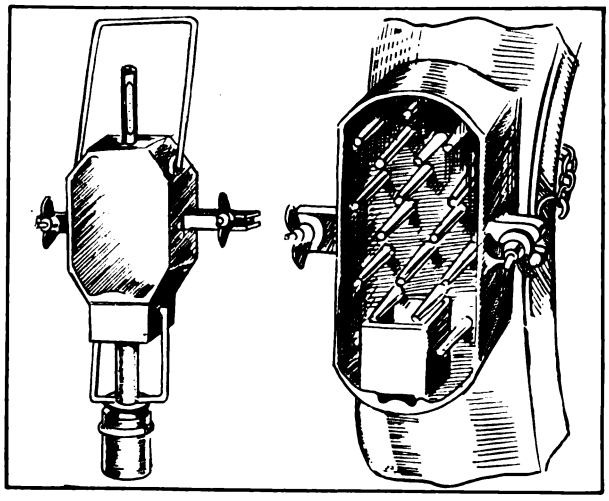
From the economical point of view a suitable vulcanizing outfit is a good investment. Punctured inner tubes cannot be used until repaired, but it is not so with cut or damaged casings. Frequently an owner will note a cut in the tread, but will avoid carrying the tire down street to the repair shop, especially when obliged to use a trolley car. With the garage outfit it is a simple matter to vulcanize the cut and some vulcanizers are constructed so that the work may be performed without removing the casing from the wheel.

The cost of a vulcanizing outfit varies from a few dollars to as high as $25 or more, but a serviceable one may be secured for about $5. The most inexpensive members are adaptable for repairing inner tubes. Gasoline is utilized as a fuel and the heat is regulated by the construction of the vulcanizer itself. One of this type is the McVey, shown in an accompanying illustration and produced by the McVey Manufacturing Company, Dayton, O. It is filled with an ounce of gasoline which when ignited by a match will burn out and retain sufficient heat to vulcanize properly. The outfit is very compact, may be carried in the tool box, and comprises in addition to the vulcanizer, cement, rubber, scissors, etc.

The Mascot vulcanizer, also illustrated, operates on a similar principle, and is adaptable to both inner tubes and casings. The work is performed automatically and the device is provided with a chain and clamps for securing it to the shoe, which need not be removed from the wheel. The outfit is very complete, comprising a roll of rubber, cement, sandpaper, shears, etc.

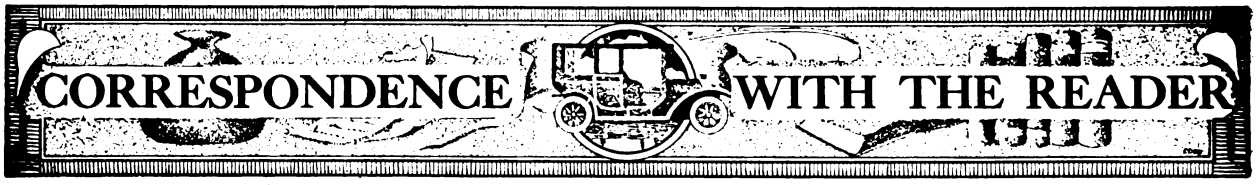
The National Motor Supply Company, Cleveland, O., maker of the Mascot, also produces the National portable steam vulcanizer, which comprises a hollow metal body partly filled with water and sealed. It is heated by a wood alcohol lamp with an adjustable burner and the device operates on the same principle as the large steam vulcanizers. A thermometer enables one to note the temperature. It is stated that it requires but a few minutes to develop steam. Two vulcanizing surfaces are provided, one curved for casings and the other flat, for tubes. It is moderately priced.

With any equipment the maker supplies explicit instructions as to its operation and several illustrate the various processes of repairing casings. With a moderately priced outfit one could overhaul and place the tires and tubes in first class condition at a slight cost. With a large outfit, such as is designed for the private garage, one could easily pay for the outfit in a short time by doing repair work for motorists in the neighborhood. Instructive data upon tire repairing are furnished free of charge upon application by the makers of vulcanizing outfits.



National Portable Steam and Mascot Vulcanizers, Adapted for Owners Who Make Tire Repairs.

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Flexible Couplings.

(1493)—I noted in your issue of Jan. 25th mention of flexible couplings employed on several cars to drive the magneto. Am contemplating installing a magneto, driving it from an extension shaft and mounting it on a bracket or frame. Was told by a repairman that it would be necessary to have both shafts line up perfectly and that it was a job that could not be done other than by an expert. Could I not employ a flexible coupling and what type would you advise? INFORMATION.

Danbury, Conn., Feb. 25.

The flexible couplings referred to were of the leather type and constructed by the car makers. Announcement is made by the Bosch Magneto Company, New York City, of a new adjustable flexible coupling which would be adaptable to drive a magneto installed as mentioned.

The device, which is shown assembled at Fig. 1, permits the driven unit to operate both out of centre and out of line, eliminating the need for exact alignment of the magneto and driving shaft as mentioned by the repairman. Another advantage of the Bosch device is that the magneto may be displaced without disturbing the timing or any part of the driving mechanism.

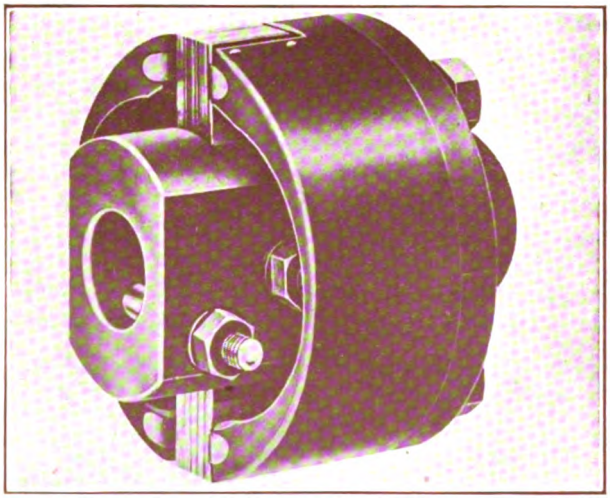


Fig. 1—Bosch Adjustable Flexible Coupling Permitting Driven Unit to Operate Out of Centre or Line, and Change of Timing Without Removing Magneto.

The Bosch coupling comprises a cone shaped piece of steel attached to the armature shaft and terminating in a ring having diametrical fibre lined slots. To the driving shaft is secured a flange that carries a flat crossbar consisting of a large number of fine spring steel leaves or plates. The crossbar fits in the slots or recesses of the cone shaped member, as is shown at Fig. 2.

The laminated crossbar has a marked spring action and permits the two members of the coupling to have a slight relative torsional movement, which is ample to absorb the shock of varying resistance to the rotation of the magneto armature. The spring crossbar also has a slight bending or twisting movement sideways, permitting the two shafts to be slightly out of line. With a rigid coupling the driving and driven shafts must be aligned, and the shock created by the magnetic resistance is transmitted to the driving gears, producing noise. Noisy action is eliminated in the Bosch spring crossbar and ring by lining the cavities with fibre, which in addition, obviates the necessity for lubrication.

The cone shaped member of the coupling is made with proper tapers for various types of Bosch magnetos, a recess being provided for the armature nut. This section is keyed to the armature shaft, while the other member of the coupling may be attached to the driving shaft by a key or the bolt which accompanies the coupling.

Where the adjustable flexible coupling differs particularly from the usual flexible coupling is in the construction of the cone shaped member. In the adjustable type this is made in two parts instead of one, the portion engaging the driving member having a circular groove carrying three bolts with tapered heads, as is shown at Fig. 2, which depicts the disassembled coupling.

The portion which is actually secured to the armature shaft is an ordinary flange having three holes in which the taper headed bolts register. When the nuts on these bolts are set up tight there can be no relative motion between the two portions, due to the binding effect of the taper; so that the sections become as one. Upon loosening the nuts, the magneto armature, together with its portion of the coupling, can be rotated through a complete circle.

A vernier engraved on the stationary portion permits accurate regulation to any degree and on this account the magneto may be mounted on the motor without reference to the timing and the armature set in any position after the entire apparatus is fixed. The construction permits of tests being made to secure the best results from timing without changing keyways, cotter pins,

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etc.; or in other words, the position of the armature may be altered slightly after installing the magneto, a condition not possible with rigid couplings without considerable labor.

Ford Transmissions.

(1494)—Can you inform me if the Ford Motor Company ever fitted a transmission other than the planetary to its cars? FORD OWNER.
Cleveland, O., Feb. 26.

The Ford Motor Company always has installed the planetary type of transmission on its cars.

Imperial and U. S. Gallon.

(1495)—I note that the price of gasoline is much higher in England than it is in this country, but I have been informed that a British gallon is larger than the American. If so, what is the difference? AMERICAN.
Little Compton, R. I., March 1.

The Imperial or British gallon is larger than that in use in the United States. The former contains 277.274 cubic inches while the latter is given as 231.

The British Imperial gallon is usually defined as being equal to 277.274 cubic inches, or 10 pounds of pure water at the temperature of 62 degrees Fahrenheit and barometer at 30 inches.

The Metric System.

(1496)—In some of the descriptions of foreign motors in your book you give the bore and stroke in millimeters. How do you convert these to inches in our measurement? W. D. T.
Pittsburg, Penn., March 2.

The metric system of measurement is utilized abroad. The fundamental unit of it is the meter, the unit of length. From this the units of mass (gram) and capacity (liter) are derived. All other units are the decimal sub-divisions or multiples of these. These three units are simply related, so that for all practical purposes the volume of one kilogram of water (one liter) is equal to one cubic decimeter.

The millimeter may be converted into inches by multiplying by .03937. Conversion tables are printed in a number of hand books and were published in these columns some time ago.

Renovating Timer.

(1497)—The timer on my car is so worn that the roller jumps and causes the engine to skip. The bearings of the timer are adjustable and although I have taken up all lost motion the skipping continues. The repairman advises me to purchase a new timer. Cannot the present one be repaired? I note you answer similar questions from time to time and would like to have your advice. SUBSCRIBER.
Stonington, Conn., Feb. 25.

If the bearings of the timer are in good condition as stated it will not be necessary to secure a new one provided the commutator is fitted with a fibre or some similar insulating substance. This material, in which the contact blocks are imbedded, can be trued up in a lathe and any good machinist can perform the work, which will not be expensive. The skipping mentioned is caused by the roller jumping the blocks.

Parts for Parry Car.

(1498)—Kindly forward me the address of the company having parts for the Parry car, also name of maker of brass tubing and light brass cast T's and L's such as used on intake manifolds. F. S. R.
Northampton, Mass., March 4.

Try the Motor Car Manufacturing Company, Indianapolis, Ind., for parts for a Parry car.

Brass tubing is produced by the following concerns: Bridgeport Brass Company, Bridgeport, Conn.; Waterbury Manufacturing Company, Waterbury, Conn.; Coe Brass Manufacturing Company, Torrington, Conn.; Buffalo Tube Company, Buffalo, N. Y.; Ivins Tube

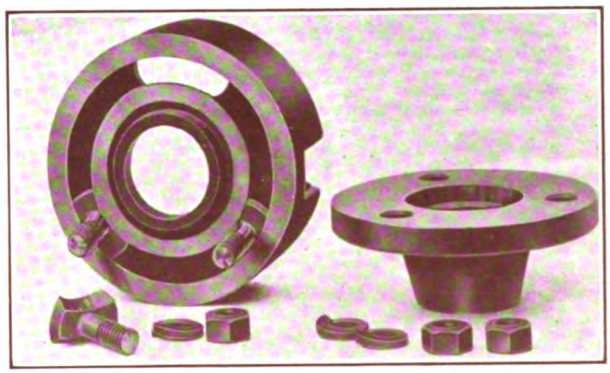


Fig. 2—Showing Components of Bosch Coupling, Including Cone Member, Flange, Crossbar and Bolts.

Works, Lane Station, Philadelphia, and Rome Brass & Copper Company, Rome, N. Y.

Intake and exhaust manifold makers, and manufacturers of castings comprise the Imperial Brass Manufacturing Company, Chicago; the A-Z Company, 530 West 56th street, New York City; Fowler Brass Works, Chicago; Fort Hill Bronze Manufacturing Company, West Everett, Mass., and the Millett Brass Company, Springfield, Mass.

Bore-Stroke Ratios.

(1499)—Availing myself of the privilege of your correspondence column I would be pleased to have you explain what is meant by the bore to stroke ratios. READER.
Hoboken, N. J., March 3.

By the term bore-stroke ratio is meant the relation of the bore or diameter of the cylinder, in inches, to the stroke of the piston in inches, with the bore considered as one. It is found by dividing the stroke by the bore.

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THE BOSTON SHOW.

In many respects the annual exhibition of the Boston Automobile Dealers' Association has proven a satisfactory indicator of the interest in the motor car industry, particularly in the matter of sales. General Manager Campbell is firmly of the opinion that the uniform success of this display has been due in no small measure to the fact that it is held at a time when the buying public is ready to make up its mind. The opening of the actual driving season is not far distant, and the enthusiasm created by the show becomes a valuable stimulant for business.

The present discussion of the show situation offers an opportunity for those directly interested in holding exhibitions of this character to study the effect of this plan upon conditions in their immediate vicinity. It will be admitted, of course, that the demand for business stimulation varies according to the section of the country. So far as Boston is concerned the dates appear to have been selected wisely.

Since the Boston show always has been a dealer's proposition, it follows that its wonderful success from every standpoint must redound to the credit of the dealers. Mr. Campbell has a proper right to reserve a generous portion for himself, but the fact remains that he has had the liberal support of the association for which he has acted.

Concerning the forthcoming show: There is every reason to predict another splendid success. The evidences presented at practically every local display throughout the country, albeit there have been many more this year than heretofore, are such as to indicate that the interest in automobiles and motoring is by no means a thing of the past. That the Boston show as an exhibition will be bigger and better than ever before is set forth in the advance announcement. There appears to be every reason for believing that this will hold true of the attendance and sales as well.

CONCERNING REGISTRATION FEES.

A special commission in New York State has been investigating the possibilities for securing some $6,000,000 in additional revenue by indirect taxation. This committee has found, among other things, that "while upward of 107,000 cars and 46,000 chauffeurs were licensed last year, the sum total received in the automobile bureau was but a little more than $1,000,000." It is not difficult for the average motorist to forecast the recommendation under such circumstances.

The committee would double the present registration fees, and makes the following interesting comment: "The increase of fees suggested is readily accomplished by an amendment to that sub-division of that section of the highway law which alone bears upon that subject."

Unfortunately, this plan of raising additional money by taxing the automobile owner is too readily accomplished. Recently, when the Minnesota legislature sought to raise additional money by this means, attorneys representing organized motorists were able to convince the committee in charge that a license tax greatly in excess of the cost of issuing the same would be unconstitutional. Perhaps the Minnesota constitution differs in this respect.

Rhode Island is considering the advisability of a universal lighting law, and it would appear that the bill is likely to be passed in the near future.

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THE AUTOMOBILE SHOW SITUATION.

Additional Opinions from Exhibition Managers, and Manufacturers of Cars and Accessories Concerning Relative Merits of National and Local Displays.

FEW men have been more closely identified with the management of automobile shows than Chester I. Campbell of Boston. He has had direct personal charge of all of the exhibitions in that city under the auspices of the Boston Automobile Dealers' Association, and of the dealers before that organization was perfected. Inasmuch as the Boston show, although at all times a dealer's proposition, has been conceded to be the biggest and best business exhibition of the year, his opinion with reference to the present discussion of national and local displays, and their respective merits, will prove of interest.

Mr. Campbell's letter, and those which follow it, comprise a continuation of the opinions expressed by motor car and accessory manufacturers and others in the last issue. They were received in response to a request directed to the exhibitors at the New York and Chicago national displays and the managers of all the principal shows in the country for a statement with reference to the letter sent to automobile makers by Albert L. Pope, president of the Pope Manufacturing Company, Hartford, Conn., suggesting the abandonment of national shows in the future, and the announcement of Chas. E. Miller, 97-103 Reade street, New York City, pioneer accessory dealer, favoring the substitution of local dealer's shows for the national events in these two cities.

Why Campbell Favors Local Shows.

Your letter of recent date in reference to the letter forwarded to the motor car manufacturers by Albert L. Pope, wherein he suggests the abandonment of the national shows at New York and Chicago, is at hand. It occurs to the writer that the attitude of Mr. Pope, and many of the other manufacturers, towards the national show situation has brought to light a detail of the show business which is little known and which is of vital importance.

The manufacturers for some 12 years past have held their annual shows at New York and Chicago. In the early years of the same it served as a meeting place for their agents, at which time these agents would "sign up" for another year and study the general make-up of the cars which they were to handle, as well as make comparisons with various other makes on exhibition. It also gave the manufacturers the opportunity of appointing new agents in unoccupied territory. At these earlier shows each agent had his best salesmen there and many sales were made in various cities of the country.

The conditions at this time, however, are very materially changed. The manufacturer meets and conquers his agent on entirely different grounds. He calls them in convention at the respective factories when the details of the new models are shown and explained. It is at these times that arrangements for the following year are made and the agent returns with either signed or cancelled contract in his pocket; hence the show as early in January in New York is altogether too late for the benefit of imparting knowledge to the agent, and too early to interest the individual in purchasing his car to be delivered several months hence. Mr. Pope in his letter to the manufacturers realizes this situation.

The Boston automobile show has stoutly maintained that the proper time for the show is in March, just previous to the opening of the spring, and it is at the time when the individual is commencing to long for the outdoor life and he feels the "Call of the Car" in his veins. That is the time the Boston show strikes and it catches the individual, enthuses the new recruit and results in signed orders.

I do not wish it understood that I believe that the New York or Chicago show should be abandoned. I certainly do not believe that should be the case; but I do believe that these shows should be held under the auspices of the automobile dealers in each of these cities, and that they should determine the time that is best suited for them to show the public the new models and to appeal to their local individual interests.

It is my personal opinion that the agent feels that the manufacturer should not attempt to control the situation in the individual cities, but that it should be left in the hands of the agents they have appointed, they having been satisfied they were proper people to represent their particular line; therefore, if the manufacturers' judgment in selecting their agents is correct, it occurs to me that they should acknowledge their agents' judgment in relation to the policy to be pursued with regard to the show situation.

Shows should not be held as a money-making scheme. They should be held with a view of securing as much publicity and advertising for the agent as it is possible to get, at the minimum cost, and I am of the opinion that in any of the large cities results can be obtained that would be very satisfactory to the dealers themselves.

Yours very truly,
CHESTER I. CAMPBELL,
Manager Boston Automobile Show.

Boston, Mass., Feb. 25.

Useless and Unnecessary Expense.

Replying to yours relative to the attitude of the Regal Motor Car Company on the holding of further national automobile shows in New York and Chicago, wish to state that we are in accord with the view expressed in Mr. Pope's recent letter on this subject. We believe that the time has come in the industry when it is a useless and unnecessary expense to hold automobile shows in the above named cities. We believe that a series of shows promoted by the different dealers' associations in the larger cities and held without conflict of dates is a stimulus to the retail trade, furnishing as it does the dealer a list of prospects which enables him to do good missionary work during the dull months and a resultant increase in sales during the normal selling season.

We are further of the belief that one national dealers' show should be held during the month of August in Detroit, Mich., which would serve the purpose of the manufacturer and dealer inasmuch as it would come at a time when all of the dealers wish to visit the factories, the majority of which are located in Detroit, and inspect new models, both as a finished product and in the process of construction. Selling contracts could then be adjusted in a much more satisfactory manner to both the manufacturer and dealer, and the dealers would return home with their contracts fully made for the coming season without holding off, awaiting the national shows, which has become a chronic excuse with a good many of them, resulting in a heavy loss of business for them and for the manufacturer, as a consequence.

Yours very truly,
REGAL MOTOR CAR COMPANY,
By G. D. WILCOX, Sales Manager.

Detroit, Mich., Feb. 13.

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Favors Discontinuing National Shows.

In regard to abandoning the national shows, will say that we are heartily in favor of discontinuing them. We have agents scattered all over the country that are well able to take care of the shows. It is necessary for us to assist them and make certain inducements for them to exhibit the Schacht cars, and we think that would be all that is necessary. So put us down as one of them in favor of discontinuing the national shows.

Yours very truly,
SCHACHT MOTOR CAR COMPANY,
By G. A. SCHACHT, President.
Cincinnati, O., Feb. 8.

Glad to Co-Operate with Dealers.

We have answered Mr. Pope's communication advising that we are heartily in accord with the general sentiment expressed by all reputable manufacturers tending toward the discontinuance of national shows. Candidly, we do not believe the expense and effort is worth the while, and certainly fall buying is held up.

If dealers in such cities as New York and Chicago wish to hold automobile shows, that is their affair. We should be glad to co-operate in the same manner as we co-operate with Omaha, Kansas City and other large cities.

Yours truly,
VELIE MOTOR VEHICLE COMPANY,
By H. T. WHEELOCK, Motor Truck Department.
Moline, Ill., Feb. 17.

Would Not Eliminate National Shows.

We might state that automobile shows probably always have and always will serve as a great educator of the public in the construction of an article that is of eminent interest to them, as well as a novelty, and unless the shows were taken up by the dealers and carried on by them in the various states, as they now are, we would not be in favor of eliminating national shows.

There is probably nothing greater the automobile world has attempted to do to stimulate interest in and educate people in the advantages of an automobile than shows, and it will be as practical to abandon publication of newspapers and let people ferret out the happenings of the day themselves as it would be to abandon automobile shows, in the hope that people would find the new things developed by personal search.

We must admit that it is a great expense to the manufacturing industry, and probably has been carried on on too extravagant lines, but we must get into the limelight with automobiles, and cannot hide our light under the bushel.

Yours very truly,
MITCHELL-LEWIS MOTOR COMPANY,
By LEO A. PEIL, General Sales Manager.
Racine, Wis., Feb. 22.

What's in a Name?

Regarding Mr. Pope's suggestion of abandoning the national automobile shows in New York and Chicago, it strikes the writer that it may be a good plan for well established companies, who are so firmly intrenched that they do not need new dealers and distributors and can rely upon their old owners for repeat orders year after year, with no advertising. You and I may doubt whether any firm is so firmly established as this. But take the case of a rather new concern putting out a car that would appeal to dealers and owners, and cut them off from the New York and Chicago shows, and you would limit their sales very materially for the first and second season. This matter can be proved by facts, if one prefers such dry things to argument and rhetoric.

Whether it is necessary that the shows in New York and Chicago be continued as national affairs, we do not know, but it strikes the writer that whether they are called dealer's shows, national shows or international shows, if continued at all, they cannot help but attract the same attention which they have always attracted.

It does seem that a show in New York or Chicago, that is planned on a big line must continue to be a national affair in fact, whether it is so in name or not. Both New York and Chicago seem to be national centres in affairs of wide scope; no man or body of men can denationalize these places. Shows of any size held in these centres are bound to have national significance no matter what the name, just as newspaper advertising in these centres always has something of a national effect, because of the wide circulation of metropolitan papers.

As far as that goes, the New York show can well claim the distinction of being an international show. There are scores of export agents, who make it a point to visit the show and use it as a basis for the placing of orders for export shipments to the most distant places of the globe.

The results obtained by the Empire Automobile Company in New York and Chicago go to prove that the Middle West manufacturer reaching out to the East can concentrate in the New York show a great deal of successful selling and advertising work, and line up important distributors, that for some reason or other could not be lined up before the New York show.

In Chicago this company was in the not unusual position of being forced to hold a private show, because of not being able to obtain adequate space in the Chicago show. This, of course, was laboring under a disadvantage, but in view of the new distributors and dealers lined up at the Chicago show, it strikes us that the Chicago show was a success for this company, which had only a "side show." Dealers and distributors from the Middle West and West go to the Chicago show because it has national significance. Many also come to Chicago from the effete East.

Very truly yours,
EMPIRE AUTOMOBILE COMPANY,
By HARLOW HYDE, Advertising Manager.
Indianapolis, Ind., Feb. 22.

Agrees with Pope, but Not with Miller.

We indorse Albert L. Pope's position regarding shows, but we do not indorse Chas. E. Miller's position. Miller's business is very largely with the dealer, and naturally he would favor a dealers' show. Our business is largely with the manufacturer, and we would like to see all shows done away with where accessory goods are shown. No accessory people could afford to make exhibits at all local shows, unless it would be the tire manufacturers, and they probably would not do so.

Speaking personally, we go to New York and Chicago with a few sets of axles and wire wheels, and spend a couple of thousand dollars to exhibit those goods. The very man we want to interest most will not even look at them—that is, the manufacturer—they know the line; know any well advertised line, and to us it seems a foolish expense. We would much rather take the same money and place it in a trade journal, believing we can get very much better results, because our publicity would be general.

Mr. Pope has placed the matter very clearly before the manufacturer, and he has stated the truth so clearly that no one can misunderstand. Chas. E. Miller's attitude is purely from a dealer's standpoint and not a broad one at all.

Very truly yours,
McCUE COMPANY,
By B. F. McCUE.
Buffalo, N. Y., Feb. 21.

Local Shows Conducive to Sales.

As manager of our local show for the past seven years and as a visitor at the national shows for the past 11 years, I feel that I have had a very fair opportunity of comparing the two forms of display. In my opinion the local show is a better proposition from every standpoint than the national show. One of the best indications of this is the remarkable growth and success of the local shows.

When I went over to the Chicago shows in 1902-3-4 and 5, I could count on meeting, 50, 60 or even 100 dealers from Nebraska who were going over to take in the big show. When I went over this last time there were not to exceed five Nebraska dealers on the train. Of course there are a great many more dealers in Nebraska than there were four of five years ago, and in talking with them and from information received from travelling salesmen who cover this territory, I find that the dealers are cutting out the national shows in favor of the Omaha exhibit.

These local shows are conducive to direct and immediate sales to a larger extent than the national shows. The dealers of this territory not only come in themselves, but in nearly every instance bring in prospective customers. Last year I remember one dealer brought in 20 live prospects for cars, and others brought in 10 to 15. You can readily understand how a dealer doing business in this territory would prefer to make a trip of this kind than to go to New York or Chicago where there was absolutely no prospect of his making sales.

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Further than this, a show such as our Omaha show really gives as much to the dealer as the show in Chicago or New York. We don't have the great number of cars on exhibition here, but we do have on display practically every well known make of car, and the models shown are those which are practicable for use in this territory. I am instancing the Omaha show as this is the only local show I have had any experience with.

Yours very truly,
C. G. POWELL, Secretary,
OMAHA AUTOMOBILE SHOW ASSOCIATION.
Omaha, Neb., Feb. 18.

Should Support Dealers' Shows.

I have long been of the opinion that there would be a much more favorable situation created for dealers if manufacturers would give support to dealers' shows in the various cities of the country. I believe that manufacturers would obtain greater benefits by affording assistance to local dealers in the maintenance of these displays. It would permit of advertising over a more extensive territory and the national shows would not then detract from the importance to the local communities of shows in the smaller cities.

Sincerely,
C. A. SIMMONS,
(Manager Albany Show.)
Albany, N. Y., Feb. 19.

In a statement issued for publication, Stewart McDonald, vice president and general manager of the Moon Motor Car Company, St. Louis, Mo., has the following to say upon this subject:

Worth Their Cost in Educational Value.

I consider automobile shows a great gathering to educate the public regarding the technical features of automobile construction and design. These shows are much less of the nature of motor marts than the average person realizes. We, for instance, rarely if ever even go so far as to ask a visitor to our exhibit anything about his intentions, or attempt in any way to offer selling arguments. We are always very glad indeed to have people manifest an interest in our various models and constructional parts, and usually have from three to six or seven young mechanical engineers, recent technical school graduates, on hand to answer questions and explain any points upon which visitors manifest a desire for more information.

I consider the great thing which the automobile shows stimulate is natural interest in automobiles, and once this interest is created the sales will follow, if your car is good, without your being compelled to resort to the strong arm methods happily absent from automobile selling, but not so far away from many industries which do not attempt to enlighten the public. Automobile shows mark the progress in the industry, and are worth their cost from the educational standpoint, entirely aside from their value in creating immediate business.

AUTOMOBILE AIDS SURGERY.

Dr. Fred Albee Utilizes Borland Electric as Portable Storage Battery.

Few men enjoy a wider reputation as a surgeon than Dr. Fred Albee of New York City. Recently he was called to the Children's Memorial Hospital in Chicago to assist Dr. E. W. Ryerson, the head of the institution, in performing a particularly delicate operation in bone surgery. In the two cases to be treated the front of the spine had been eaten away until the patients were humpbacked to a pitiful degree.

An electric motor controlling a circular saw was required in order to cut away a strip of bone .5 inch wide, .25 inch thick and about six inches long from the patient's upper leg, this being transferred to the front of the spine, thereby strengthening and straightening it in a manner necessary to heal the growth. Upon Dr. Albee's arrival from New York, however, it was made known that his instruments operated on direct electric current only, whereas all the hospital lighting was of the alternating type.

The Commonwealth Edison Company was summoned by telephone, but could do nothing beyond supplying a rectifier, which would take some time to install. Bruce Borland of the Borland-Grannis Company, maker of the Borland



Borland Electric Aids Famous Surgeon in Performing Remarkable Operation.

electric car, solved the difficulty by sending one of these machines to the hospital. An accompanying illustration shows the car, from which a cord led to the third story hospital window, supplying the necessary direct current for the surgical instruments.

Dr. Ryerson has utilized Borland electric cars in three other similar instances, and is enthusiastic in his recommendation of their ability as movable storage batteries.

A new motor organization, to be known as the Washington Motorists' Association, is being organized to take the place of the Automobile Club of Washington, D. C., recently disbanded.

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NEW AND NOVEL ACCESSORIES THAT APPEAL TO MOTORISTS

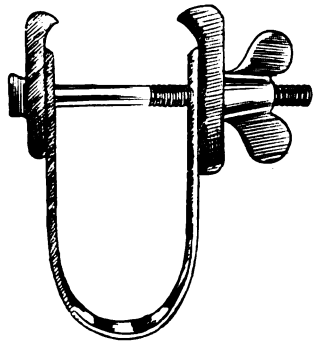
Security Spring Spreaders are produced by the Security Reliner Company, Montgomery, N. Y., and as the name implies are utilized to spread the leaves of vehicle springs so that they may be cleaned and lubricated. The device is in the form of a clamp having a threaded bolt and wing nut. The clamp carries a pair of pointed jaws, which face each other and are slipped between the leaves and tightened by the wing nut. This separates the leaves enough to permit of introducing the cleaning and lubricating elements. The Security spring spreader is moderately priced.

★

The Gilmer Fan Belt is manufactured by the L. H. Gilmer Company, 52 North Seventh street, Philadelphia. It is of the endless type, being woven and constructed of a material which is held to be oil and water proof. It is made especially for model T Ford automobiles and one of the qualities emphasized is its gripping ability, the maker holding that greater efficiency is secured by allowing it to run loosely. It is inexpensive.

★

The Automatic Fire Extinguisher is the product of the Inst Lighter Company, Columbus, O., and operates on the sprinkler principle. It comprises a metal container which is mounted on the front of the dash inside the hood, and carries a fusible head which melts when subjected to a certain temperature. The vessel contains about 2000 cubic feet of heavy fire extinguishing gas, called "Fire Out," which smothers the flames when the fusible head of the container is melted.



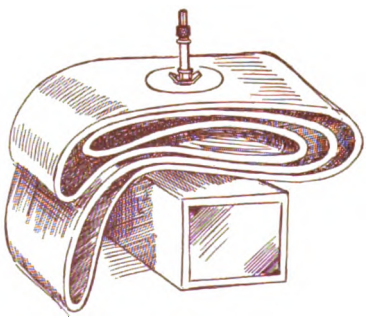
Security Spring Spreader



Gilmer Fan Belt



Automatic Fire Extinguisher



Endurance Inner Tube

Endurance Red Inner Tubes are produced by the Endurance Tire & Rubber Company, New Brunswick, N. J., and qualities emphasized are thick and substantial construction, and the use of a high grade of rubber. It is held that their durability is due to the special process of treating the materials and that they are patched easily. Endurance tubes are guaranteed and are constructed for both automobiles and motorcycles.

★

The Chau-Phone is the product of the Western Electric Company, Chicago, and is an automobile telephone. It comprises a hand transmitter for the passenger connected to a loud speaking receiver located conveniently to the chauffeur's ear and is designed to replace the conventional speaking tube. It is claimed by the maker that ordinary tones are magnified by the megaphone shaped receiver and that it is not affected by the vibration of the car or the wind. It is operated by six-volt batteries and may be connected to the usual members. The transmitter is provided with a gravity switch, entirely automatic in its action, the circuit being broken when the transmitter is replaced in its pocket, which may be located as desired. The receiver is weather proof and is finished in dull black, nickel or polished brass.

★

The Improved Priming Cup is marketed by the Auto Parts Company, West Jackson boulevard, Chicago, and is operated easily, the work involving a quarter-turn of the handle. It is claimed by the maker that it will not leak or stick and that it may be attached in places not adaptable

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to other forms of priming devices. It is constructed with short, long and angle shanks, .125 and .25 inch. The cups are inexpensive.

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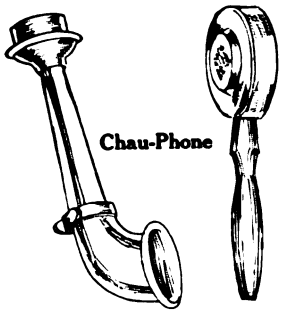
The Gemco Ventilator is manufactured by the Garage Equipment Company, Milwaukee, Wis., to provide ventilation of fore door cars by moving the lower half of the windshield and deflecting the currents of air. The device is bolted to the filler board or dash and has a sliding member which is secured to the frame of the shield by two screws. A screw having a knurled head is utilized to lock the sliding member in position, the maximum adjustment permitted being two inches. Two ventilators comprise a set and they are finished in brass or nickel. They are moderately priced.

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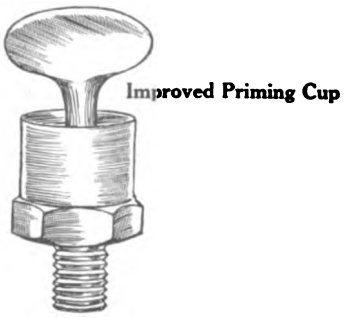
The Detroit Auto Heater is manufactured by the Detroit Auto Heater Company, Detroit, and differs from the usual heaters in that provision is made for conveying warmth to the front compartment of the car as well as the tonneau. The exhaust gases from the motor are led to the heaters and after passing through these members are conveyed by a tubing to the muffler. Means are provided to adjust the heat as well as to shut off the supply and without interfering with the operation of the muffler. The heaters are neatly finished, all castings being of aluminum, and being compact do not occupy much room. The equipment is moderately priced and the maker states it may be installed easily.

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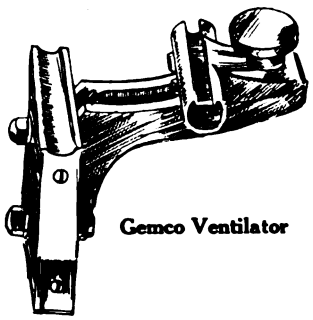
The Halladay Package Carrier will be appreciated by motorists who have attempted to secure packages or dress suit-



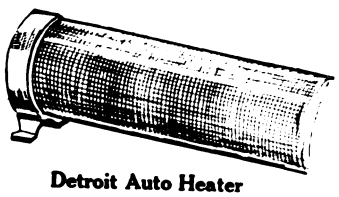
Chau-Phone



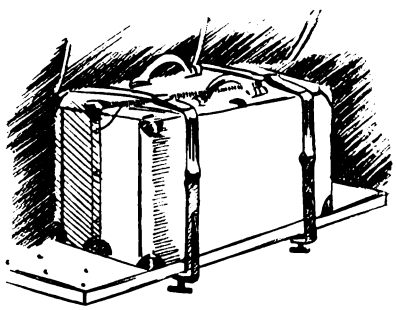
Improved Priming Cup



Gemco Ventilator



Detroit Auto Heater



Halladay Package Carrier

cases to the running board with ordinary straps or rope. The device comprises two metal arms, to the upper end of which straps are secured, these having the usual buckle for making adjustments. The lower portion of one is provided with an arm, while the other carries a wing nut and clamp. The second holder is slidably mounted, permitting the carrying of a thin or thick package, which is retained by the arms and heavy straps. The carrier is finished in black japan and a quality claimed for it is that it does not injure the running board. It is made by the L. P. Halladay Company, Streator, Ill.

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The Tesla Light is manufactured by the Tesla Auto Light Company, 1324 Michigan boulevard, Chicago, and is designed to comply with the laws of those states which require the license numbers to be illuminated after dark. Some ordinances provide that the numbers shall be legible at a distance of not less than 150 feet and others at more. The Tesla is an electrical unit and in addition to the usual red semaphore comprises illuminated numbers.

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Barco Motorcycle Chimes are manufactured by the Barco Brass & Joint Company, Chicago, and the 1913 design is an improvement over previous models. Three harmonizing notes are produced by the exhaust gases and the volume of sound is controlled by the rider. The signal is operated by a lever conveniently located, and it is claimed that the actuating valve will not clog or become loose. The horn is attached in the exhaust pipe and all parts are heavily nickel plated. Valves vary from .875

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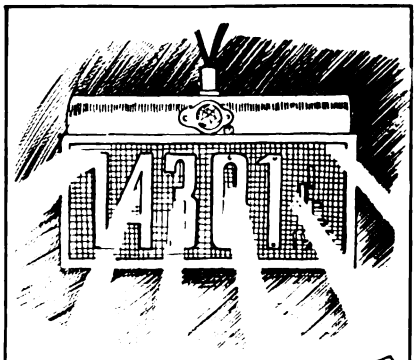
to 1.5 inches. The signal is moderately priced.

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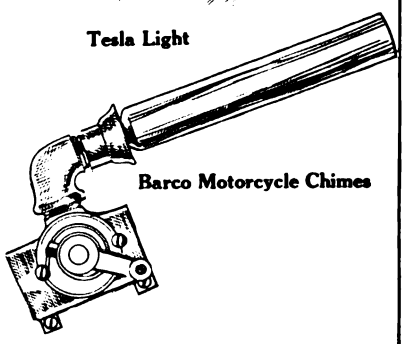
The Jubilee Two-Tone Horn, manufactured by the Randall-Faichney Company, Jamaica Plain, Boston, is actuated by the exhaust gases of the motor and operated by the conventional pedal. Its tone is clear and penetrating but not harsh, and the volume of sound is controllable. It is constructed of high grade material and comes complete with cable, brass pedal, attaching coupling, cable clamps, pulleys, etc. It is installed easily and is constructed for cars of varying horsepower, etc. It is moderately priced.

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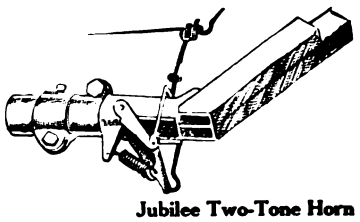
Woodward Tire Pumps, manufactured by Woodward & Son, 1229 Nicholas building, Toledo, O., are automatic, stopping when the predetermined amount of air has been pumped into the tire. The pump is a two-cylinder opposed unit, having a 1.125-inch bore and stroke. It is stated that it will pump 2.5 cubic inches of free air each revolution and compress it to 200 pounds. It is double acting, giving an impulse of air at every stroke. It is permanently attached to the car by means of adjustable brackets and is actuated by the motor through friction, a leather faced wedge shaped wheel being moved into contact with the periphery of the flywheel. The friction member is thrown into engagement by a small starting lever mounted on the floorboard of the car and the dash is provided with a connection for the hose. The latter is a high grade flexible tubing, 10 feet long, and is equipped with a connection for the dash member. When the flywheel is enclosed the pump



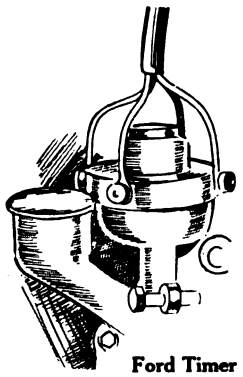
Tesla Light



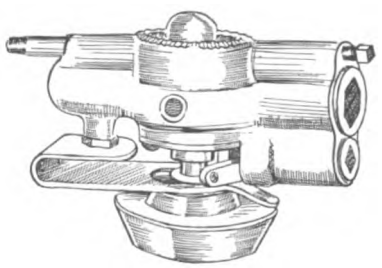
Barco Motorcycle Chimes



Jubilee Two-Tone Horn



Ford Timer Device



Woodward Tire Pump

is operated by a gear and a slip gear on some exposed shaft, such as the pump, magneto, or the secondary on the transmission or camshaft. Means are provided for meshing and releasing the gears automatically. The lubricant utilized with the pump is entirely vegetable and the maker states it will not injure a tire no matter how much it is employed.

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The Ford Timer elevating device is marketed by the Ford Parts Specialty Company, 1211 Main street, Richmond, Ind. It is adapted to replace the usual model T Ford timer and when installed is held to make for greater accessibility as well as convenience. The timer is placed in a vertical position instead of horizontal, this being accomplished by an adapter. The timer shaft is actuated by hardened spiral gears and the commutator is constructed of high grade material and nicely finished. The maker states that the device is easily installed, the work requiring no special tools and that greater motor efficiency is possible through accurate timing of the break of the primary circuit. Another feature emphasized is that the wires are easily accessible in the event of a short circuit or breakage.

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The Schoen-Jackson hot air pipe connection is manufactured by the Schoen-Jackson Company, Media, Penn., maker of the Feps carburetor. It is constructed to convey heated air from the exhaust pipe or manifold to the intake port of the carburetor, thereby assisting in the vaporization of the fuel as well as making for economy. The part fitting the vaporizer is a one-piece brass stamping and the tubing is

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flexible. A two-piece member is employed for attaching to the exhaust pipe and this is secured by screws having locknuts. It is moderately priced.

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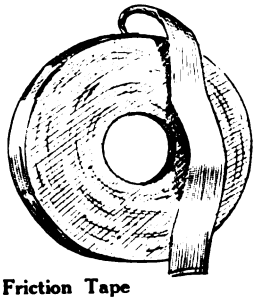
J-M Friction Tape is the product of the H. W. Johns-Manville Company, New York City. It is carefully constructed, being closely woven and having both sides uniformly covered with insulating compounds. Every thread is thoroughly impregnated by a specially designed machine, insuring great insulating efficiency and adhesive power. It is made for insulating automobile and electric light wiring and a quality emphasized with it is that it will not dry up and lose its efficiency. It is made in two brands, Nos. 3 and 4, and is put up in one, two, four and eight-ounce rolls, .75-inch wide.

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The Staon Tire Gauge is the product of the Advance Specialty Company, Rochester, N. Y., and a feature of the device is its compactness, measuring as it does less than two inches in height and one inch in width. It is attached by screwing onto the valve stem and need not be removed except when changing tires. The calibrated dial is concealed and protected by a cover which is opened easily, enabling the driver to note at a glance whether the shoe needs inflation. It is stated that the gauges will not leak and that rubber packings are unnecessary. They are constructed on the same general principle as a steam gauge, employing a hollow curved tube, known as a Bourbon tube, to actuate the pointers, this tending to straighten out under the influence of the pressure. They



S-J Hot Air Pipe



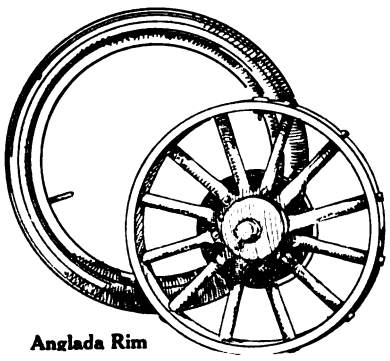
J-M Friction Tape



Staon Tire Gauge

Tinol Solder-Stick





Anglada Rim

are packed in sets of four, one for each wheel, in a handsome case and a pair of nickeled wrenches accompanies each outfit. All parts are nickel plated.

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The Tinol Solder Stick is a new form of solder of that name brought out by Hess & Son, 1031 Chestnut street, Philadelphia. The stick is about five inches long, sells for a few cents and does not require flux or acid. To use it the part to be mended is heated and the solder applied. All that is essential is to have the work clean. One stick comprises enough material to complete a number of repairs and being compact is carried easily in the tool kit. It is held that the flame of a match or a candle is sufficient to heat the part and melt the solder.

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The Anglada Rim, manufactured by the Anglada Company, 650 Woodward avenue, Detroit, is of the quick demountable detachable type and it is held to be applicable to wire as well as wood wheels. Features claimed for the construction are that it may be fitted to wood wheels without rebuilding; that it can be applied to all existing types of quick detachable rims, and that all standard makes of clincher and quick detachable tires fit the rim. The construction is simple, nuts, bolts, clamps, washers, etc., being eliminated. It has a series of strong clips formed integral with it, while the band on the wheel carries integral lugs with which the clips engage and lock when an eccentric is turned. To remove the rim a hexagon locknut on the stem of the eccentric is loosened and the clips are disengaged by turning the eccentric in the opposite direction.

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HOLLAND WITH DETROIT ELECTRIC.

Well Known Authority on Storage Battery Development Heads Research Department.

The Anderson Electric Car Company, maker of the Detroit electric, has appointed Walter E. Holland manager of its mechanical and electrical research department. Mr. Holland is an electrical engineer of high standing and his reputation as an authority on storage batteries and their applications is well known. From January, 1911, to February, 1913, he was chief electrical engineer of the Edison Storage Battery Company of West Orange, N. J.



Walter E. Holland, Electrical Expert, with Anderson Electric Car Company.

Mr. Holland was associated with the Edison companies as early as 1902, aiding in the development of the first types of the Edison battery, which included tests of lead-acid batteries and road tests of various types of electric vehicles, equipped with both types of battery. Subsequently he was closely connected with Thomas A. Edison in various lines of research work and won the high personal regard of the great inventor. Mr. Holland is responsible for many important discoveries in connection with storage batteries and has invented a number of improvements in them. He has written articles and presented papers before engineering societies, a number of which were later translated into several languages. His appointment by the Anderson Electric Car Company is most important and is assurance that the Detroit electric will be still further perfected through the expert knowledge of Mr. Holland.

RE-ELECTS OLD BOARD.

Recently Organized Manhasset Company Anticipates Successful Business in Tire Fabrics.

At the annual meeting of the stockholders of the Manhasset Manufacturing Company, Putnam, Conn., held at the company's offices at Providence, R. I., it was unanimously voted to increase the capital stock of the concern from $175,000 to $250,000 by an issue of 7 per cent. cumulative preferred stock. This action was made necessary in order to care for the increased business since the start of operations six months ago. Ninety per cent. of the total stock was represented at the meeting. The company manufactures high grade fabrics for use in automobile tires and it anticipates a very prosperous year.

The concern was incorporated under the laws of Rhode Island, with offices at Providence, the factory being located at Putnam, Conn. The treasurer's report showed a gratifying financial gain and the following officers were re-elected: President, E. V. Livesey, Fall River, Mass.; vice

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president, Albert Howarth, Providence, R. I.; treasurer and agent, R. H. Ballou, Woonsocket, R. I.; secretary, H. J. Thayer, Putnam, Conn. These four, with William Muir and C. A. Lord of Providence, and William S. Cherry of Fall River, form the board of directors.

NEW TRUCK CONCERN.

Admiral Motor Company to Be Organized to Produce 1000-Pound Wagon in St. Louis.

It is said that the Admiral Motor Company will soon begin manufacturing operations at St. Louis, Mo. Don E. Evans, now acting as sales manager for the Alma Manufacturing Company, St. Louis, will act as general manager for the new concern, which is expected to produce an approved type of motor truck.

The vehicle will be a 1000-pound wagon. Work will be started with about a dozen men, it is said, but the force and output will soon be increased. A light farm tractor will also be manufactured. It is stated that citizens of St. Louis already have subscribed for $10,000 of preferred stock, the total capital being $50,000.

TO PRODUCE HOFF CAR.

Company Organized at La Crosse, Wis., to Promote Design of Hofweber Brothers.

The organization of the Hoff Motor Company, a $1,000.000 corporation, to manufacture automobiles at La Crosse, Wis., is said practically to have been completed. The articles state that $100,000 of the capital has been subscribed and the right to increase the capitalization to $100,000,000 is reserved. The idea of a factory at La Crosse was proposed by Joseph E. Hofweber of 1606 Jackson street, that city, who has constructed a model car at Detroit, with the aid of his brother, August Hofweber. Should the capital be placed at $1,000,000 eventually, it is understood there will be $250,000 preferred stock and $750,000 of common stock issued.

The tentative plan submitted to the stock subscribers provides for the manufacture of the first 20 cars at Detroit. These will be given a thorough test in various parts of the country before others are made. When the success of the new machine has been demonstrated to the satisfaction of the organizers and stockholders, a plant will be erected at La Crosse and business started on an extensive scale.

IS PURCHASING AGENT.

E. E. Westman Leaves Cole Forces to Join Interests with Henderson Company.

E. E. Westman, who has been purchasing agent for the Cole Motor Car Company, Indianapolis, Ind., since October, 1909, has resigned to accept a similar position with the Henderson Motor Car Company of that city. As a result of the move he will again be associated with J. M. Smith, formerly factory manager of the Cole company, who is now the Henderson factory manager.

Mr. Westman has been regarded as an important factor in the success of the Cole, and before his connection with that company he held a responsible position with the Weston-Mott Company of Flint, Mich., for some time. The Henderson brothers were well informed of his ability through their close connection with the Cole factory organization during the life of the Henderson Motor Sales Company, which acted as Cole distributor for a number of years. His acquirement is another step in the plan of the Hendersons to strengthen their organization by the addition of some of the best talent in the automobile industry.



E. E. Westman, Purchasing Agent, Henderson Motor Car Company.

ADDED MANUFACTURING FACILITIES.

Ford Plant at Long Island City Preparing for Increased Business in Its District.

A recent consignment of Ford cars to arrive from the home factory at Detroit, at the sub-factory at Long Island City, N. Y., made up 93 carloads, of which about 60 were of automobiles in the rough, and the 33 others of semi-assembled

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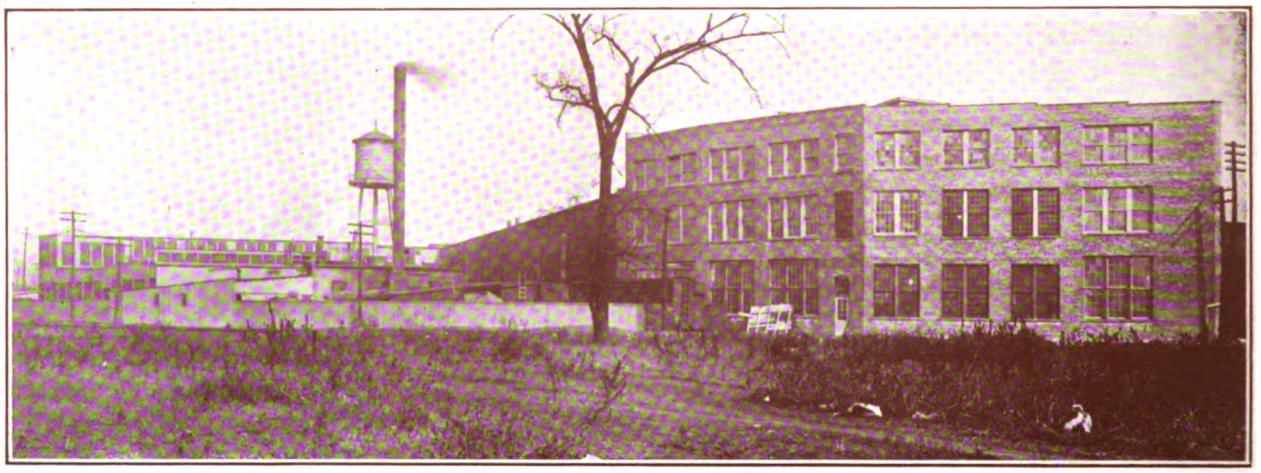
machines. The entire train load comprised about 700 Ford automobiles.

A large addition is being built to the Long Island plant and still another building is to be added, it is stated. New York has contracted for 13,500 Ford machines this year and the Boston branch, which is in the same district, will take 10,000.

FACTORY ADDITION COMPLETED.

Three-Story Building Provides Much Needed Room for National Motor Vehicle Company.

The National Motor Vehicle Company, Indianapolis, Ind., maker of National cars, has completed another addition to its already large plant in the Indiana metropolis. The latest addition, required by the steady increase in business, is a modern brick and cement building that allows general expansion and at the same time increases efficiency and eliminates any possible lost motion in getting materials from one department to another.



Two-Story Addition Recently Completed for the National Motor Vehicle Company, Maker of National Cars at Indianapolis, Ind.

The new building, shown in an accompanying illustration, allows 20,000 feet of floor space and there are three floors. It is built at the rear of the company's 22nd street plant. On the first floor will be a general expansion of the machine shops, while the second floor will permit an enlargement of the paint department and the installation of modern equipment. The top floor provides an enlargement of the trimming and upholstery departments and has been especially arranged to afford exceptionally good light and ventilation. The National factories are now working day and night shifts.

GOODYEAR INTERESTS INVOLVED.

Purchase Control of the Killingly Company, Engaged in Manufacturing Cotton Goods.

Interests identified with the Goodyear Tire & Rubber Company, Akron, O., maker of Goodyear tires, have purchased the control of the Killingly Manufacturing Company, which has a plant at Williamsville, in the town of Killingly, Conn., for the manufacture of cotton goods. These men have entered the directorate, which has elected a new set of officers.

The official roster of the firm follows: President, Benjamin F. Smith of the B. F. Smith Construction Company, Pawtucket, R. I.; vice president, P. W. Litchfield, Akron, O.; treasurer, W. E. Palmer, Akron, O.; assistant treasurer, W. Irving Bullard, Danielson, Conn. These men and W. T. Teagan of Boston and A. M. Bannister of Providence, R. I., make up the new board of directors. Material improvements and additions to the plant will be made in the near future.

CAPT. LEWIS RESIGNS.

Joseph Winterbotham Becomes Head of the Mitchell-Lewis Motor Company.

Announcement is made by the Mitchell-Lewis Motor Company, Racine, Wis., maker of Mitchell cars, that Joseph Winterbotham, Jr., of Chicago, has been elected president of the concern, to succeed Capt. William Mitchell Lewis, resigned. Mr. Winterbotham for the past two years has represented the banking interests that have financed the Mitchell-Lewis concern.

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PNEUMATIC TIRES UNNECESSARY.

Kansas City Plant to Produce Cars Equipped with Patented Steel Wheels.

J. North Carnahan of Washington, D. C., representative of the Bernston Steel Wheel Company, Bethlehem, Penn., is quoted as saying that the company will establish a new automobile factory at Kansas City, Mo., which will feature a recently patented steel wheel in an assembled car. The factory is to be one of a chain of six throughout the United States.

According to information from Kansas City, the company only manufactures the steel wheels, the motor cars proper being purchased by contract and assembled at the Bernston shops. The Bernston wheel is made with steel spokes in such manner that it is claimed pneumatic tires are unnecessary.

STREATOR PLANT REOPENED.

Limited Number of Cars Being Made and Halladay Owners Assured of Service.

It is reported that the Streator Motor Company plant, Streator, Ill., in which Halladay cars were made previous to the suspension of operations brought about by bankruptcy proceedings, is again in operation, having been taken over by A. C. Barley, secretary and director of the Rutenber Motor Company of Marion and Logansport, Ind.

Mr. Barley is said to have purchased it of the Merchants Realization Company, Chicago, which concern secured the plant at bankruptcy sale with the intention of dismantling it.

It is understood that cars are being made in a conservative way and that an adequate service department for Halladay owners also has been established. The machines will be manufactured with the idea of meeting the requirements of old agents of Halladay cars and later operations will be conducted on a larger scale.

RESPONSIBLE FOR LENOX SALES.

William Blanchard Owes Success to Thorough Knowledge of Constructional Details.

The importance of placing well trained men in charge of the sales department is understood by most automobile manufacturing concerns, but it is seldom that a company is more fortunate in this respect than the Lenox Motor Car Company, Boston, Mass., maker of Lenox cars. William Blanchard, sales manager of the Lenox company, not only is well equipped with sales ability, but he is thoroughly conversant with every detail in the construction of automobiles.

Mr. Blanchard has been connected with the industry for the past six years. He gained his rudimentary knowledge of motor cars with the Easton Machine Company, South Easton, Mass., maker of the Morse line. Here he worked in every department, serving his full time at the bench and in the shop. It was while acting as salesman for Morse cars that the Lenox company induced him to undertake the exploitation of its line.



William Blanchard, Sales Manager, Lenox Motor Car Company.

Undoubtedly some of his success may be traced to the fact that he has a wide circle of friends and acquaintances, particularly in New England. His first connection with the Lenox company was as salesman, dating from 1911. Early in 1912 he was promoted to become sales manager, and in this position he has had much to do with the success of the Lenox Motor Car Company, particularly during the past year.

The Henderson Motor Car Company, Indianapolis, Ind., maker of the Henderson cars, has entered a car in the third annual 500-mile race to be run in that city May 30. William Knipper will be the driver and his mechanic will be Frank Jones, who has ridden with him in many races in the past. The Henderson machine was introduced to the public on the occasion of the second 500-mile race and the entrance of the car in the coming event will be in the nature of a celebration of its first appearance. This will be the first Henderson machine that has taken part in a race meet of this character.

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1913 PLEASURE CARS

Alphabetical Index for Illustrations and Specifications - - -	Pages 33-34
Illustrations - - - -	Pages 35-47
Mechanical Specifications - -	Pages 48-59
Buyers' Reference - - -	Pages 60-65
Key to Abbreviations - - -	Page 58

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INDEX TO AMERICAN CAR SPECIFICATIONS.

(For Key to Abbreviations, See Page 58)

Name	Maker	Address	Illustrations	Classification
Abbott-Detroit,	Abbott Motor Co.,	Detroit, Mich.	36-44	60-62-63
Adams-Farwell,	Adams Co.,	Dubuque, Ia.	..	63
Alco,	American Locomotive Co.,	New York City	39	63
Alpena,	Alpena Motor Car Co.,	Alpena, Mich.	38	60-62
American,	American Motors Co.,	Indianapolis, Ind.	36-39-44	60-62-63
Ames,	Ames Motor Car Co.,	Owensboro, Ky.	36	60
Apperson,	Apperson Bros. Automobile Co.,	Kokomo, Ind.	40	60-62
ArBenz,	Arbenz Car Co.,	Chillicothe, O.	40	60
Atlas,	Atlas Motor Car Co.,	Springfield, Mass.	43	63
Auburn,	Auburn Automboile Co.,	Auburn, Ind.	41-42-43	60-62-63
Austin,	Austin Automobile Co.,	Grand Grand Rapids, Mich.	42-43-44	63
Bergdoll,	Louis J. Bergdoll Motor Co.,	Philadelphia, Penn.	37-39	60-62-63
Buick,	Buick Motor Co.,	Flint, Mich.	41	60
Burg,	L. Burg Cge. Co.,	Dallas City, Ill.	..	62
Cadillac,	Cadillac Motor Car Co.,	Detroit, Mich.	36	60-62-63
Cameron,	Cameron Mfg. Co.,	Beverly, Mass.	..	60
Carhartt,	Carhartt Automobile Corp.,	Detroit, Mich.	..	60
Carroll,	Carroll Motor Car Co.,	Strasburg, Penn.	42	62-63
Cartercar,	Cartercar Co.,	Pontiac, Mich.	41	60-62
Case,	J. I. Case Threshing Machine Co.,	Racine, Wis.	36-44	60-62
Chadwick,	Chadwick Engineering Works,	Pottstown, Penn.	35	63
Chalmers,	Chalmers Motor Co.,	Detroit, Mich.	36-41-44	62-63
Chevrolet,	Chevrolet Motor Co.,	Detroit	40-42	62
Cino,	Cino Motor Car Co.,	Cincinnati, O.	36-37	60-62
Colby,	Colby Motor Co.,	Mason City, Ia.	..	60-62
Cole,	Cole Motor Car Co.,	Indianapolis	35-38	60-62-63
Columbia,	Columbia Motor Car Co.,	Hartford, Conn.	37	63
Corbitt,	Corbitt Automobile Co.,	Henderson, N. C.	40	60
Correja,	Vandewater & Co., Ltd.,	Elizabeth, N. J.	37	60-62
Crane,	Crane Motor Car Co.,	Bayonne, N. J.	43	..
Crawford,	Crawford Automobile Co.,	Hagerstown, Md.	10-42	60-62
Crow Elk-Hart,	Crow Motor Car Co.,	Elkhart, Ind.	36-37-40	60-62
Croxton,	Croxton Motor Co.,	Washington, Penn.	42-43	62-63
Cunningham,	Jas. Cunningham Son & Co.,	Rochester, N. Y.	44	63
Cutting,	Cutting Motor Car Co.,	Jackson, Mich.	39	60
Davis,	Geo. W. Davis Carriage Co.,	Richmond, Ind.	35-38	60
Day Utility,	Day Automobile Co.,	Detroit, Mich.	..	60
Detroiter,	Briggs-Detroiter Co.,	Detroit, Mich.	36	60
Diamond T,	Diamond T. Motor Car Co.,	Chicago	..	63
Dispatch,	Dispatch Motor Car Co.,	Minneapolis, Minn.	44	..
Dorris,	Dorris Motor Car Co.,	St. Louis	40	62
Duquesne,	Duquesne Motor Car Co.,	Pittsburg, Penn.	..	62-63
Duryea,	Duryea Motor Co.,	Saginaw, Mich.	..	60
Edwards,	Edwards Motor Car Co.,	New York City	38	63
Empire,	Empire Automobile Co.,	Indianapolis, Ind.	..	60
Enger,	Enger Motor Car Co.,	Cincinnati, O.	40	60
Falcar,	F. A. L. Auto Co.,	Chicago, Ill.	36	61
Fiat,	Fiat Automobile Co.,	New York City	37-44	63
Firestone-Columbus,	Columbus Buggy Co.,	Columbus, O.	35-44	64
Flanders,	Flanders Motor Co.,	Detroit, Mich.	..	61-62
Ford,	Ford Motor Co.,	Detroit, Mich.	40	60
Franklin,	H. H. Franklin Mfg. Co.,	Syracuse, N. Y.	36-37-39-41	61-62-64
Garford,	Garford Co.,	Elyria, O.	38	62-64
Gilde,	Bartholomew Co.,	Peoria, Ill.	40	61-62
Great Eagle,	U. S. Cge. Co.,	Columbus, O.	35	64
Great Southern,	Great Southern Automobile Co.,	Birmingham, Ala.	37-38	61-62
Great Western,	Great Western Automobile Co.,	Peru, Ind.	38	61-62
Grout,	Grout Automobile Co.,	Orange, Mass.	..	62
Halladay,	Streator Motor Car Co.,	Streator, Ill.	..	60-61
Havers,	Havers Motor Car Co.,	Port Huron, Mich.	42-43	61-62
Haynes,	Haynes Automobile Co.,	Kokomo, Ind.	35	62-64
Henderson,	Henderson Motor Car Co.,	Indianapolis, Ind.	42	61
Herreshoff,	Herreshoff Motor Co.,	Detroit, Mich.	38-44	61
Hudson,	Hudson Motor Car Co.,	Detroit, Mich.	36-44	61-62-64
Hupmobile,	Hupp Motor Car Co.,	Detroit, Mich.	36-39	60
Imperial,	Imperial Automobile Co.,	Jackson, Mich.	36-39-42	61
Inter-State,	Inter-State Automobile Co.,	Muncie, Ind.	35	62
Jackson,	Jackson Automobile Co.,	Jackson, Mich.	41-44	61-62
Keeton,	Keeton Motor Co.,	Detroit, Mich.	43-44	62
King,	King Motor Car Co.,	Detroit, Mich.	40	60-61
KisselKar,	Kissel Motor Car Co.,	Hartford, Wis.	37-38-42-43	61-62-64
Kline-Kar,	Kline Motor Car Corp.,	Richmond, Va.	37-38	61-62-64
Knox,	Knox Automobile Co.,	Springfield, Mass.	35-42	64
K-R-I-T,	K-R-I-T Motor Car Co.,	Detroit, Mich.	44	60
Lambert,	Buckeye Mfg. Co.,	Anderson, Ind.	40	60-61
Lenox,	Lenox Motor Car Co.,	Boston, Mass.	36-42	62
Lexington,	Lexington Motor Car Co.,	Connersville, Ind.	..	62
Lion,	Lion Motor Car Co.,	Adrian, Mich.	..	60
Little,	Little Motor Car Co.,	Flint, Mich.	..	60-61
Locomobile,	Locomobile Co. of America,	Bridgeport, Conn.	37-39-43	64
Lozier,	Lozier Motor Co.,	Detroit, Mich.	43-44	64
Luverne,	Luverne Automboile Co.,	Luverne, Minn.	37	62
Luck Utility,	Cleburn Motor Car Mfg. Co.,	Elkhart, Ind.	..	60
Marathon,	Marathon Automobile Co.,	Wilkes-Barre, Penn.	38-42-43	60-61
Marion,	Marion Motor Car Co.,	Indianapolis, Ind.	..	61
Marmon,	Nordyke & Marmon Co.,	Indianapolis, Ind.	37-44	62-64
Mason,	Mason Motor Car Co.,	Waterloo, Ia.	35-36	60-61
Matheson,	Matheson Automobile Co.,	Wilkes-Barre, Penn.	39	64
Maxwell,	Maxwell Motor Co.,	Detroit.	41	60-61
McFarlan,	McFarlan Motor Car Co.,	Connersville, Ind.	36-38-40	62-64
McIntyre,	W. H. McIntyre Co.,	Auburn, Ind.	39	61

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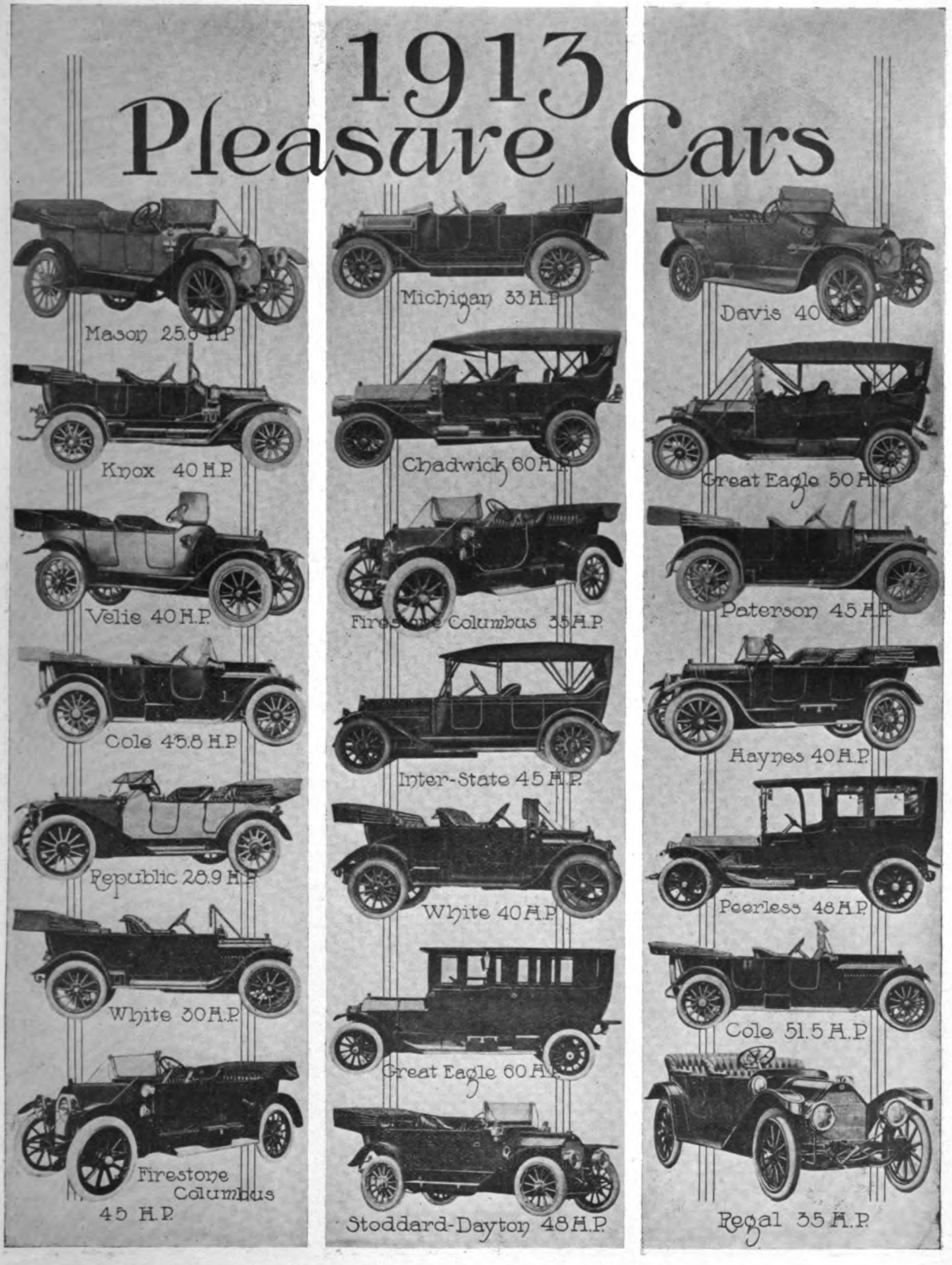
INDEX TO AMERICAN CAR SPECIFICATIONS--Continued.

Name	Maker	Address	Illustrations	Classification
Mercer,	Mercer Automobile Co.,	Trenton, N. J.	43	62
Metz,	Metz Co.,	Waltham, Mass.	36	60
Michigan,	Michigan Motor Car Co.,	Kalamazoo, Mich.	35-37	61
Midland,	Midland Motor Co.,	East Moline, Ill.	38-40	61-62-64
Miller,	Miller Car Co.,	Detroit, Mich.	..	61
Mitchell,	Mitchell-Lewis Motor Co.,	Racine, Wis.	37-41	61-62
Moline,	Moline Automobile Co.,	East Moline, Ill.	38	61
Moon,	Moon Motor Car Co.,	St. Louis, Mo.	38-43	61-62
Morse,	Easton Mch. Co.,	S. Easton, Mass.	44	64
Motorette,	Kelsey Mfg. Co.,	Hartford, Conn.	39	60
Moyer,	H. A. Moyer,	Syracuse, N. Y.	..	62
National,	National Motor Vehicle Co.,	Indianapolis, Ind.	43	64
Norwalk,	Norwalk Motor Car Co.,	Martinsburg, W. Va.	36-43	62-64
Nyberg,	Nyberg Automobile Works,	Anderson, Ind.	36-40-42-43	61-63
Oakland,	Oakland Motor Car Co.,	Pontiac, Mich.	36-41	60-61-63
Oldsmobile,	Olds Motor Works,	Lansing, Mich.	39	64
Only,	Only Motor Car Co.,	Port Jefferson, L. I.	..	60-61
Overland,	Willys-Overland Co.,	Toledo, O.	41	60-61
Packard,	Packard Motor Car Co.,	Detroit, Mich.	39-42	64
Paige,	Paige-Detroit Motor Car Co.,	Detroit, Mich.	..	60-61
Palmer-Singer,	Palmer & Singer Mfg. Co.,	Long Island City, N. Y.	40-42	63-64
Paterson,	W. A. Paterson Co.,	Flint, Mich.	35-43	61
Pathfinder,	Motor Car Mfg. Co.,	Indianapolis, Ind.	44	61-63
Peerless,	Peerless Motor Car Co.,	Cleveland, O.	35-37-39	64
Perfex,	Perfex Co.,	Los Angeles, Cal.	..	60
Pierce-Arrow,	Pierce-Arrow Motor Car Co.,	Buffalo, N. Y.	37-39-44	64-65
Pilot,	Pilot Motor Car Co.,	Richmond, Ind.	36-40	61-63
Pope-Hartford,	Pope Mfg. Co.,	Hartford, Conn.	37-42-44	63-65
Pratt,	Elkhart Carriage & Harness Mfg. Co.,	Elkhart, Ind.	40-42	61-63
Premier,	Premier Motor Mfg. Co.,	Indianapolis, Ind.	38-43	63-65
Pullman,	Pullman Motor Car Co.,	York, Penn.	37-41-44	61-63
Rambler,	Thos. B. Jeffrey & Co.,	Kenosha, Wis.	38	61-63
Rayfield,	Rayfield Motor Car Co.,	Springfield, Ill.	..	63
R-C-H,	R-C-H Corporation,	Detroit, Mich.	39	60-61
Reeves,	M. O. Reeves,	Columbus, Ind.	..	65
Regal,	Regal Motor Car Co.,	Detroit, Mich.	35-38-39	60-61
Reo,	Reo Motor Car Co.,	Lansing, Mich.	41	60
Republic,	Republic Motor Car Co.,	Hamilton, O.	35-36	61-63-65
Richmond,	Wayne Works,	Richmond, Ind.	39-43	60-61
Schacht,	Schacht Motor Car Co.,	Cincinnati, O.	42	61-63
Selden,	Selden Motor Vehicle Co.,	Rochester, N. Y.	42	63-65
S. G. V.,	S. G. V. Co.,	Reading, Penn.	39-42	63-65
Simplex,	Simplex Automobile Co.,	New York City	..	65
Spaulding,	Spaulding Mfg. Co.,	Grinnell, Ia.	38	61
Speedwell,	Speedwell Motor Car Co.,	Dayton, O.	38	63
Spoerer,	Carl Spoerer's Sons Co.,	Baltimore, Md.	..	61-63-65
Staver,	Staver Cge. Co.,	Chicago, Ill.	36-43	61-63
Stearns,	F. B. Stearns Co.,	Cleveland, O.	44	65
Stevens-Duryea,	Stevens-Duryea Co.,	Chicopee Falls, Mass.	39	65
Stoddard-Dayton,	Dayton Motor Car Co.,	Dayton, O.	35-39-41-43	61-63-65
Studebaker,	Studebaker Corp.,	Detroit, Mich.	43-44	60-61-63
Stutz,	Ideal Motor Car Co.,	Indianapolis, Ind.	38-44	63
Velie,	Velie Motor Veh. Co.,	Moline, Ill.	35-37-39	61-63-65
Warren,	Warren Motor Car Co.,	Detroit, Mich.	37-41	61-63
Westcott,	Westcott Motor Car Co.,	Richmond, Ind.	..	61-63
White,	White Co.,	Cleveland, O.	35-43	63-65
Winton,	Winton Motor Carriage Co.,	Cleveland, O.	38	65
Zimmerman,	Zimmerman Mfg. Co.,	Auburn, Ind.	38-43	61

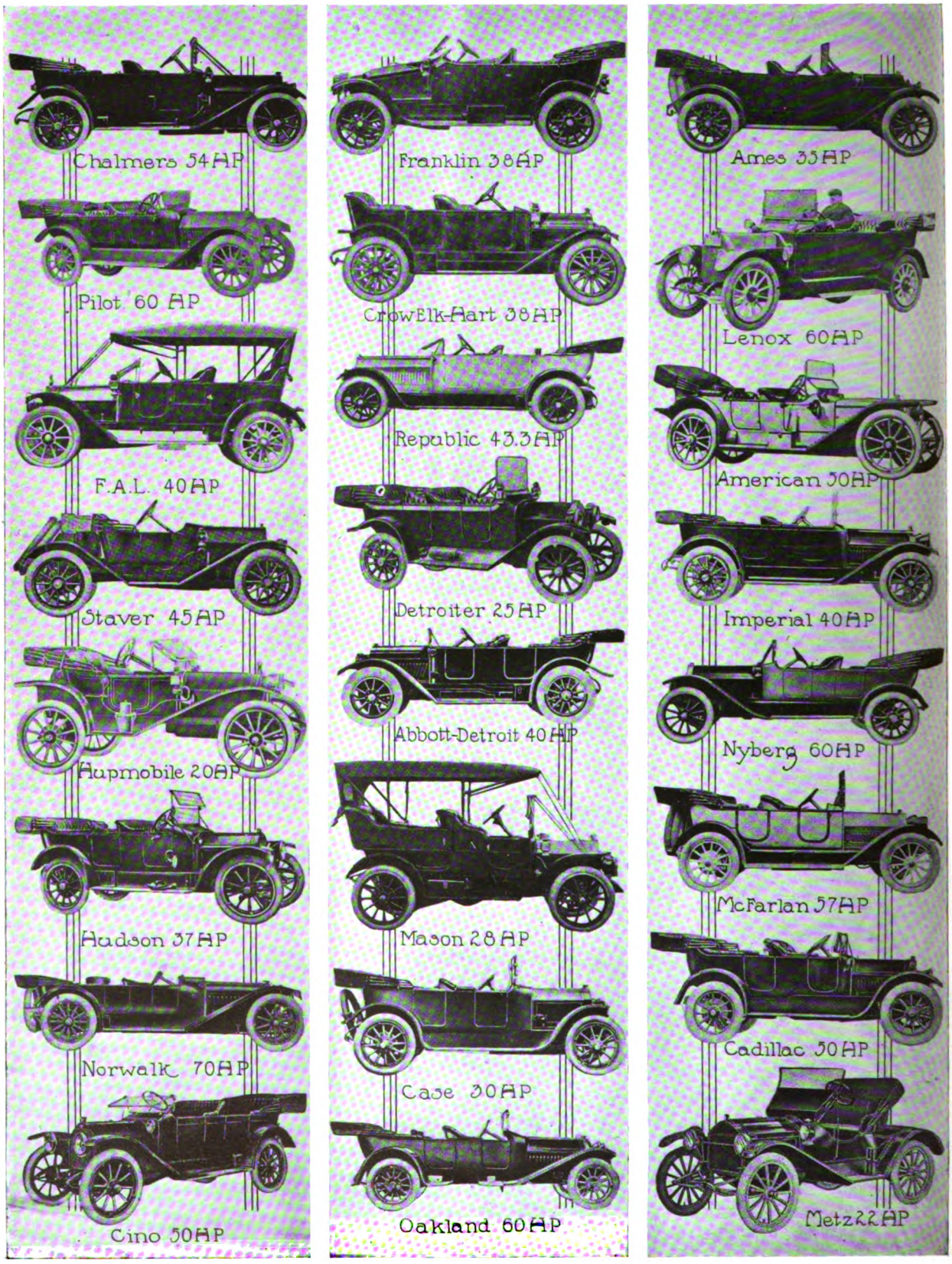
ELECTRIC VEHICLES.

Name	Maker	Address	Illustrations	Classification
Argo,	Argo Electric Vehicle Co.,	Detroit, Mich.	45-46	58
Bailey,	S. R. Bailey & Co.,	Amesbury, Mass.	45-46	58
Baker,	Baker Motor Vehicle Co.,	Cleveland, O.	..	58
Broc,	Broc Electric Vehicle Co.,	Cleveland, O.	45-46	58
Borland,	Borland-Grannis Co.,	Chicago, Ill.	47	58
Buffalo,	Buffalo Electric Vehicle Co.,	Buffalo, N. Y.	45-46	58
Century,	Century Electric Motor Car Co.,	Detroit, Mich.	45	58
Chicago,	Chicago Electric Motor Car Co.,	Chicago, Ill.	45-46	58
Church-Field,	Church-Field Co.,	Sibley, Mich.	..	58
Colonial,	Colonial Electric Car Co.,	Detroit, Mich.	..	58
Clark,	Clark Motor Car Co.,	Buffalo, N. Y.	..	58
Columbus,	Columbus Buggy Co.,	Columbus, O.	..	58
Dayton,	Dayton Electric Car Co.,	Dayton, O.	..	58
Detroit,	Anderson Electric Car Co.,	Detroit, Mich.	46	58
Electra,	Storage Battery Power Co.,	Chicago, Ill.	47	58
Flanders,	Flanders Mfg. Co.,	Pontiac, Mich.	..	59
Fritchle,	Fritchle Automobile & Battery Co.,	Denver, Col.	45-46-47	59
Grinnell,	Grinnell Electric Car Co.,	Detroit, Mich.	45-46	59
Hupp-Yeats,	R-C-H Corporation,	Detroit, Mich.	46	59
Ideal,	Ideal Electric Co.,	Chicago, Ill.	..	59
Kimball,	C. P. Kimball Co.,	Chicago, Ill.	..	59
Ohio,	Ohio Electric Car Co.,	Toledo, O.	47	59
Phipps,	Phipps Electric Co.,	Detroit, Mich.	..	59
Rauch & Lang,	Rauch & Lang Carriage Co.,	Cleveland, O.	46-47	59
Standard,	Standard Electric Car Co.,	Jackson, Mich.	45	59
Studebaker,	Studebaker Corporation,	South Bend, Ind.	..	59
Waverley,	Waverly Co.,	Indianapolis, Ind.	45-46	59
Woods,	Woods Motor Vehicle Co.,	Chicago, Ill.	45-46	59

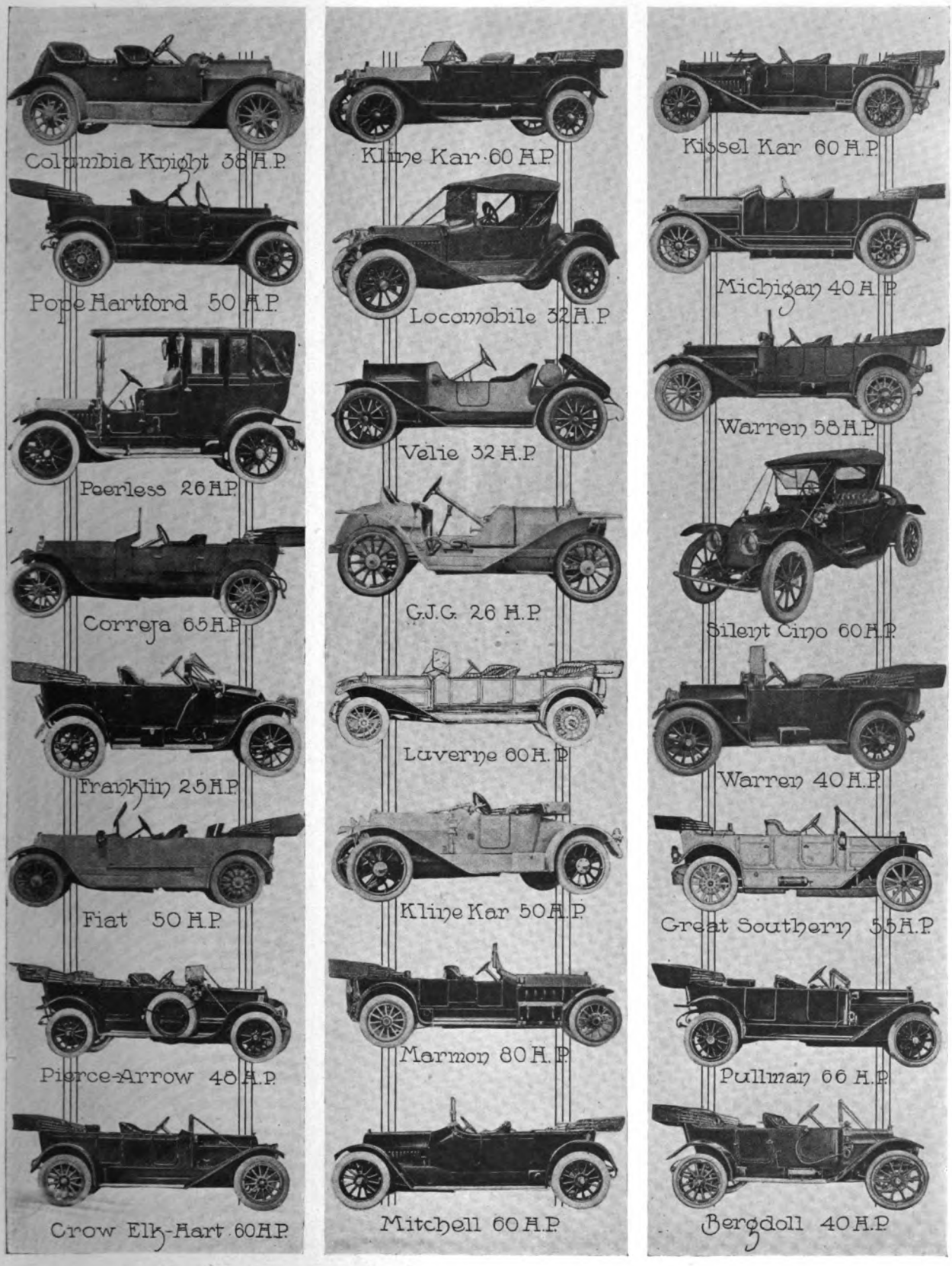
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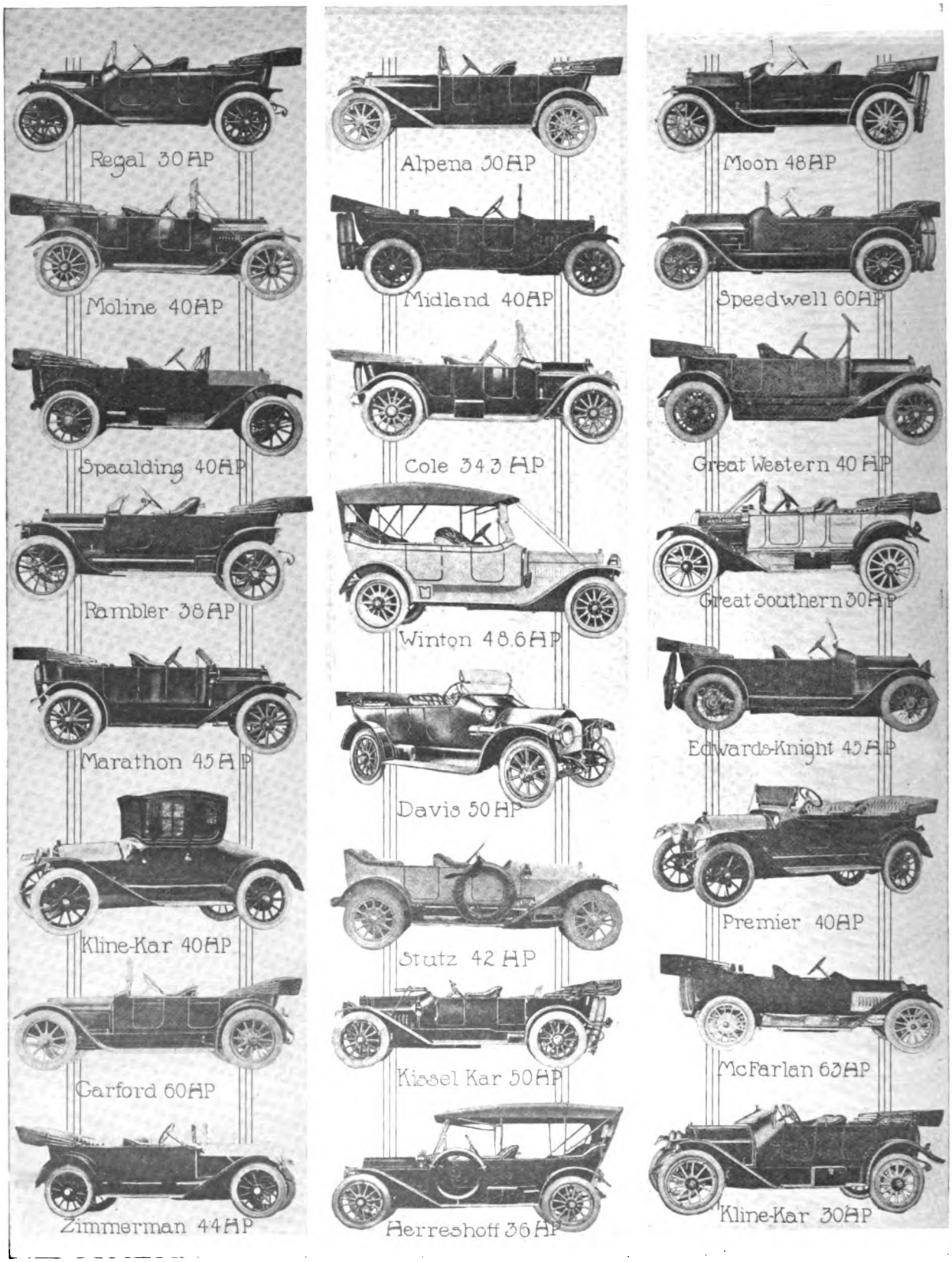
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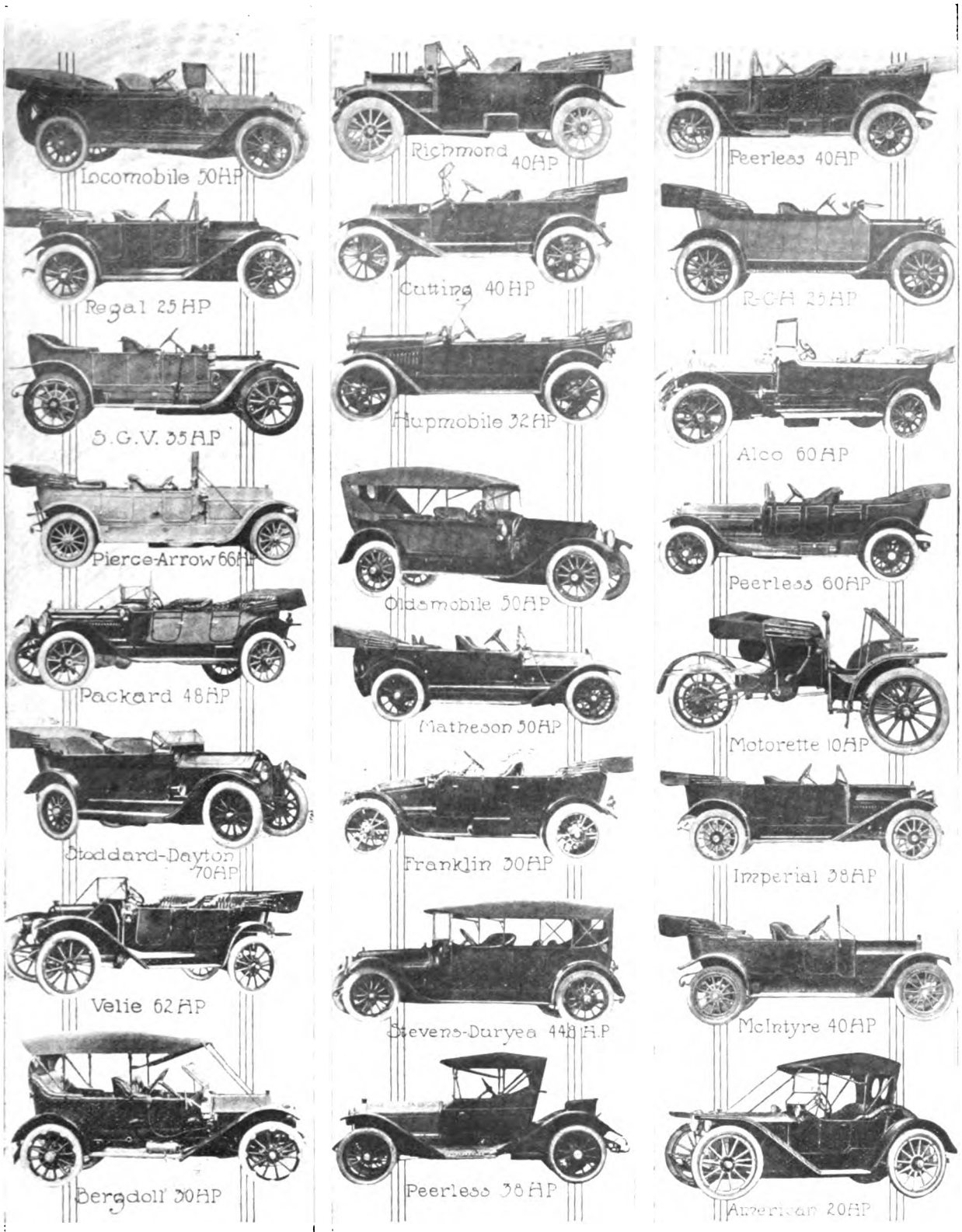
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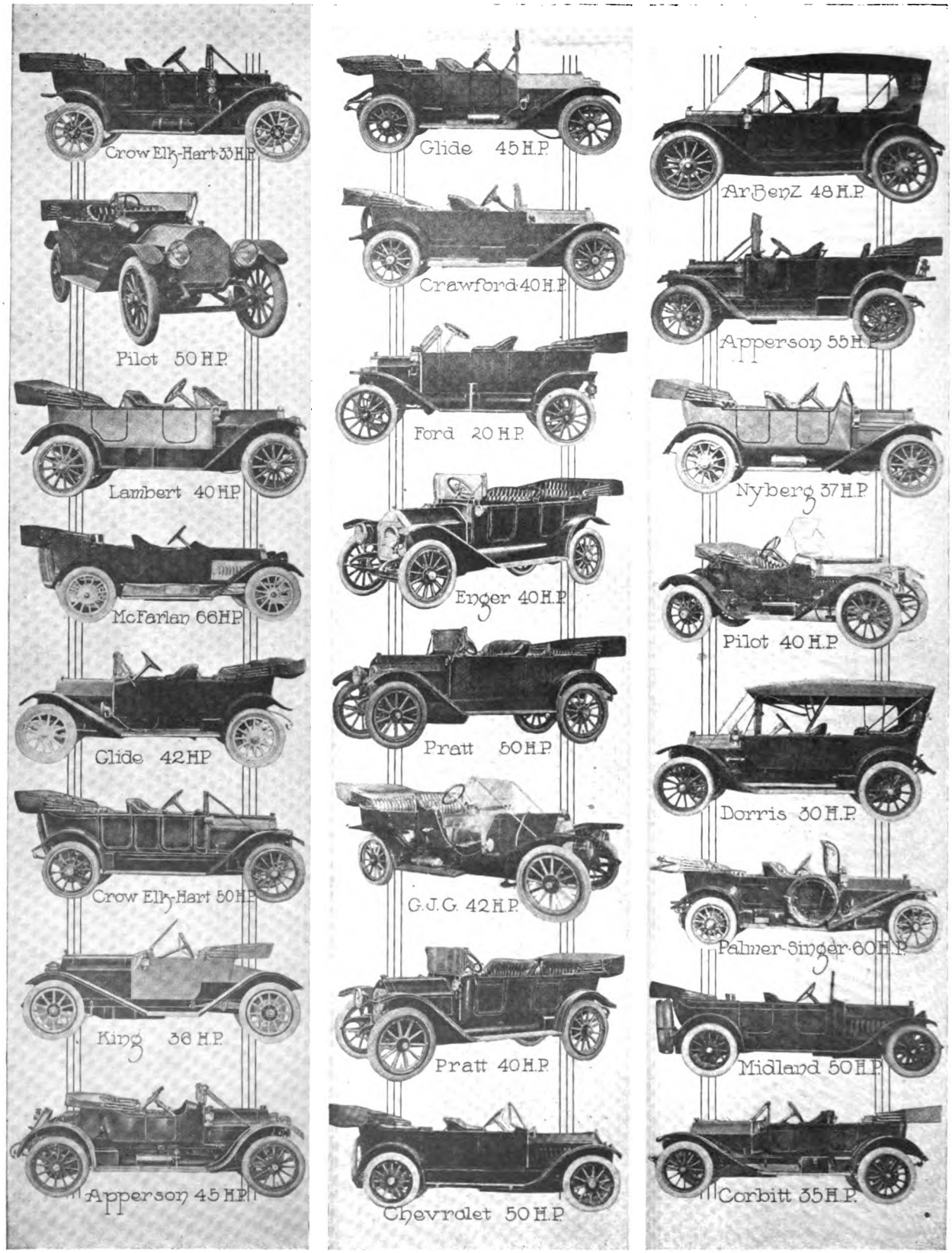
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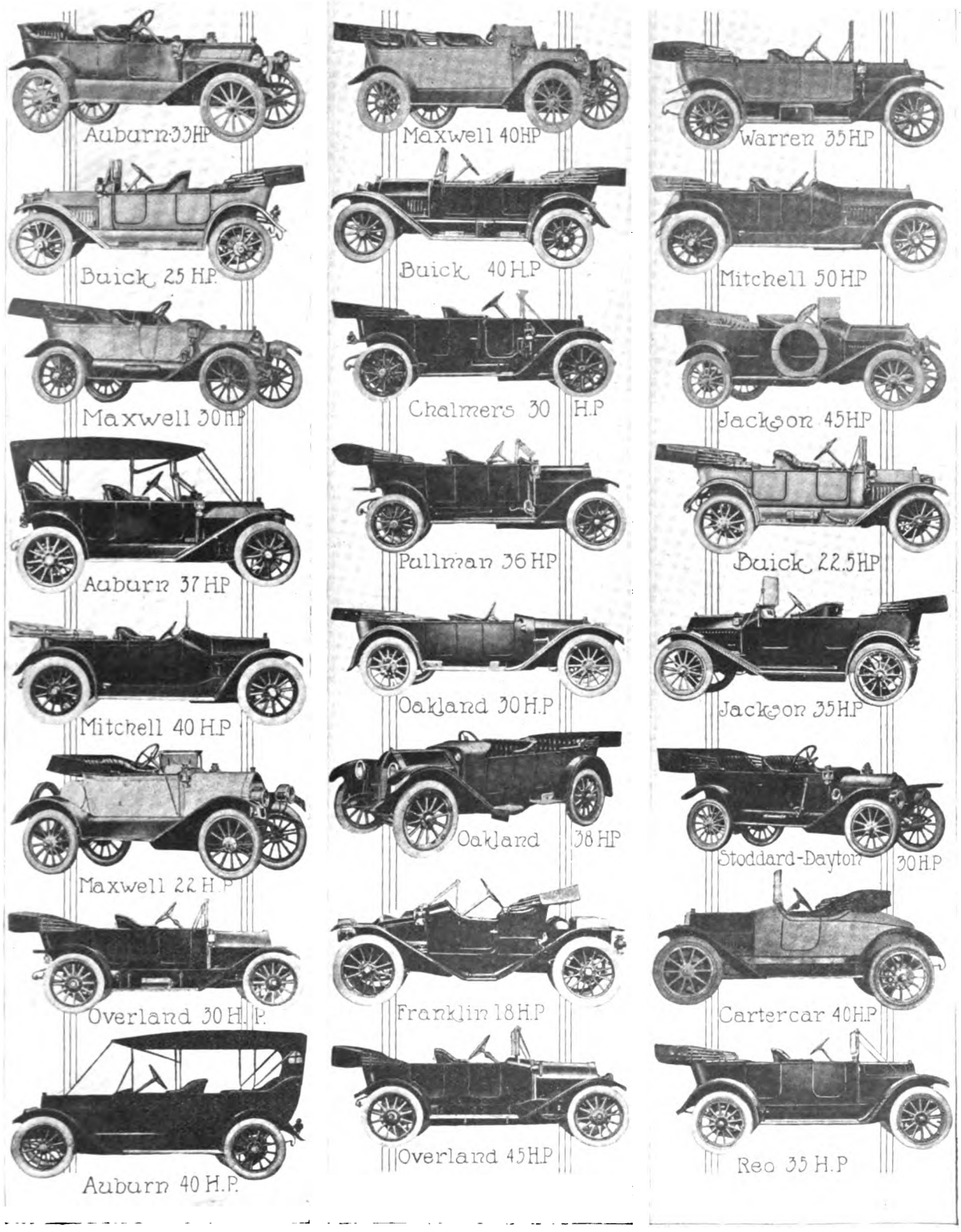
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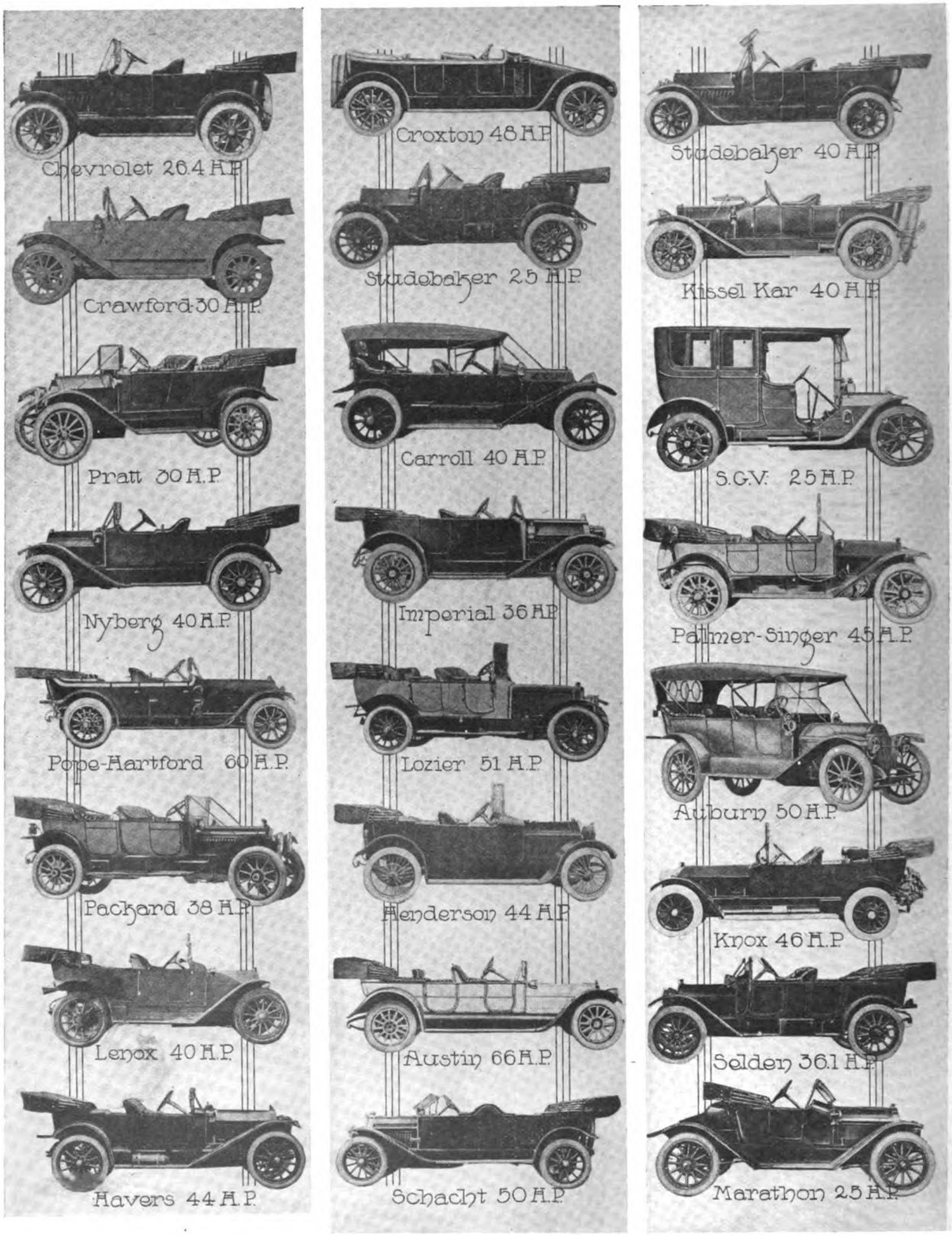
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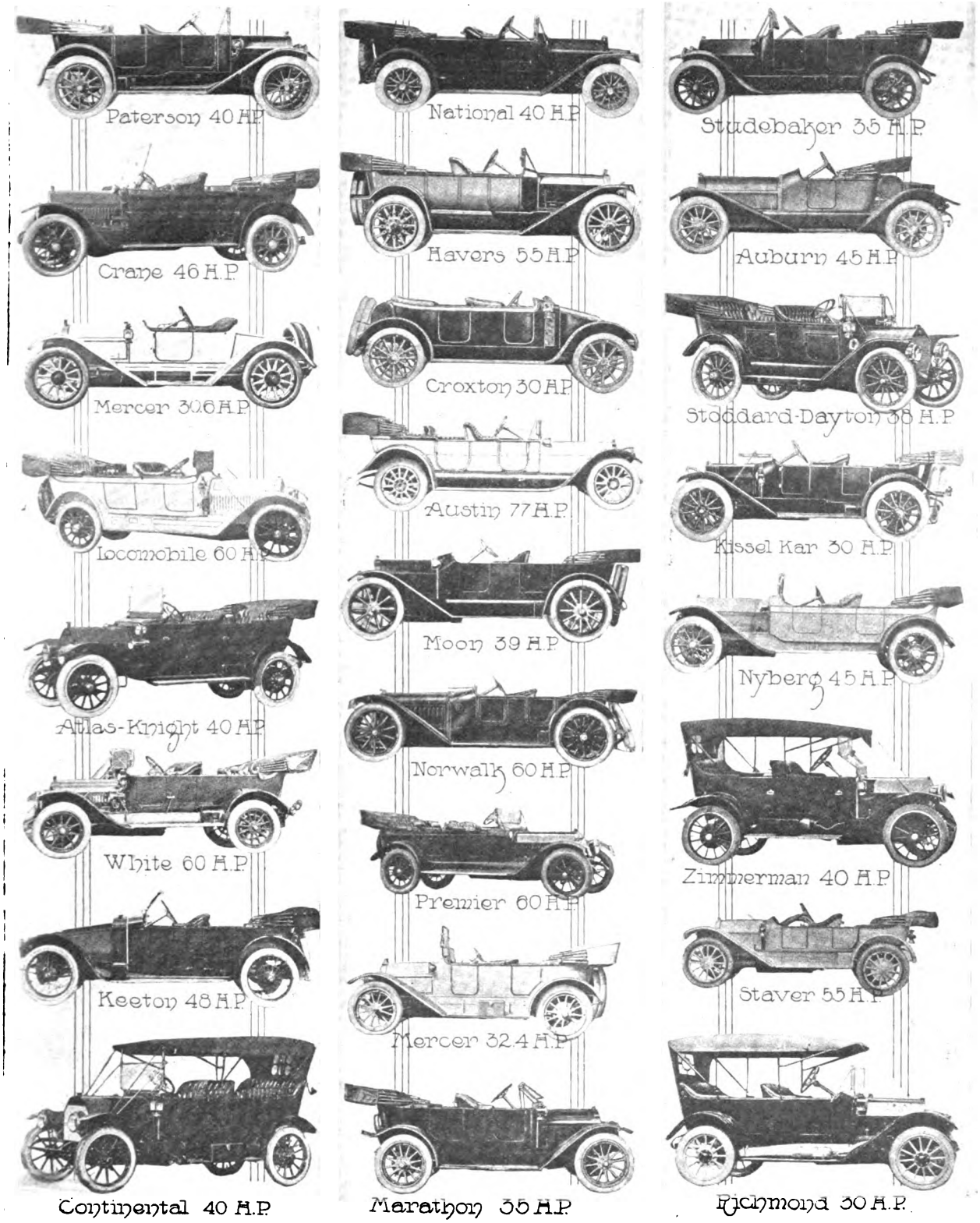
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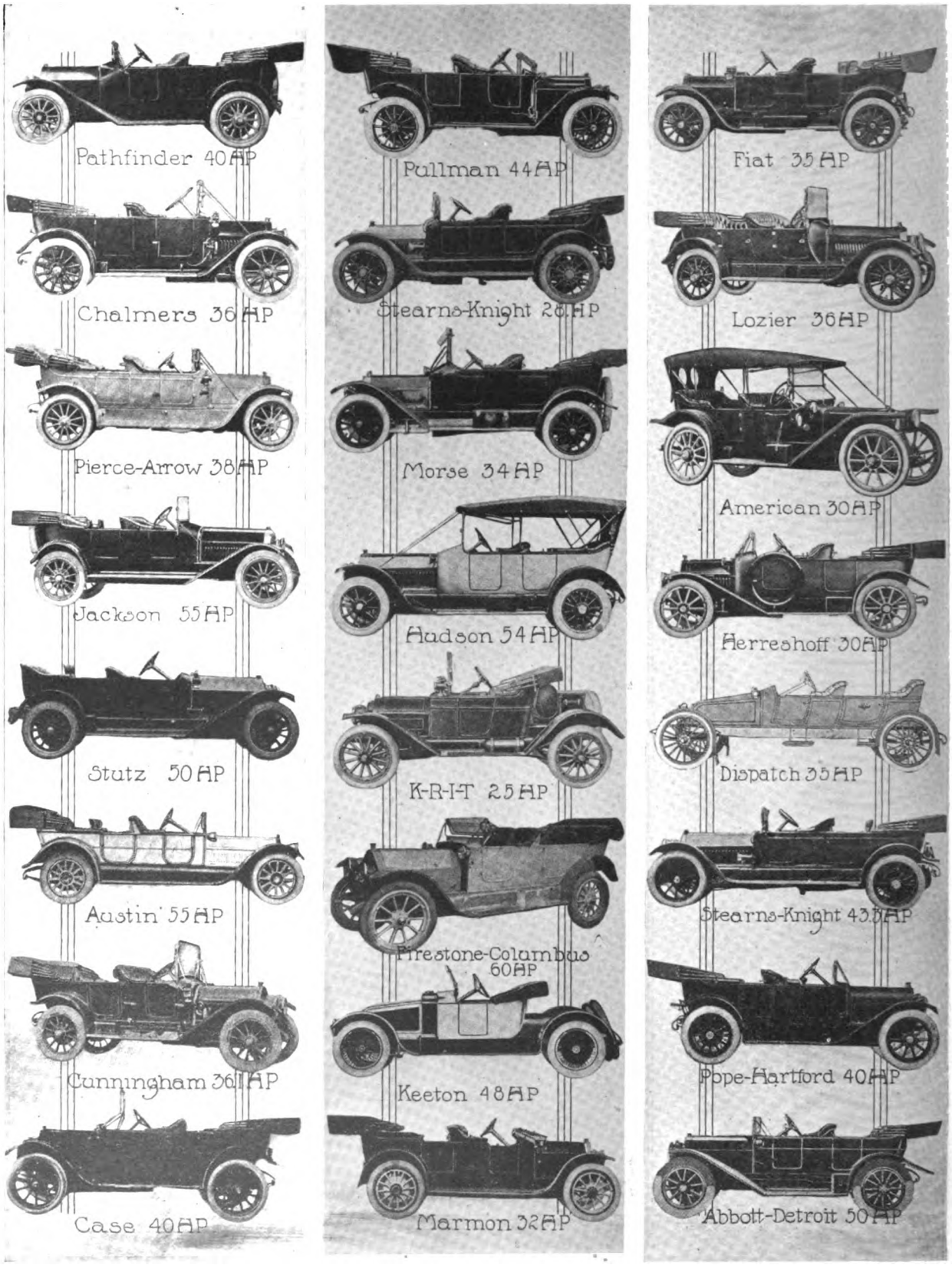
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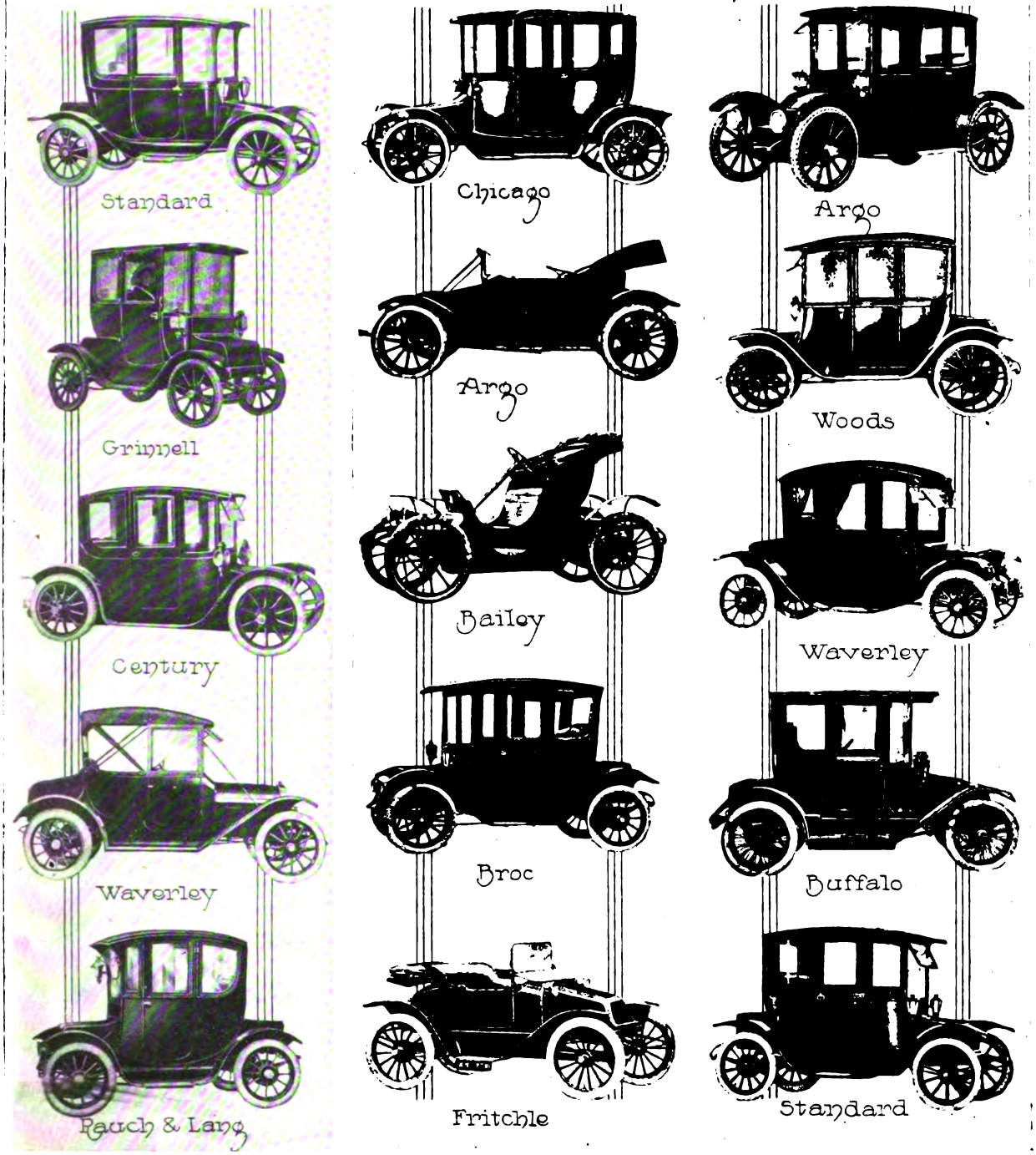


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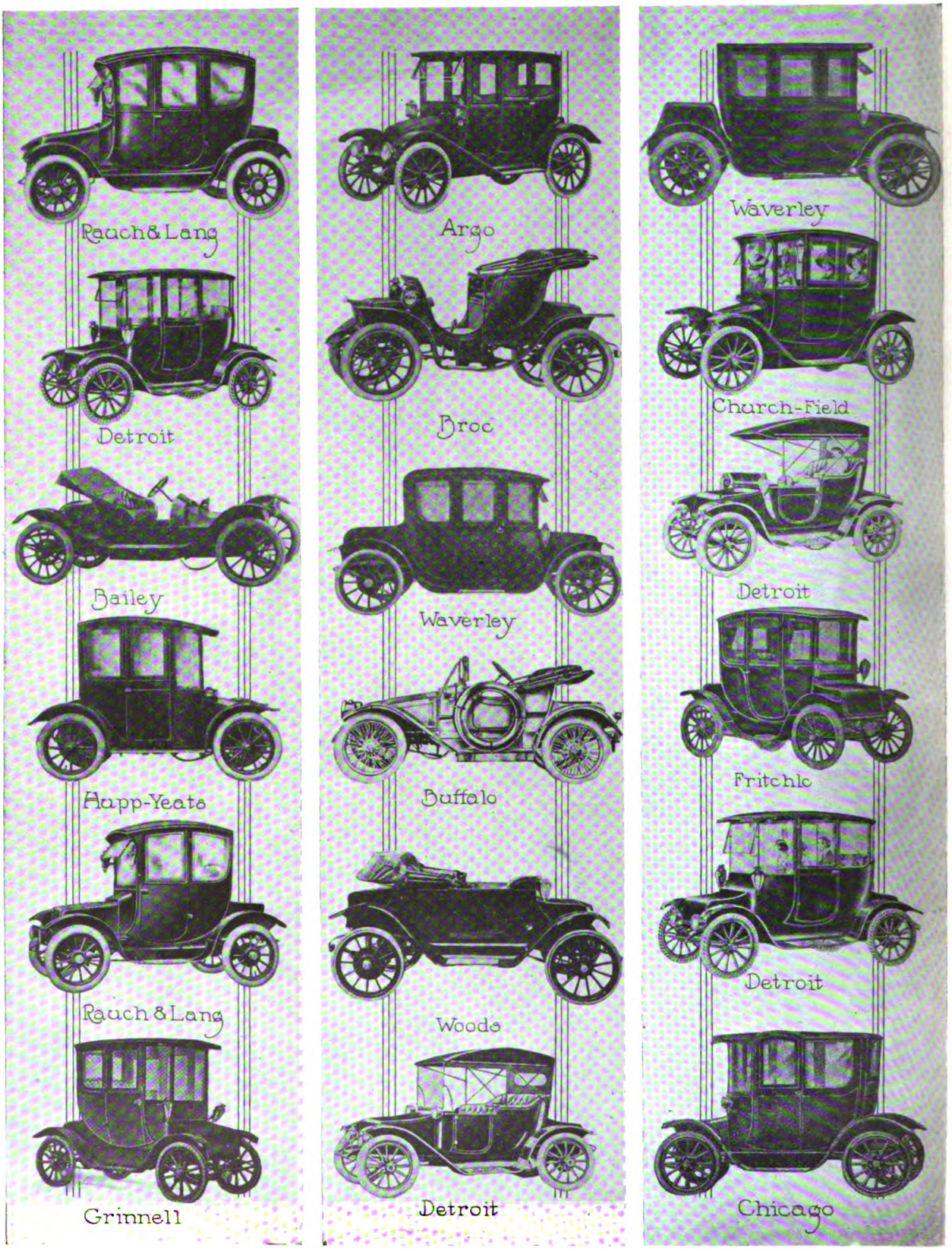


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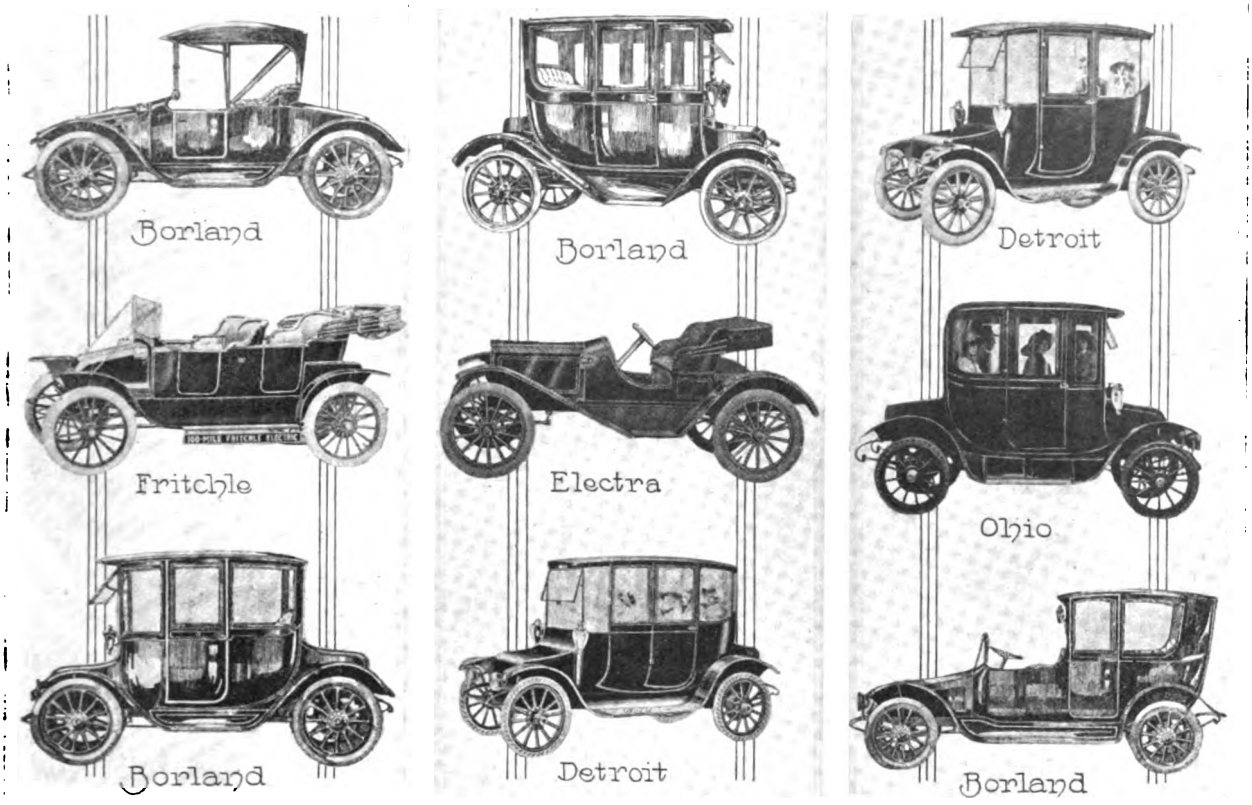
Electric Pleasure Vehicles



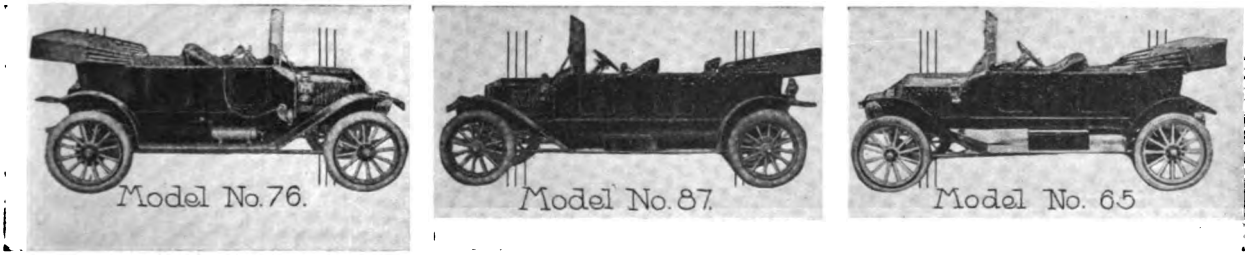
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Stanley Steam Cars



REMY GRAND BRASSARD.

Becomes One of the Awards for the Memorial Day Race at Indianapolis.

The Remy Electric Company, Anderson, Ind., maker of Remy magnetos, has decided to offer the Remy Grand Brassard and trophy as the prize to be awarded the car and driver which first completes 200 miles in the 500-mile race at Indianapolis, Ind., Memorial Day. The Remy company first made this award in August, 1909, for a 25-mile free-for-all race. It was won by Barney Oldfield, driving a Benz. Subsequently it was held by Ray Harroun, Robert Burman, Joseph Dawson and others.

Under the conditions of the prize offer it is stipulated that if the car first covering 200 miles in the big race is equipped with a Remy magneto, the driver will also receive a cash award of $50 a week for a period of 20 weeks. Otherwise the Grand Brassard only is offered. The trophy goes to the manufacturer nominating the car. They will remain in the possession of the winners until the Remy company demands possession of them as prizes in subsequent races.

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Specifications of American

The Accompanying Table Gives Detail Information of Chassis Construction of

(For Key to Abbreviations, See Page 58)

NAME AND MODEL	CYLINDERS			Bore and Stroke, Inches	S. A. E. H. P.	Piston Displacement Cubic Inches	VALVES	CARBURETION		IGNITION			LUBRICATION		COOLING		STARTER
	No. of Cylinders	Shape	How Cast				Location	Make of Carburetor	Fuel Feed	System	Magneto Generator	Control	System	Type of Pump	Circulation	Radiator	Type
Abbott-Detroit, D	4	L Head	Pairs	4.13x5.25	27.30	280.6	Left	Mayer	Grav	Dual	Spld'rf	Hand.	Spl-Pres	Piston	Pump	Cell	Elec
Abbott-Detroit, E	4	L Head	Pairs	4.50x5.50	32.40	349.9	Left	Mayer	Grav	Dual	Spld'rf	Hand.	Spl-Pres	Piston	Pump	Cell	Elec
Adams-Farwell, 9	5	Straight	Sep'rt	5.50x5.00	65.00	594.0	Head	Own	Pres	Dual	Optional	Hand.	Pressure	Noncir.	Air	....	Lever.
A. E. C., 6-45	6	L Head	Block	3.75x5.50	33.80	364.4	Left	Rayfield	Pres	Dual	Bosch	Hand.	Pressure	Gear	Pump	Cell	Elec
A. E. C., 6-60	6	T Head	Pairs	4.25x5.00	43.80	425.4	Opp	Rayfield	Pres	Dual	Bosch	Hand.	Pressure	Gear	Pump	Cell	Air
Alco, 7-16	4	T Head	Pairs	3.94x4.25	24.00	207.0	Opp	Stromberg	Grav	Sing	Bosch	Fixed	Spl-pres.	Gear	Pump	Cell	.....
Alco, 11-60	6	T Head	Pairs.	4.75x5.50	54.10	589.8	Opp	Newcomb	Pres	Dual	Bosch	Hand.	Spl-pres.	Gear	Pump	Cell	.....
Alpena, N-50	6	L Head	Pairs.	3.75x5.25	33.75	231.9	Left	Zenith	Pres	Dual	.....	Hand.	Splash	.....	Pump	Cell	Elec
Alpena, P-40	4	L Head	Pairs.	3.75x5.25	22.50	372.1	Left	Zenith	Pres	Dual	.....	Hand.	Splash	.....	Pump	Cell	Elec
American Scout, 22 A	4	T Head	Block	3.75x5.00	22.50	220.9	Opp	Rayfield	Pres	Dual	Eisemann	Hand.	Splash	Gear	Pump	Cell	Acet
American Tour., 34 A	4	T Head	Block	4.50x5.00	32.40	318.1	Opp	Rayfield	Pres	Dual	Eisemann	Hand.	Splash	Gear	Pump	Cell	Acet
American Trav., 54 A	4	L Head	Pairs	5.38x5.50	46.00	499.2	Right	Rayfield	Pres	Dual	Bosch	Hand.	Splash	Gear	Pump	Cell	Elec
American Trav., 56 A	4	L Head	Pairs	5.38x5.50	46.00	499.2	Right	Rayfield	Pres	Dual	Bosch	Hand.	Splash	Gear	Pump	Cell	Elec
American Road., 32 A	4	T Head	Block	4.50x5.00	32.40	318.1	Opp	Rayfield	Pres	Dual	Eisemann	Hand.	Splash	Gear	Pump	Cell	Acet
Ames, 44 & 45	4	L Head	Block	4.13x5.25	27.30	280.6	Left	Schebler	Grav	Dual	Remy	Hand.	Spl-pres.	Piston	Pump	Tub	Acet
Apperson, 4-45	4	T Head	Sep'rt	4.50x5.00	32.40	318.1	Head	Rayfield	Grav	Dual	National	Hand.	Splash	Gear	Pump	Cell	Elec
Apperson, 4-55	4	T Head	Sep'rt	4.75x5.00	36.10	354.4	Head	Rayfield	Grav	Dual	National	Hand.	Splash	Gear	Pump	Cell	Elec
Apperson, 4-55	4	T Head	Sep'rt	4.75x5.00	36.10	354.4	Head	Rayfield	Grav	Dual	National	Hand.	Splash	Gear	Pump	Cell	Elec
Arbens, F. G. H	4	L Head	Pairs	4.13x5.50	27.30	294.0	Left	Schebler	Grav	Dual	.....	Hand.	Spl-pres	Gear	Pump	Tub	Elec
Atlas, 12	4	Knight	Pairs	4.50x5.50	32.40	349.9	Opp	Stromberg	Grav	Sing	Deaco	Hand.	Pressure	Piston	Pump	Tub	Elec
Auburn, 33L	4	L Head	Block	3.75x5.25	22.50	231.9	Opp	Schebler	Grav	Dual	Remy	Hand.	Splash	Piston	Pump	Tub	.....
Auburn, 37L	4	L Head	Block	4.25x4.75	28.90	269.4	Left	Schebler	Grav	Dual	Remy	Hand.	Splash	Piston	Pump	Tub	.....
Auburn, 40L	4	L Head	Sep'rt	4.50x5.00	32.40	318.1	Left	Schebler	Grav	Dual	Remy	Hand.	Splash	Piston	Pump	Tub	.....
Auburn, 6-45	6	L Head	Pairs	3.75x5.25	33.75	347.8	Opp	Schebler	Grav	Dual	Remy	Hand.	Splash	Piston	Pump	Tub	.....
Auburn, 6-50	6	L Head	Sep'rt	4.13x5.25	41.95	420.9	Left	Schebler	Grav	Doub	Bosch	Hand.	Splash	Piston	Pump	Tub	.....
Austin, 55	6	L Head	Pairs	4.00x5.00	38.40	376.9	Left	Rayfield	Grav	Dual 2	Spld'rf	Hand.	Spl-Pres	Gear	Pump	Cell	Air
Austin, 66	6	T Head	Sep'rt	4.50x7.00	48.60	667.9	Opp	Rayfield	Grav	Dual 2	Spld'rf	Hand.	Spl-Pres	Noncir.	Pump	Cell	Air
Austin, 77	6	T Head	Sep'rt	4.50x7.00	48.60	667.9	Opp	Rayfield	Grav	Dual 2	Spld'rf	Hand.	Spl-Pres	Noncir.	Pump	Cell	Air
Bergdoll, 30	4	L Head	Block	4.00x4.50	25.60	226.2	Opp	Schebler	Grav	Sing	Bosch	Hand.	Splash	Piston	Pump	Cell	Elec
Bergdoll, 40	4	L Head	Block	4.00x5.94	25.60	298.5	Opp	Schebler	Grav	Sing	Bosch	Hand.	Splash	Piston	Pump	Cell	Elec
Bergdoll, 40	4	L Head	Block	4.00x5.94	25.60	298.5	Opp	Schebler	Grav	Sing	Bosch	Hand.	Splash	Piston	Pump	Cell	Elec
Buick, 25, 24	4	Straight	Pairs	3.75x3.75	22.50	165.5	Head	Schebler	Grav	Dual	Remy	Hand.	Splash	Gear	Pump	Tub	Acet
Buick, 31, 30	4	Straight	Pairs	4.00x4.00	25.60	201.1	Head	Schebler	Grav	Dual	Remy	Hand.	Splash	Noncir.	Pump	Tub	Acet
Buick, 40	4	Straight	Pairs	4.25x4.50	28.90	255.3	Head	Schebler	Grav	Dual	Remy	Hand.	Splash	Noncir.	Pump	Tub	Acet
Burg, S	6	L Head	Pairs	3.75x5.25	22.50	347.8	Left	.....	.....	Dual	Bosch	Hand.	Spl-pres.	Piston	Pump	Tub	.....
Burg, R	6	L Head	Sep'rt	4.13x5.25	22.30	420.9	Right	.....	.....	Dual	Bosch	Hand.	Spl-pres.	Piston	Pump	Cell	.....
Cadillac, 1913	4	L Head	Sep'rt	4.50x5.75	32.40	365.8	Right	Own	Grav	Doub	Delco	Hand.	Splash	.....	Pump	Tub	Elec
Cameron, 29 A	4	Straight	Sep'rt	3.88x3.75	24.00	176.9	Head	Kingston	Grav	Sing	.....	Hand.	Spl-pres	Gear	Air	....	.....
Cameron, 28	4	Straight	Sep'rt	3.88x3.75	24.00	176.9	Head	Kingston	Grav	Sing	.....	Hand.	Spl-pres	Gear	Air	....	.....
Cameron, 30	6	Straight	Sep'rt	3.88x3.75	36.07	265.4	Head	Kingston	Grav	Sing	.....	Hand.	Spl-pres	Gear	Air	....	.....
Cameron, 32	6	Straight	Sep'rt	3.88x3.75	36.07	265.4	Head	Kingston	Grav	Sing	.....	Hand.	Spl-pres	Gear	Air	....	.....
Carhartt, K	4	L Head	Block	4.07x4.50	26.40	285.0	Right	Stromberg	.....	Doub	.....	Hand.	Splash	.....	Pump	Cell	.....
Carhartt, B	4	L Head	Pairs	4.50x5.50	32.40	349.9	.....	Stromberg	Grav	Dual	.....	Hand.	Splash	.....	Pump	Cell	.....
Carroll, 4 E	4	L Head	Pairs	4.50x5.50	32.40	349.9	Left	Rayfield	Pres	Doub	Optional	Hand.	Splash	.....	Pump	Cell	Mech
Carroll, 4 D	4	L Head	Pairs	5.00x5.00	40.00	392.7	Left	Rayfield	Pres	Doub	Optional	Hand.	Splash	Gear	Pump	Cell	Mech
Carroll, 6 C	6	L Head	Pairs	4.13x5.25	40.90	420.9	Left	Rayfield	Pres	Doub	Optional	Hand.	Splash	.....	Pump	Cell	Mech
Cartercar, 5	4	L Head	Pairs	4.13x4.75	27.25	253.9	Left	Schebler	Grav	Dual	.....	Hand.	Spl-pres	Noncir.	Pump	Cell	Elec
Case, N	4	L Head	Block	4.13x5.25	27.25	420.9	Left	Rayfield	Pres	Opt	Remy	Hand.	Splash	Piston	Pump	Cell	.....
Case, O	4	T Head	Pairs	4.50x5.25	32.40	334.0	Opp	Rayfield	Pres	Opt	Optional	Hand.	Splash	Gear	Pump	Cell	Elec
Chadwick, 19—Road	6	L Head	Pairs	5.00x6.00	60.00	706.8	L&H.	Own	Pres	Doub	Bosch	Hand.	Pressure	Noncir.	Pump	Cell	Opt
Chadwick, 19—Touring	6	L Head	Pairs	5.00x6.00	60.00	706.8	L&H.	Own	Pres	Doub	Bosch	Hand.	Pressure	Noncir.	Pump	Cell	Opt
Chalmers, 17	4	Straight	Block	4.25x5.25	28.90	297.8	L&H.	Rayfield	Pres	Dual	Spld'rf	Hand.	Splash	Gear	Pump	Cell	Air
Chalmers, 18	6	Straight	Threes	4.25x5.25	43.80	446.7	L&H.	Rayfield	Pres	Dual	Spld'rf	Hand.	Splash	Gear	Pump	Cell	Air
Chevrolet, C	6	T Head	Threes	3.55x5.00	30.20	298.9	Opp	.....	Grav	Dual	.....	Hand.	Splash	Noncir.	Pump	....	Air
Cino, 450	4	T Head	Block	4.50x6.00	32.40	381.7	Opp	Rayfield	Grav	Dual	Optional	Hand.	Spl-Pres	Gear	Pump	Tub	.....
Cino, 440	4	T Head	Block	4.50x5.00	32.40	318.1	Opp	Rayfield	Grav	Dual	Optional	Hand.	Spl-Pres	Gear	Pump	Tub	.....
Cino, 660	6	T Head	Block	4.00x6.00	38.40	452.4	Opp	Rayfield	Grav	Dual	Optional	Hand.	Spl-Pres	Gear	Pump	Tub	Elec

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Gasoline Pleasure Vehicles.

Practically All the 1913 Passenger Cars Produced and Sold in America.

(For Key to Abbreviations, See Page 58)

BEARINGS				RUNNING GEAR						CONTROL			TRANSMISSION							
					TIRES		SPRINGS										GEARSET			
Crank-shaft Type and No.	Gearset	Rear Axle	Front Wheel	Front Axle	Front	Rear	Front	Rear	Wheelbase	Location Steering Wheel	Gearshift Location	Emergency Brake Control	Drive	Car Drives Through	Rear Axle	Clutch Type	Type	Forward Speeds	Location	Chassis Weight, Lbs.
Plain, 3	Roll.	Roll.	Roll.	I-Beam	34x4	34x4	½ Ell	½ Ell	116	Right.	Right	Right	Bevel...	Rad. Rd	Float	Disk...	Sel..	3	Unit M	2 250
Plain, 3	Roll.	Roll.	Roll.	I-Beam	36x4½	36x4½	½ Ell	½ Ell	121	Right.	Right	Right	Bevel...	Rad. Rd	Float	Disk...	Sel..	3	Unit M	2,850
Plain, 2	Ball.	Roll.	Roll.	Square.	36x4½	36x4½	½ Ell.	½ Ell	120	Right.	Right	Right	Chain.	Rad. Rd	Semi F	Cone ..	Sel..	3	Amid.	.....
Plain, 4	Ball.	Roll.	Roll.	I-Beam	36x4½	36x4½	½ Ell	½ Ell	130	Left ..	Cent	Cent	Bevel...	Rad. Rd	Float	Disk...	Sel..	3	Unit M	2,000
Plain, 4	Ball.	Roll.	Roll.	I-Beam	37x5	37x5	½ Ell	½ Ell	138	Right.	Right	Right	Bevel...	Rad. Rd	Float	Disk...	Sel..	4	Amid.	2,500
Plain, 3	Ball.	Ball.	Ball.	I-Beam	32x4	32x4	½ Ell	½ Ell	104	Right	Right	Right	Bevel..	Rad. Rd	Float	Disk...	Sel..	3	Amid.	2,420
Plain, 5	Ball.	Ball.	Ball.	I-Beam	36x4½	37x5	½ Ell.	½ Ell	133½	Right.	Right	Right	Bevel...	Rad Rd	Float	Disk...	Sel..	4	Amid.	3,560
Plain, 4	Plain	Ball.	Ball.	I-Beam	36x4	36x4	.....	.....	135	Opt ..	Cent.	Cent	Bevel..	Springs.	Float	Disk...	Sel..	.....	.....	.....
Plain, 4	Plain	Ball.	Ball.	I-Beam	36x4	36x4	.....	.....	135	Opt ..	Cent.	Cent	Bevel..	Springs.	Float	Disk...	Sel..	.....	.....	.....
Plain, 3	Ball.	Ball.	Ball.	I-Beam	36x3½	36x3½	½ Ell	½ Ell	105	Right.	Right	Right	Bevel..	Tor T	Float	Cone ..	Sel..	3	Amid.	2,000
Plain, 3	Ball.	Ball.	Ball.	I-Beam	37x4	37x4	½ Ell	½ Ell	118	Right.	Right	Right	Bevel..	Tor T	Float	Cone ..	Sel..	3	Amid.	2,150
Plain, 3	Ball.	Ball.	Ball.	I-Beam	40x4	41x4½	½ Ell	½ Ell	124	Right	Right	Right	Bevel..	Tor T	Float	Cone ..	Sel..	4	Amid.	3,000
Plain, 3	Ball.	Ball.	Ball.	I-Beam	41x4½	41x4½	½ Ell.	½ Ell.	140	Right.	Right	Right	Bevel..	Tor T	Float	Cone ..	Sel..	4	Amid.	3,100
Plain, 3	Ball.	Ball.	Ball.	I-Beam	37x4	37x4	½ Ell.	½ Ell.	118	Right.	Right	Right	Bevel..	Tor T	Float	Cone ..	Sel..	3	Amid.	2,150
Plain, 3	Roll	Ball	Ball.	I-Beam	36x4	36x4	½ Ell.	Ell..	118	Left ..	Cent.	Cent	Bevel..	Springs.	Float	Disk...	Sel..	3	Uint M	2,100
Plain, 5	Ball.	B&R.	Ball.	I-Beam	34x4	34x4	½ Ell	½ Ell	114	Right	Right	Right	Bevel...	Tor T	Semi F	Con Bd	Sel..	3	Amid.	2,300
Plain, 5	Ball.	B&R.	Ball.	I-Beam	36x4	36x4	½ Ell.	½ Ell.	118	Right.	Right	Right	Bevel...	Tor T	Semi F	Con Bd	Sel..	3	Amid.	2,800
Plain, 5	Ball.	B&R.	Ball.	I-Beam	36x4½	36x4½	½ Ell.	½ Ell.	122	Right.	Right	Right	Bevel...	Tor T	Semi F	Con Bd	Sel..	3	Amid.	3,000
Plain, 3	Ball.	Ball.	Roll.	I-Beam	36x4	36x4	½ Ell.	½ Ell.	120	Left ..	Cent.	Cent.	Bevel...	Rad Rd	Float	Cone ..	Sel..	3	Unit X	2,900
Plain, 5	Ball.	Ball.	Roll.	I-Beam	37x5	37x5	½ Ell.	½ Ell.	130	Left ..	Cent.	Cent.	Worm..	Tor T	Float	Disk...	Sel..	3	Unit X	3,000
Plain, 3	Ball.	Ball.	Roll.	I-Beam	34x3½	34x3½	½ Ell.	½ Ell.	112	Right.	Right	Right	Bevel...	Rad Rd	Semi F	Cone ..	Sel..	3	Amid.	2,500
Plain, 3	Ball.	Ball.	Ball.	I-Beam	35x4	35x4	½ Ell.	½ Ell.	115	Right.	Right	Right	Bevel...	Rad Rd	Float	Disk...	Sel..	3	Unit M	2,850
Plain, 5	Ball.	Ball.	Ball.	I-Beam	36x4	36x4	½ Ell.	½ Ell.	122	Right.	Right	Right	Bevel...	Rad Rd	Float	Cone ..	Sel..	3	Amid.	2,950
Plain, 4	Ball.	Ball.	Ball.	I-Beam	36x4	36x4	½ Ell.	½ Ell.	130	Right.	Right	Right	Bevel...	Rad Rd	Float	Cone ..	Sel..	3	Amid.	3,100
Plain, 7	Ball.	Ball.	Ball.	I-Beam	37x4½	37x4½	½ Ell.	½ Ell.	135	Right.	Right	Right	Bevel...	Rad Rd	Float	Disk...	Sel..	3	Amid.	3,450
Plain, 4	Ball.	Ball.	Ball.	I-Beam	37x5	37x5	½ Ell.	½ Ell.	141	Left ..	Cent.	Pedal	Bevel...	Springs.	Float	Disk...	Sel..	4	Amid.	.....
Plain, 7	Ball.	Ball.	Ball.	I-Beam	37x5	37x5	½ Ell.	½ Ell.	141	Left ..	Cent.	Pedal	Bevel...	Springs.	Float	Disk...	Sel..	4	Amid.	.....
Plain, 7	Ball.	Ball.	Ball.	I-Beam	37x5	37x5	½ Ell.	½ Ell.	141	Left ..	Cent.	Pedal	Bevel...	Springs.	Float	Disk...	Sel..	4	Amid.	.....
Ball, 2	Ball.	Ball.	Ball.	I-Beam	34x4	34x4	½ Ell.	½ Ell.	115	Right.	Right	Right	Bevel...	Springs.	Float	Disk...	Sel..	3	Unit M	2,500
Ball, 2	Ball.	Ball.	Ball.	I-Beam	36x4	36x4	½ Ell.	½ Ell.	121	Right.	Right	Right	Bevel...	Springs.	Float	Disk...	Sel..	4	Unit M	2,600
Ball, 2	Ball.	Ball.	Ball.	I-Beam	34x4	34x4	½ Ell.	½ Ell.	115	Right.	Right	Right	Bevel...	Springs.	Float	Disk...	Sel..	4	Unit M	2,500
Plain, 3	Roll.	B&R	Ball.	I-Beam	32x3½	32x3½	½ Ell.	½ Ell.	105	Right.	Right	Right	Bevel...	Rad Rd.	Semi F	Cone ..	Sel..	3	Amid.	2,000
Plain, 3	Ball.	B&R.	Ball.	I-Beam	34x4	34x4	½ Ell.	½ Ell.	108	Right.	Right	Right	Bevel...	Tor T ..	Semi F	Cone ..	Sel..	3	Unit M	2,600
Plain, 3	B&P	Ball.	Ball.	I-Beam	36x4	36x4	½ Ell.	½ Ell.	115	Right.	Right	Right	Bevel...	Tor T ..	Float	Cone ..	Sel..	3	Unit M	2,870
Plain, 5	Ball.	Ball.	Ball.	I-Beam	36x4	36x4	½ Ell	½ Ell.	124	Opt ..	Cent.	Pedal	Bevel...	S & T T	.....	Disk...	Sel..	3	Unit M	2,000
Plain, 7	Ball.	Ball.	Ball.	I-Beam	36x4½	36x4½	½ Ell.	½ Ell.	134	Right.	Cent.	Cent.	Bevel...	S & T T	Float	Disk...	Sel..	3	Unit M	2,700
Plain, 5	Ball.	Roll.	Roll.	I-Beam	36x4½	36x4½	½ Ell.	½ Plat	120	Right.	Right	Right	Bevel...	S& T T	Float	Cone ..	Sel..	3	Amid.	.....
Plain, 3	Plain	Ball.	Ball.	Tube...	32x3½	32x3½	½ Ell	Ell ..	110	Right.	Right	Cent.	Bevel...	Tor T...	Float	Cone ..	Sel..	3	Unit X	1,700
Plain, 3	Plain	Ball.	Ball.	Tube...	32x3	32x3	½ Ell.	Ell ..	104	Right.	Right	Right	Bevel...	Tor T...	Float	Cone ..	Sel..	3	Unit X	1,485
Plain, 3	Plain	Ball.	Ball.	Tube...	34x3½	34x3½	½ Ell.	Ell ..	114	Right.	Right	Right	Bevel...	Tor T...	Float	Cone ..	Sel..	3	Unit X	1,600
Plain, 3	Plain	Ball.	Ball.	Tube...	34x3½	34x3½	½ Ell.	Ell ..	120	Right.	Cent.	Cent.	Bevel...	Tor T...	Float	Cone ..	Sel..	3	Unit X	1,900
Plain, 3	.....	Roll.	Ball.	I-Beam	34x4	34x4	½ Ell.	½ Ell.	109	Right.	Right	Right	Bevel...	Tor T...	Float	Cone ..	Sel..	3	Amid.	2,350
Plain, 3	.....	Roll.	Roll.	I-Beam	34x4	34x4	½ Ell.	½ Ell.	119	Right.	Right	Right	Bevel..	Tor T...	Float	Cone ..	Sel..	3	Amid.	2,950
Plain, 3	Ball.	Roll.	Roll.	I-Beam	36x4	36x4	½ Ell.	½ Ell.	118	Opt ..	Right	Right	Bevel...	R & T R.	Float	Disk...	Sel..	4	Amid.	2,850
Plain, 3	Ball.	Roll.	Roll.	I-Beam	36x4½	36x4½	½ Ell.	½ Ell.	128	Opt ..	Right	Right	Bevel...	R & T R.	Float	Disk...	Sel..	4	Amid.	3,500
Plain, 5	Ball.	Roll.	Roll.	I-Beam	36x4½	36x4½	½ Ell.	½ Ell.	128	Opt ..	Right	Right	Bevel...	R & T R.	Float	Disk...	Sel..	4	Amid.	3,750
Plain, 3	Plain	Ball.	Ball.	I-Beam	36x4	36x4	½ Ell.	½ Ell.	116	Right.	Right	Right	Chain..	Rad Rd.	Float	.....	Frict	.....	.....	2,350
Plain, 3	Plain	Ball.	Ball.	I-Beam	34x4	34x4	½ Ell.	½ Ell	115	Right.	Cent.	Cent.	Bevel...	Springs..	Float	Disk...	Sel..	3	Unit M	.....
Plain, 3	Roll.	Roll.	Roll.	I-Beam	37x4½	37x4½	½ Ell.	½ Ell.	125	Right.	Right	Right	Bevel...	Springs..	Float	Disk...	Sel..	3	Amid.	3,500
Plain, 4	Ball.	Ball.	Ball.	I-Beam	36x4½	36x4½	½ Ell.	Plat.	112	Right.	Right	Right	Chain..	Rad Rd.	Dead	Exp Bd	Sel..	4	Amid.	2,700
Plain, 4	Ball.	Ball.	Ball.	I-Beam	36x4½	37x5	½ Ell.	Plat.	133	Right.	Right	Right	Chain..	Rad Rd.	Dead	Exp Bd	Sel..	4	Amid.	3,000
Ball, 2	Roll.	Roll.	Roll.	I-Beam	36x4	36x4	½ Ell.	½ Ell.	118	Right.	Right	Right	Bevel...	Tor R ..	Float	Disk...	Sel..	4	Unit M	2,774
Ball, 3	Roll.	Roll.	Roll.	I-Beam	36x4½	36x4½	½ Ell.	½ Ell.	130	Right.	Right	Right	Bevel...	Tor R ..	Float	Disk...	Sel..	4	Unit M	3,173
Plain, 3	Plain	Roll.	Ball.	I-Beam	35x4½	35x4½	½ Ell.	½ Plat	120	Left ..	Cent	Right	Bevel..	Tor T...	Float	Cone ..	Sel..	3	Unit X	.....
Plain, 3	Ball.	Ball.	Roll.	I-Beam	34x4	34x4	½ Ell.	½ Ell.	120	Right	Cent.	Cent	Bevel..	.....	Float	Cone ..	Sel..	3	.....	.....
Plain, 3	Ball.	Ball.	Roll.	I-Beam	34x4	34x4	½ Ell.	½ Ell.	120	Right.	Cent.	Cent	Bevel..	.....	Float	Cone ..	Sel..	3	Unit X	2,422
Plain, 3	Ball.	Ball.	Roll.	I-Beam	36x4½	36x4½	½ Ell.	½ Ell.	132	Right.	Cent.	Cent	Bevel..	S & T T	Float	Cone ..	Sel	3	.....	3,560

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NAME AND MODEL	CYLINDERS						VALVES	CARBURETION		IGNITION			LUBRICATION		COOLING		STARTER
	No. of Cylinders	Shape	How Cast	Bore and Stroke, Inches	S. A. E. H. P.	Piston Displacement Cubic Inches	Location	Make of Carburetor	Fuel Feed	System	Magneto Generator	Control	System	Type of Pump	Circulation	Radiator	Type
Coey	6	T Head	Threes	4.00x5.00	38.40	376.9	Opp	Schebler	Pres	Dual		Hand	Splash		Pump	Cell	
Colby, C	4	L Head	Block	4.13x5.25	27.25	280.6	Left	Rayfield	Grav	Dual	Eisemann	Hand	Spl-Pres	Piston	Pump	Cell	Air
Colby, E	4	L Head	Pairs	4.50x5.50	32.40	349.9	Left	Rayfield	Pres	Dual	Eisemann	Hand	Spl-Pres	Piston	Pump	Cell	Air
Colby, C-6-60	6	L Head	Threes	4.13x5.25	40.88	420.9	Left	Rayfield	Pres	Doub	Eisemann	Hand	Spl-Pres	Piston	Pump	Cell	Elec
Cole, 40	4	L Head	Pairs	4.13x4.75	27.25	253.9	Left	Schebler	Pres	Dual	Delco	Hand	Splash	Piston	Pump	Cell	Elec
Cole, 50	4	L Head	Pairs	4.50x5.25	32.40	334.0	Left	Schebler	Pres	Dual	Delco	Hand	Splash	Piston	Pump	Cell	Elec
Cole, 60	6	L Head	Pairs	4.13x4.75	40.90	380.8	Left	Schebler	Pres	Dual	Delco	Hand	Splash	Piston	Pump	Cell	Elec
Columbia, Mark 88	4	Knight	Pairs	4.88x5.13	38.00	382.6	Opp	Stromberg	Pres	Doub	Bosch	Hand	Splash	Piston	Pump	Cell	
Columbia, Mark 85	4	T Head	Pairs	4.88x5.50	38.00	410.6	Opp	Stromberg	Pres	Doub	Bosch	Hand	Spl-Pres	Gear	Pump	Cell	
Corbitt, D, E, & F	4	L Head	Pairs	4.00x4.50	25.60	226.2	Left	Stromberg	Grav	Sing	U. & H	Hand	Pressure	Gear	Pump	Cell	Elec
Correja, T & D	4	T Head	Pairs	4.25x5.00	28.90	283.6	Opp	Schebler	Pres	Doub	Simms	Hand	Spl-Pres	Gear	Pump	Cell	Mech
Correja, A, B & C	4	T Head	Pairs	4.25x5.00	28.90	283.6	Opp	Schebler	Grav	Sing	Simms	Fixed	Spl-Pres	Gear	Pump	Cell	
Correja, S & R	6	T Head	Pairs	4.25x5.00	43.35	425.4	Opp	Schebler	Pres	Doub	Simms	Hand	Spl-Pres	Gear	Pump	Cell	Mech
Correja, C & J	6	T Head	Threes	3.50x5.00	29.40	388.6	Opp		Pres	Doub	Eisemann	Hand	Spl-Pres	Gear	Thermo	Tub	Elec
Correja, R & S	6	T Head	Threes	4.00x6.00	38.40	452.4	Opp		Pres	Doub	Eisemann	Hand	Spl-Pres	Gear	Pump	Tub	
Crane, 3	6	L Head	Pairs	4.38x6.25	45.94	563.7	Left		Pres	Dual	Bosch	Hand	Pressure	Gear	Pump	Cell	Air
Crawford, 13-30	4	L Head	Block	4.13x5.25	27.25	280.6	Left	Stromberg	Grav	Dual	Remy	Hand	Spl-Pres	Piston	Pump	Tub	Elec
Crawford, 13-40	4	L Head	Pairs	4.50x5.50	32.40	349.9	Left	Stromberg	Grav	Dual	Bosch	Hand	Spl-Pres	Gear	Pump	Tub	Elec
Crow Elkhart, C-1	4	L Head	Block	3.75x4.50	22.50	198.8	Right	Schebler	Grav	Dual	Briggs	Hand	Splash	Piston	Thermo	Cell	Acet
Crow Elkhart, C-2-3-4, D-T	4	L Head	Block	4.00x4.50	25.60	226.2	Right	Schebler	Grav	Dual	Briggs	Hand	Splash	Piston	Thermo	Cell	Acet
Crow Elkhart, C-5	4	T Head	Block	4.13x5.00	27.25	267.3	Opp	Schebler	Grav	Dual	Briggs	Hand	Splash	Piston	Thermo	Cell	
Crow Elkhart, C-7-8-9	4	L Head	Pairs	4.50x5.00	32.40	318.1	Left	Schebler	Grav	Dual	Briggs	Hand	Splash	Gear	Thermo	Cell	Acet
Crow Elkhart, C-6A	6	L Head	Pairs	4.13x5.25	40.90	420.9	Left	Schebler	Grav	Dual	Briggs	Hand	Splash		Thermo	Cell	Acet
Crow Elkhart, C-6-B	6	L Head	Pairs	3.75x5.00	33.75	331.4	Left	Stromberg	Grav	Dual	Briggs	Hand	Spl-Pres	Piston	Thermo	Cell	Elec
Croxton, A	4	L Head	Elock	4.13x5.50	27.30	294.0	Right	Schebler	Grav	Sing	Eisemann	Fixed	Splash		Thermo	Cell	Elec
Croxton, B6	6	L Head	Threes	4.25x5.50	43.80	468.0	Right	Schebler	Grav	Sing	Eisemann	Fixed	Splash		Thermo	Cell	Elec
Cunningham, M	4	Straight	Pairs	4.75x5.75	36.10	407.6	Head		Pres	Dual		Hand	Pressure	Gear	Pump	Cell	Elec
Cutting, 40	4	L Head	Block	4.00x5.00	25.60	251.3	Left	Rayfield	Grav	Dual	Remy	Hand	Pressure	Gear	Pump	Cell	Acet
Davis, 40	4	L Head	Block	4.13x5.25	27.25	280.6	Left	Stromberg	Grav	Dual		Hand	Splash	Piston	Pump	Cell	Opt
Davis, 50	4	L Head	Pairs	4.50x5.50	32.40	349.9	Left	Stromberg	Grav	Dual		Hand	Splash	Piston	Pump	Cell	Opt
Day Utility, D	4	L Head	Pairs	4.00x4.50	25.60	267.3	Opp	Schebler	Grav	Doub	Remy	Hand	Splash		Pump	Cell	
Detroiter, A	4	L Head	Block	3.38x4.75	18.25	170.0	Left	Kingston	Grav	Sing	Bosch	Fixed	Splash	Gear	Thermo	Tub	
Diamond T, F	4	L Head	Pairs	5.00x5.50	40.00	431.4	Left	Rayfield	Pres	Dual	Bosch	Hand	Splash	Piston	Pump	Tub	
Dispatch, G-2	4	2 Cycle	Sep'rt	3.50x5.00		192.4		Maco	Grav	Dual	Optional	Hand	Splash		Air		
Dorris, H	4	Straight	Pairs	4.38x5.00	30.73	300.7	Head	Stromberg	Pres	Sing	Bosch	Hand	Splash	Gear	Pump	Tub	Elec
Duquesne, 50	4	T Head	Pairs	4.75x5.50	36.10	389.9	Opp		Pres	Dual	Mea	Hand	Pressure	Gear	Pump	Cell	Elec
Duquesne, Six	6	L Head	Block	3.75x5.50	33.75	364.4	Left		Pres	Dual	Mea	Hand	Pressure	Gear	Pump	Cell	Elec
Duryea, Victoria	2	2 Cycle	Sep'rt	3.75x3.75		82.8		Heitger	Grav	Sing	Dry Cells	Hand	In fuel		Air		Lever
Duryea, Runabout	2	2 Cycle	Sep'rt	3.75x3.75		82.8		Heitger	Grav	Sing	Dry Cells	Hand	In fuel		Air		Lever
Duryea, Buggy	2	2 Cycle	Sep'rt	3.75x3.75		82.8		Heitger	Grav	Sing	Dry Cells	Hand	In fuel		Air		Lever
Duryea, Surry	2	2 Cycle	Sep'rt	3.75x3.75		82.8		Heitger	Grav	Sing	Dry Cells	Hand	In fuel		Air		Lever
Edwards, 25	4	Knight	Pairs	4.00x5.50	25.60	276.5		S.U	Pres		Simms	Hand	Pressure	Piston	Pump	Cell	Elec
Empire, Touring	4	L Head	Pairs	3.50x4.50	19.60	173.2	Left	Holley	Grav	Sing	Eisemann	Fixed	Spl-Pres	Piston	Thermo	Tub	
Enger, F, J, E	4	L Head	Pairs	4.50x5.25	32.40	334.0	Left	Schebler	Grav	Dual	Remy	Hand	Splash	Flywheel	Pump	Cell	
Enger, P	4	L Head	Pairs	4.50x5.25	32.40	334.0	Left	Schebler	Grav	Dual	Remy	Hand	Splash	Flywheel	Pump	Cell	Elec
Falcar, 40	4	L Head	Sep'rt	4.13x5.25	27.25	280.6	Right	Rayfield	Grav	Dual	Bosch	Hand	Spl-Pres		Pump	Tub	
Fiat, 54	4	L Head	Block	4.40x6.00	30.63	371.2	Left	Own	Pres	Dual	Bosch	Hand	Spl-Pres	Gear	Pump	Tub	
Fiat, 56	6	L Head	Block	4.40x6.00	45.95	556.8	Left	Own	Pres	Dual	Bosch	Hand	Spl-Pres	Gear	Pump	Tub	
Fiat, 55	4	L Head	Block	5.13x6.75	42.00	557.0	Left	Own	Pres	Dual	Bosch	Hand	Spl-Pres	Gear	Pump	Tub	
Firestone-Col., 86E	4	L Head	Block	4.13x5.25	27.25	280.6	Left	Schebler	Grav	Dual	Splt'rf	Hand	Splash	Gear	Pump	Cell	Elec
Firestone-Col., 60	4	L Head	Pairs	4.50x5.50	32.40	349.9	Left	Schebler	Grav	Doub	Conn	Hand	Splash	Gear	Pump	Cell	Elec
Firestone-Col., 90	6	L Head	Threes	4.13x5.25	40.90	420.9	Right		Pres	Doub	Conn	Hand	Splash	Piston	Pump	Cell	Elec
Flanders, 40	6	L Head	Block	3.63x4.50	31.60	278.7	Left	Holley	Pres	Dual	Splt'rf	Hand	Splash	Gear	Pump	Cell	Elec
Flanders, 50	6	L Head	Block	4.00x4.75	38.40	358.2	Left	Holley	Pres	Dual	Splt'rf	Hand	Splash	Gear	Pump	Cell	Elec
Ford, T	4	L Head	Block	3.75x4.00	22.50	176.7	Right	Holley	Grav	Sing	Own	Hand	Splash	Flywheel	Thermo	Tub	
Franklin, G Run	4	Straight	Sep'rt	4.00x4.00	25.60	201.1	Head	Own	Grav	Dual	Bosch	Gov	Pressure	Gear	Air		
Franklin, G Tour	4	Straight	Sep'rt	4.00x4.00	25.60	201.1	Head	Own	Grav	Dual	Bosch	Gov	Pressure	Gear	Air		
Franklin, M	6	Straight	Sep'rt	3.63x4.00	31.60	247.7	Head	Own	Grav	Dual	Bosch	Gov	Pressure	Gear	Air		Elec
Franklin, D	6	Straight	Sep'rt	4.00x4.00	38.40	301.7	Head	Own	Grav	Dual	Bosch	Gov	Pressure	Gear	Air		Elec
Franklin, H	6	Straight	Sep'rt	4.00x4.00	38.40	301.7	Head	Own	Grav	Dual	Bosch	Gov	Pressure	Gear	Air		Elec
Garford, 14	6	L Head	Three	4.25x5.25	43.80	446.7	Left			Dual	Bosch	Hand	Spl-Pres	Gear	Pump	Cell	
Garford, G15	6	L Head	Block	3.75x6.00	33.75	397.5	Right	Own	Pres	Sing	Bosch	Hand	Spl-Pres	Gear	Pump	Cell	Elec
Gleason, R	2	L Head	Sep'rt	4.75x4.00	18.00	141.8	Side	Schebler	Grav	Dual	Remy	Hand	Spl-Pres	Noncir	Thermo	Tub	
Glide, 36-42	4	L Head	Block	4.13x5.25	27.25	280.6	Left	Stromberg	Grav	Dual	Remy	Hand	Splash	Gear	Pump	Tub	Acet
Glide, 45	4	L Head	Sep'rt	4.75x5.00	36.10	354.4	Left	Schebler	Grav	Dual	Eisemann	Hand	Splash	Gear	Pump	Tub	Acet
Great Eagle, B	4	L Head	Sep'rt	4.75x5.00	36.10	354.4	S&H	Stromberg	Grav	Dual	Remy	Hand			Pump	Cell	
Great Eagle, C	6	L Head	Sep'rt	4.13x5.25	40.90	420.9	S&H	Rayfield	Grav	Dual	Remy	Hand			Pump	Cell	

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BEARINGS				RUNNING GEAR						CONTROL			TRANSMISSION							
					TIRES		SPRINGS										GEARSET			
Crank-shaft Type and No.	Gearset	Rear Axle	Front Wheel	Front Axle	Front	Rear	Front	Rear	Wheelbase	Location Steering Wheel	Gearshift Location	Emergency Brake Control	Drive	Car Drives Through	Rear Axle	Clutch Type	Type	Forward Speeds	Location	Chassis Weight, Lbs.
Plain, 3	Plain	Roll	Ball	I-Beam	36x4	36x4	½ Ell.	½ Ell.	128	Opt	Cent.	Cent.	Bevel.	Tor T	Float	Disk	Sel	3	Unit X	2,100
Plain, 3	Roll	Roll	Roll	I-Beam	34x4½	34x4½	½ Ell.	½ Ell.	118	Right	Cent.	Cent.	Bevel.	Tor Rd	Float	Disk	Sel	3	Unit M	2,800
Plain, 3	Roll	Roll	Roll	I-Beam	36x4½	36x4½	½ Ell.	½ Ell.	128	Right	Cent.	Cent.	Bevel.	Tor Rd	Float	Disk	Sel	3	Unit M	32,00
Plain, 3	Roll	Roll	Roll	I-Beam	37x5	37x5	½ Ell.	½ Ell.	138	Right	Cent.	Cent.	Bevel.	Tor Rd	Float	Disk	Sel	3	Unit M	34.00
Plain, 3	Ball	Roll	Roll	I-Beam	36x4	36x4	½ Ell.	½ Ell.	116	Right	Right	Right	Bevel.	Tor Rd.	Float	Cone	Sel	3	Unit M	.....
Plain, 3	Ball	Roll	Roll	I-Beam	36x4	36x4	½ Ell.	½ Ell.	122	Right	Right	Right	Bevel.	Tor Rd.	Float	Cone	Sel	3	Unit M	.....
Plain, 3	Ball	Roll	Roll	I-Beam	37x4½	37x4½	½ Ell.	½ Ell.	132	Right	Right	Right	Bevel.	Tor Rd.	Float	Cone	Sel	3	Unit M	.....
Plain, 5	Ball	Roll	Roll	I-Beam	36x4½	36x4½	½ Ell.	½ Ell.	129	Right	Cent.	Cent.	Bevel.	Rad Rd	Float	Cone	Sel	4	Amid	3,800
Plain, 3	Ball	Roll	Roll	I-Beam	36x4½	36x4½	½ Ell.	½ Ell.	120	Right	Right	Right	Bevel.	Springs	Float	Cone	Sel	3	Amid	3,700
Plain, 3	Ball	Ball	Ball	I-Beam	34x4	34x4	½ Ell.	½ Ell.	120	Right	Cent.	Cent.	Bevel.	Springs	Float	Disk	Sel	3	Unit M	2,200
Plain 3	Roll	Roll	Roll	I-Beam	36x4	36x4	½ Ell.	½ Ell.	125	Right	Right	Right	Bevel.	Tor T	Float	Cone	Sel	3	Unit X	2,400
Plain, 3	Roll	Roll	Roll	I-Beam	34x3½	34x3½	½ Ell.	½ Ell.	105	Right	Right	Right	Bevel	Tor T	Float	Cone	Sel	3	Unit X	2,100
Plain, 4	Roll	Roll	Roll	I-Beam	36x4	36x4	½ Ell.	½ Ell.	125	Right	Right	Right	Bevel.	Tor T	Float	Cone	Sel	3	Unit X	2,600
Plain, 3	Roll	Roll	Ball	I-Beam	34x4	34x4	½ Ell.	½ Ell.	125	Left	Cent.	Cent.	Bevel.	Tor T	Float	Cone	Sel	3	Unit X	.....
Plain, 7	Roll	Roll	Ball	I-Beam	34x4	34x4	½ Ell.	½ Ell.	125	Right	Right	Right	Bevel.	Tor T	Float	Cone	Sel	3	Unit X	.....
Plain, 7	Ball	Ball	Ball	.....	36x4½	37x5	½ Ell.	Plat	135	Right	Right	Right	Bevel.	Rad Rd	Float	Disk	Sel	4	Amid	3,100
Plain, 3	Roll	Roll	Roll	I-Beam	34x4	34x4	½ Ell.	Ell.	115	Right	Right	Right	Bevel.	Tor T	Float	Cone	Sel	3	Unit X	2,600
Plain, 3	Roll	Roll	Roll	I-Beam	36x4	36x4	½ Ell.	Ell.	125	Right	Right	Right	Bevel.	Tor T	Float	Cone	Sel	3	Unit X	2,800
Plain, 2	Roll	Roll	Ball	I-Beam	32x3½	32x3½	½ Ell.	Ell.	112	Right	Cent.	Cent.	Bevel.	Rad Rd	Semi F	Disk	Sel	3	Unit M	.....
Plain, 2	Roll	Roll	Ball	I-Beam	34x3½	34x3½	½ Ell.	Ell.	114	Right	Cent.	Cent.	Bevel.	Rad Rd	½ Float	Disk	Sel	3	Unit M	.....
Plain, 2	Roll	Roll	Ball	I-Beam	35x4	35x4	½ Ell.	½ Ell.	122	Right	Cent.	Cent.	Bevel.	Rad Rd	½ Float	Disk	Sel	3	Unit M	.....
Plain, 3	Roll	Ball	Ball	I-Beam	36x4	36x4	½ Ell.	½ Ell.	122	Right	Cent.	Cent.	Bevel.	Rad Rd	Float	Disk	Sel	3	Unit M	.....
Plain, 4	Roll	Ball	Ball	I-Beam	37x4½	37x4½	½ Ell.	½ Ell.	137	Right	Cent.	Cent.	Bevel.	S & R R	Float	Disk	Sel	3	Unit M	.....
Plain, 4	Ball	Roll	Ball	I-Beam	35x4½	35x4½	½ Ell.	½ Ell.	122	Right	Cent.	Cent.	Bevel.	Rad Rd	Float	Disk	Sel	3	Unit M	.....
Plain, 3	Plain	Ball	Roll	I-Beam	36x4	36x4	½ Ell.	½ Ell.	121	Left	Ce.	[illegible]	Bevel.	Rad Rd	Float	Disk	Sel	3	Amid	2,350
Plain, 3	Plain	Ball	Roll	I-Beam	36x4½	36x4½	½ Ell.	½ Plat	138	Left	Cent.	Cent.	Bevel.	Rad Rd	Float	Disk	Sel	4	Amid	2,750
Plain, 3	Ball	Roll	Roll	I-Beam	36x4½	36x4½	½ Ell.	½ Ell.	124	Left	Cent.	Cent.	Bevel.	Springs	Float	Cone	Sel	3	Unit M	.....
Plain, 3	Ball	Roll	Ball	I-Beam	36x4	36x4	½ Ell.	½ Ell.	120	Right	Right	Right	Bevel.	Tor T	Semi F	Disk	Sel	3	Unit M	2,200
Plain, 3	Ball	Ball	Ball	I-Beam	36x4	36x4	½ Ell.	½ Plat	118	Right	Cent.	Cent.	Bevel.	Rad Rd	Float	Cone	Sel	3	.....	.....
Plain, 3	Ball	B&R	Ball	I-Beam	36x4	36x4	½ Ell.	½ Plat	118	Right	Cent.	Cent.	Bevel.	Rad Rd	Float	Cone	Sel	3	.....	.....
Plain, 3	Ball	Roll	Ball	I-Beam	34x4	34x4	½ Ell.	½ Ell.	115	Left	Cent.	Cent.	Bevel.	Springs	Float	Disk	Pro	3	.....	.....
Ball, 2	Ball	Ball	Roll	I-Beam	32x3½	32x3½	½ Ell.	Plat	104	Left	Cent.	Pedal.	Bevel.	Tor T	Float	Disk	Sel	3	Unit M	2,000
Plain, 3	Roll	Roll	Roll	I-Beam	36x4½	36x4½	½ Ell.	½ Ell.	126	Right	Right	Right	Bevel.	Tor R	Float	Disk	Sel	3	Amid	3,300
Plain, 5	Roll	Roll	Roll	Tube	36x3½	36x3½	Ell.	Ell.	120	Right	Pedal	Right	Chain	S&RR	Dead	.....	Frict		Amid	1,200
Plain, 3	Roll	Roll	Roll	I-Beam	36x4	36x4	½ Ell.	½ Ell.	121	Right	Right	Right	Bevel.	Springs	Float	Disk	Sel	3	Unit M	.....
Plain, 3	Ball	Roll	Roll	I-Beam	36x4½	36x4½	½ Ell.	½ Ell.	124	Left	Cent.	Cent.	Bevel.	Springs	Float	Disk	Sel	3	Unit M	2,600
Plain, 4	Ball	Roll	Roll	I-Beam	36x4½	36x4½	½ Ell.	½ Ell.	133	Left	Cent.	Cent.	Bevel.	Springs	Float	Disk	Sel	3	Unit M	2,700
Plain, 4	Roll	Ball	Ball	Tube	30x3	36x3	½ Ell.	½ Ell.	100	Cent	Cent	.....	Roller	Tor T	Dead	.....	Frict	2	Unit X	650
Plain, 4	Roll	Ball	Ball	Tube	30x3	36x3	½ Ell.	½ Ell.	80	Cent	Cent	.....	Roller	Tor T	Dead	.....	Frict	2	Unit X	650
Plain, 4	Roll	Ball	Ball	Tube	1¼	1¼	½ Ell.	½ Ell.	80	Cent	Cent	.....	Roller	Tor T	Dead	.....	Frict	2	Unit X	650
Plain, 4	Roll	Ball	Ball	Tube	1⅜	1⅜	½ Ell.	½ Ell.	90	Cent	Cent	.....	Roller	Tor T	Dead	.....	Frict	2	Unit X	650
Plain, 5	Roll	Roll	Roll	I-Beam	36x4½	36x4½	½ Ell.	½ Ell.	120	Left	Cent.	Cent.	Bevel.	Rad Rd	Float	Disk	Sel	4	Amid	.....
Plain, 3	Ball	B&R	Ball	I-Beam	32x3½	32x3½	½ Ell.	½ Ell.	104	Right	Cent.	Pedal.	Bevel.	S & T T	Semi F	Disk	Sel	3	Unit M	1,550
Plain, 3	Ball	Ball	Ball	I-Beam	34x4	34x4	½ Ell.	½ Ell.	120	Right	Cent.	Pedal.	Bevel.	Tor T	Float	Disk	Sel	3	Unit M	2,400
Plain, 3	Ball	Ball	Ball	I-Beam	36x4	36x4	½ Ell.	½ Ell.	120	Right	Cent.	Pedal.	Bevel.	Tor T	Float	Disk	Sel	3	Unit M	.....
Plain, 3	Ball	Ball	Ball	I-Beam	34x4	34x4	½ Ell.	½ Ell.	116	Right	Right	Right	Bevel.	S & R R	Float	Cone	Sel	3	Amid	2,400
Plain, 3	Ball	Ball	Ball	I-Beam	36x4½	36x4½	½ Ell.	½ Ell.	123	Right	Right	Right	Bevel.	Springs	Semi F	Disk	Sel	4	Amid	2,800
Plain, 4	Ball	Ball	Ball	I-Beam	36x4½	37x5	½ Ell.	½ Ell.	135	Right	Right	Right	Bevel.	Springs	Semi F	Disk	Sel	4	Amid	3,300
Plain, 3	Ball	Ball	Ball	I-Beam	36x4½	37x5	½ Ell.	½ Ell.	128	Right	Right	Right	Bevel.	Springs	Semi F	Disk	Sel	4	Amid	3,150
Plain, 3	Ball	Ball	Ball	I-Beam	34x4	34x4	½ Ell.	½ Ell.	116	Left	Cent.	Cent.	Bevel.	Springs	Float	Cone	Sel	3	Amid	.....
Plain, 3	Ball	Ball	Ball	I-Beam	36x4	36x4	½ Ell.	½ Ell.	122	Left	Cent.	Cent.	Bevel.	Springs	Float	Cone	Sel	3	Amid	.....
Plain, 3	Ball	Ball	Ball	I-Beam	36x4½	36x4½	½ Ell.	½ Ell.	130	Left	Cent.	Cent.	Bevel.	Springs	Float	Disk	Sel	3	Unit M	.....
Plain, 3	P&R	Roll	Ball	I-Beam	34x4	34x4	½ Ell.	½ Ell.	118	Right	Right	Right	Bevel.	Tor T	½ Float	Cone	Sel	3	Unit X	2,600
Plain, 3	P&R	Roll	Roll	I-Beam	36x4½	36x4½	½ Ell.	½ Ell.	130	Right	Right	Right	Bevel.	Tor T	½ Float	Cone	Sel	3	Unit X	3,750
Plain, 3	.....	Roll	Ball	I-Beam	30x3	30x3½	Cross	Cross	100	Left	Pedal.	Left	Bevel.	Tor T	Semi F	Disk	Plan	2	Unit M	1,000
Plain, 5	Ball	B&R	Roll	Tube	32x3½	32x3½	Ell.	Ell.	100	Right	Right	Right	Bevel.	Springs	Semi F	Disk	Sel	3	Amid	1,800
Plain, 5	Ball	B&R	Roll	Tube	32x4	32x4	Ell.	Ell.	103	Right	Right	Right	Bevel.	Springs	Semi F	Disk	Sel	3	Amid	2,300
Plain, 7	Ball	B&R	Roll	Tube	34x4½	34x4½	Ell.	Ell.	116	Right	Right	Right	Bevel.	Springs	Semi F	Disk	Sel	3	Amid	2,400
Plain, 7	Ball	B&R	Roll	Tube	36x4½	37x5	Ell.	Ell.	123	Right	Right	Right	Bevel.	Springs	Semi F	Disk	Sel	3	Amid	2,900
Plain, 7	Ball	B&R	Roll	Tube	37x5	37x5	Ell.	Ell.	126	Right	Right	Right	Bevel.	Springs	Semi F	Disk	Sel	3	Amid	3,000
Plain, 3	Ball	B&R	Roll	I-Beam	36x4½	37x5	½ Ell.	½ Plat	139	.....	.....	.....	Bevel.	Tor T	Float	Cone	Sel	4	Amid	3,050
Plain, 4	Ball	B&R	Roll	I-Beam	36x4½	36x4½	½ Ell.	½ Ell.	128	Left	Cent.	Cent.	Bevel.	Tor T	Float	Cone	Sel	4	Unit M	3,050
Plain, 2	Plain	Roll	Ball	I-Beam	36x2	36x2	½ Ell.	Ell.	96	Right	Right	Right	Bevel.	Tor R	Float	Disk	Sel	3	Unit M	1,500
Plain, 3	Roll	Ball	Ball	I-Beam	34x4	34x4	½ Ell.	½ Ell.	118	Left	Cent.	Cent.	Bevel.	Springs	½ Float	Disk	Sel	3	Unit M	2,300
Plain, 6	Roll	Roll	Roll	I-Beam	36x4½	36x4½	½ Ell.	½ Ell.	120	Right	Cent.	Cent.	Bevel.	Tor T	Float	Disk	Sel	3	Unit X	2,800
.....	.....	.....	.....	I-Beam	36x4½	36x4½	½ Ell.	½ Ell.	135	Right	Right	Right	Bevel.	.....	Float	Cone	Sel	3	Amid	.....
.....	.....	.....	.....	I-Beam	37x5	37x5	½ Ell.	½ Ell.	142	Right	Right	Right	Bevel.	.....	Float	Cone	Sel	3	Amid	.....

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NAME AND MODEL	CYLINDERS			Bore and Stroke, Inches	S. A. E. H. P.	Piston Displacement Cubic Inches	VALVES	CARBURETION		IGNITION			LUBRICATION		COOLING		STARTER
	No. of Cylinders	Shape	How Cast				Location	Make of Carburetor	Fuel Feed	System	Magneto Generator	Control	System	Type of Pump	Circulation	Radiator	Type
Great Southern, 30	4	L Head	Block	4.00x4.50	25.60	226.6	Right	Schebler	Grav	Dual	Bosch	Hand	Spl-Pres	Piston	Thermo	Tub	Acet
Great Southern, 51	4	L Head	Pairs	5.19x6.00	43.00	507.2	Right	Stromberg	Grav	Dual	Bosch	Hand	Spl-Pres	Gear	Pump	Cell	Opt
Great Western,	4	L Head	Sep'rt	4.25x5.50	28.90	312.0	Right	Schebler	Grav	Dual	Remy	Hand	Splash	Piston	Pump	Tub	Acet
Grout, 35	4	L Head	Sep'rt	4.50x5.50	32.40	349.0	Left	Schebler	Grav	Dual		Hand	Splash		Pump	Cell	Elec
Grout, 45	4	L Head	Sep'rt	4.75x5.00	36.10	354.4	Left	Schebler	Grav	Dual		Hand	Splash	Gear	Pump	Cell	Elec
Halladay, 32	4	L Head	Block	3.75x5.25	22.50	231.9	Left	Schebler	Grav	Dual	Briggs	Hand	Splash	Piston	Pump	Tub	
Halladay, 40	4	L Head	Sep'rt	4.50x5.00	32.40	318.1	Left	Schebler	Grav	Doub	Bosch	Hand	Splash	Gear	Pump	Cell	Elec
Havers, 44	6	L Head	Pairs	3.75x5.00	33.75	330.4	Left	Stromberg	Pres	Dual		Hand	Spl-Pres	Gear	Thermo	Cell	Acet
Havers, 55	6	L Head	Pairs	4.00x5.00	38.40	376.9	Left	Stromberg	Pres	Sing	Atw Kent	Hand	Spl-Pres	Gear	Thermo	Cell	Elec
Haynes, 22	4	T Head	Pairs	4.50x5.50	32.40	349.9	Opp	Stromberg	Grav	Dual	Eisemann	Hand	Spl-Pres	Piston	Pump	Cell	Elec
Henderson	4	L Head	Block	4.13x5.25	27.25	420.9	Right	Rayfield	Grav	Dual	Remy	Hand	Spl-Pres	Piston	Thermo	Tub	Acet
Herreshoff, 4-30	4	T Head	Block	3.38x4.50	18.25	161.0	Opp	Stromberg	Grav	Dual	Briggs	Fixed	Splash	Piston	Thermo	Tub	
Herreshoff, 6-36	6	T Head	Block	3.38x4.50	27.40	241.5	Opp	Stromberg	Grav	Dual	Briggs	Fixed	Splash	Piston	Thermo	Tub	
Holly, A	6	T Head	Threes	4.00x5.00	38.40	376.9	Opp	Grav		Doub	Remy	Opt	Splash	Gear	Pump	Cell	Opt
Hudson, 37	4	L Head	Block	4.13x5.25	27.25	280.6	Left	Zenith	Pres	Dual	Delco	Hand	Splash	Piston	Pump	Cell	Elec
Hudson, 54	6	L Head	Threes	4.13x5.50	40.90	441.0	Left	Zenith	Pres	Dual	Delco	Hand	Splash	Piston	Pump	Cell	Elec
Hupmobile, C	4	L Head	Pairs	3.25x3.38	16.90	112.0	Left	Breeze	Grav	Sing	Bosch	Fixed	Splash	Noncir	Thermo	Tub	
Hupmobile, E	4	L Head	Pairs	3.25x3.38	16.90	112.0	Left	Breeze	Grav	Sing	Bosch	Fixed	Splash	Noncir	Thermo	Tub	
Hupmobile, H	4	L Head	Block	3.25x5.50	16.90	182.5	Left	Zenith	Grav	Sing	Bosch	Hand	Splash	Flywheel	Thermo	Cell	
Imperial, 34	4	L Head	Pairs	4.50x5.25	32.40	334.0	Left	Schebler	Grav	Dual	Remy	Hand	Splash	Flywheel	Pump	Tub	Elec
Imperial, 44	4	L Head	Pairs	4.75x5.25	36.10	272.1	Left	Schebler	Grav	Dual	Remy	Hand	Splash	Flywheel	Pump	Tub	Elec
Interstate, 45	6	L Head	Block	4.00x5.00	38.40	376.9	Left	Optional	Pres	Doub	Mea	Hand	Spl-Pres	Gear	Pump	Cell	Elec
Jackson, Olympic	4	L Head	Pairs	4.13x4.75	27.25	253.9	Left	Schebler	Grav	Dual	Remy	Hand	Spl-Pres	Piston	Pump	Cell	Acet
Jackson, Majestic	4	L Head	Pairs	4.50x5.25	32.40	334.0	Left	Schebler	Grav	Dual	Remy	Hand	Spl-Pres	Piston	Pump	Cell	Acet
Jackson, Sultanic	6	L Head	Pairs	4.13x4.75	40.90	380.8	Left	Schebler	Grav	Dual	Remy	Hand	Spl-Pres	Piston	Pump	Cell	Elec
Keeton, 48	6	L Head	Block	3.75x5.50	33.75	364.4	Left	Own	Grav	Sing	Bosch	Fixed	Spl-Pres	Gear	Thermo	Tub	Elec
King, Roadster	4	L Head	Block	3.83x5.13	22.50	226.4	Side	Stromberg	Grav	Dual	Briggs	Hand	Pressure		Thermo	Tub	
King, Touring	4	L Head	Block	4.00x5.50	25.60	276.5	Side	Stromberg	Grav	Dual	Briggs	Hand	Pressure		Thermo	Tub	
Kisselkar, 30	4	L Head	Pairs	4.25x4.25	28.90	241.1	Left	Stromberg	Grav	Dual	Esterline	Hand	Splash	Gear	Pump	Cell	Elec
Kisselkar, 40	4	L Head	Pairs	4.50x5.25	32.40	334.0	Left	Stromberg	Grav	Dual	Esterline	Hand	Splash	Gear	Pump	Cell	Elec
Kisselkar, 50	4	L Head	Pairs	4.88x5.00	38.00	373.3	Left	Stromberg	Grav	Dual	Esterline	Hand	Splash	Gear	Pump	Cell	Elec
Kisselkar, 60	6	L Head	Pairs	4.50x5.25	48.60	501.0	Left	Stromberg	Grav	Dual	Esterline	Hand	Splash	Gear	Pump	Cell	Elec
Klinekar, 30	4	T Head	Sep'rt	4.00x4.63	25.60	232.5	Right		Grav	Doub	Bosch	Hand	Splash	Gear	Pump	Tub	Opt
Klinekar, 40	4	T Head	Pairs	4.25x5.50	28.90	312.0	Opp		Grav	Doub	Bosch	Hand	Splash	Gear	Pump	Tub	Mech
Klinekar, 50	6	T Head	Sep'rt	4.10x5.00	39.90	389.5	Opp		Grav	Doub	Bosch	Hand	Splash	Gear	Pump	Tub	Mech
Klinekar, 60	6	T Head	Pairs	4.25x5.50	43.40	468.0	Opp		Grav	Doub	Bosch	Hand	Splash	Gear	Pump	Tub	Mech
Knox, 44	4	Straight	Sep'rt	5.00x5.50	40.00	431.3	Head	Stromberg	Grav	Doub	Boech	Hand	Pressure	Gear	Pump	Cell	Acet
Knox, 45	4	Straight	Sep'rt	5.00x5.50	40.00	431.3	Head	Stromberg	Grav	Doub	Bosch	Hand	Pressure	Gear	Pump	Cell	Acet
Knox, 46	6	Straight	Pairs	4.38x5.50	45.94	496.0	Head	Rayfield	Grav	Doub	Bosch	Hand	Pressure	Gear	Pump	Cell	Acet
Knox, 66	6	Straight	Pairs	5.00x5.50	60.00	646.7	Head	Stromberg	Grav	Doub	Bosch	Hand	Pressure	Gear	Pump	Cell	Acet
Krit, K	4	L Head	Block	3.70x4.00	22.50	176.7	Right	Stromberg	Grav	Sing	Bosch	Fixed	Splash	Piston	Thermo	Tub	
Lambert, Buckeye, 40	4	L Head	Block	3.25x5.25	16.90	174.2	Right	Schebler	Grav	Dual	Remy	Hand	Splash	Gear	Pump	Tub	
Lambert, 99	4	L Head	Sep'rt	4.25x5.25	28.90	297.8	Left	Schebler	Grav	Dual	Remy	Hand	Spl-Pres	Gear	Pump	Tub	
Lenox, Four	4	L Head	Block	4.25x5.50	28.90	312.0	Right	Own	Grav	Dual	Spld'rf	Hand	Spl-Pres	Piston	Pump	Cell	Elec
Lenox, Six	6	T Head	Threes	4.00x5.00	38.40	376.9	Opp	Own	Grav	Sing	Mea	Hand	Spl-Pres	Piston	Pump	Cell	Elec
Lexington, 13	6	L Head	Threes	4.13x5.25	40.90	420.9	Right		Pres	Doub		Hand	Pressure	Piston	Pump	Cell	Elec
Lion, 30	4	L Head	Block	3.50x5.00	19.60	192.4	Right	Own	Grav	Dual	Remy	Hand	Splash	Piston	Thermo	Cell	
Little Four, A	4	L Head		3.50x3.38	19.60	129.9	Left	Kingston	Grav	Doub	Briggs	Hand	Splash	Noncir	Thermo	Tub	
Little Six,	6	L Head	Threes	3.32x4.25	23.06	220.3	Side		Grav		Bosch	Hand	Splash	Noncir	Thermo	Tub	
Locomobile, L	4	T Head	Pairs	4.50x4.50	32.40	286.3	Opp	Own	Grav	Dual	Bosch	Hand	Spl-Pres	Gear	Pump	Cell	Acet
Locomobile, R	6	T Head	Pairs	4.25x5.00	43.40	425.4	Opp	Own	Grav	Dual	Bosch	Hand	Spl-Pres	Gear	Pump	Cell	Acet
Locomobile, M	6	T Head	Pairs	4.50x5.50	48.60	524.8	Opp	Own	Grav	Dual	Bosch	Hand	Spl-Pres	Gear	Pump	Cell	Acet
Lozier, 77	6	L Head	Threes	3.63x5.50	31.60	340.7	Right	Rayfield	Pres	Sing	Bosch	Hand	Spl-Pres	Gear	Pump	Tub	Elec
Lozier, 72	6	T Head	Pairs	4.63x5.50	51.60	496.1	Opp	Own	Pres	Dual 2	Bosch	Hand	Spl-Pres	Gear	Pump	Tub	Elec
Luverne, 760	6	L Head	Pairs	4.25x5.25	43.40	446.7	Left	Schebler	Grav	Dual		Hand	Splash	Gear	Thermo	Tub	Elec
Luck Utility	4	L Head	Pairs	3.50x4.25	19.60	163.5	Left	Optional	Grav	Opt	Optional	Opt	Spl-Pres	Piston	Thermo	Tub	
Marathon, Runner	4	L Head	Pairs	3.50x4.50	19.60	173.2	Right	Schebler	Grav	Dual	Remy	Hand	Splash	Flywheel	Thermo	Tub	
Marathon, Winner	4	L Head	Pairs	4.25x4.50	28.90	255.3	Right	Schebler	Grav	Dual	Remy	Hand	Splash	Flywheel	Thermo	Tub	
Marathon, Champion	4	L Head	Pairs	4.50x5.13	32.40	326.1	Right	Schebler	Grav	Dual	Remy	Hand	Splash	Flywheel	Thermo	Tub	
Marion, 36A & 37A	4	L Head	Pairs	4.00x5.00	25.60	251.3	Left	Schebler	Grav	Dual	Spld'rf	Hand	Splash	Gear	Pump	Cell	Acet
Marion, 48A	4	L Head	Pairs	4.13x5.50	27.25	294.0	Left	Schebler	Grav	Dual	Spld'rf	Hand	Splash	Gear	Pump	Cell	Elec
Marmon, 32	4	T Head	Pairs	4.50x5.00	32.40	318.1	Opp	Harroun	Grav	Dual 2	Bosch	Hand	Pressure	Gear	Pump	Cell	Elec
Marmon, Six	6	T Head	Pairs	4.50x6.00	48.60	572.5	Opp	Harroun	Pres	Dual 2	Bosch	Hand	Pressure	Gear	Pump	Cell	Elec
Mason, A, B, C	2	Straight	Sep'rt	5.00x5.00	20.00	196.4	Head	Schebler	Grav	Dual	Spld'rf	Hand	Splash		Pump	Tub	
Mason, K	4	L Head	Block	4.00x4.50	25.60	226.2	Right	Schebler	Grav	Dual	Spld'rf	Hand	Splash	Piston	Thermo	Cell	
Matheson, C	6	Straight	Pairs	4.50x5.00	48.60	477.1	Head	Stromberg	Pres	Doub	Bosch	Hand	Splash	Gear	Pump	Cell	Elec

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BEARINGS				RUNNING GEAR						CONTROL			TRANSMISSION							
					TIRES		SPRINGS										GEARSET			
Crank-shaft Type and No.	Gearset	Rear Axle	Front Wheel	Front Axle	Front	Rear	Front	Rear	Wheelbase	Location Steering Wheel	Gearshift Location	Emergency Brake Control	Drive	Car Drives Through	Rear Axle	Clutch Type	Type	Forward Speeds	Location	Chassis Weight, Lbs.
Plain, 2	Ball.	B&R	Ball	I-Beam	34x4	34x4	½ Ell.	¾ Ell.	113	Left	Cent.	Cent.	Bevel.	Tor T	Float	Disk	Sel	3	Unit M	2,000
Plain, 3	Roll.	Roll.	Roll	I-Beam	36x4½	36x4	½ Ell.	¾ Ell.	128	Left	Cent.	Cent.	Bevel.	Tor T	Semi F	Cone	Sel	3	Amid	2,600
Plain, 5	Ball.	Ball.	Ball	I-Beam	36x4	36x4	½ Ell.	¾ Ell.	118	Right	Right	Right.	Bevel.	Tor T	Float	Cone	Sel	3	Unit M	2,000
Plain, 5	Roll.	Roll.	Ball	I-Beam	35x4½	34x4	½ Ell.	Plat.	116	Right	Right	Right.	Bevel.	Springs	Semi F	Cone	Sel	3	Amid	2,600
Plain, 5	Roll.	Roll.	Ball	I-Beam	37x4½	36x4	½ Ell.	Plat.	123	Right	Right	Right.	Bevel.	Rad Rd.	Float	Cone	Sel	3	Amid	2,960
Plain, 3	Ball.	Roll.	Ball	I-Beam	33x4	33x4	½ Ell.	¾ Ell.	112	Right	Right	Right.	Bevel.	Rad Rd.	Semi F	Cone	Sel	3	Amid	2,650
Plain, 5	Ball.	Ball.	Ball	I-Beam	36x4	36x4	½ Ell.	¾ Ell.	118	Right	Right	Right	Bevel.	Rad Rd.	Float	Disk	Sel	3	Amid	3,400
Plain, 4	Ball.	B&R.	Ball	I-Beam	36x4	36x4	½ Ell.	Plat.	122	Right	Right	Right.	Bevel.	Rad Rd.	Float	Disk	Sel	3	Unit M	.....
Plain, 4	Ball.	B&R	Ball	I-Beam	36x4	36x4	½ Ell.	Plat.	128	Right	Right	Right.	Bevel.	Rad Rd.	Float	Disk	Sel	3	Unit M	.....
Plain, 3	Roll.	Roll.	Roll	I-Beam	36x4½	36x4½	½ Ell.	¾ Ell.	120	Right	Right	Right	Bevel.	Tor T	Float	Con Bd.	Sel	3	Amid	2,340
Plain, 3	Ball.	Roll.	Ball	I-Beam	34x4	34x4	½ Ell.	¾ Ell.	116	Left	Cent.	Pedal.	Bevel.	Springs	Semi F	Cone	Sel	3	Unit X	2,200
Plain, 3	B&P	B&R.	Ball	I-Beam	34x4	34x4	½ Ell.	Plat.	100	Left	Cent.	Pedal.	Bevel.	Tor T	Semi F	Disk	Sel	4	Unit M	1,600
Plain, 3	B&P	B&R.	Ball	I-Beam	34x4	34x4	½ Ell.	Plat.	124	Left	Cent.	Pedal.	Bevel.	Tor T	Semi F	Disk	Sel	4	Unit M	1,600
Plain, 3	Ball.	Ball.	Ball	I-Beam	36x4½	36x4½	½ Ell.	½ Ell.	130	Left	Cent.	Cent.	Bevel.	Tor T	‡Float	Cone	Sel	.....	Unit X	.....
Plain, 3	Roll.	Roll.	Roll	I-Beam	36x4	36x4	½ Ell.	¾ Ell.	118	Right.	Right	Right.	Bevel.	Tor T	Float	Disk	Sel	3	Unit M	2,600
Plain, 3	Roll.	Roll.	Roll	I-Beam	36x4½	36x4½	½ Ell.	¾ Ell.	127	Right.	Right	Right.	Bevel.	Tor T	Float	Disk	Sel	3	Unit M	3,000
Plain, 3	B&P	Roll.	Roll	I-Beam	30x3	30x3	½ Ell.	Cross	86	Right.	Right	Right	Bevel.	Rad Rd.	.....	Disk	Sel	2	Unit M	1,500
Plain, 3	B&P	Roll.	Roll	I-Beam	30x3	30x3	½ Ell.	Cross	110	Right.	Right	Right	Bevel.	Rad Rd.	.....	Disk	Sel	2	Unit M	1,600
Plain, 3	B&R	Roll.	Roll	I-Beam	32x3½	32x3½	½ Ell.	Cross	106	Right.	Cent.	Cent.	Bevel.	Tor T	Float	Disk	Sel	3	Unit M	1,800
Plain, 3	Ball.	B&R	Roll	I-Beam	34x4	34x4	½ Ell	¾ Ell.	118	Right.	Cent.	Cent.	Bevel.	Tor T	Float	Disk	Sel	3	Unit M	.....
Plain, 3	Ball.	B&R.	Ball	I-Beam	36x4	36x4	½ Ell	¾ Ell.	122	Right.	Cent.	Cent.	Bevel.	Tor T	Float	Disk	Sel	3	Unit M	.....
Plain, 3	Ball.	Ball.	Ball	I-Beam	36x4½	36x4½	½ Ell	¾ Ell.	132	Left	Cent.	Cent.	Bevel.	Springs	Float	Disk	Sel	4	Unit M	2,800
Plain, 3	Ball.	B&R.	Ball	I-Beam	34x4	34x4	Ell.	Ell.	115	Right.	Right	Right	Bevel.	Rad Rd.	Semi F	Cone	Sel	3	Unit M	2,000
Plain, 3	Ball.	B&R	Ball	I-Beam	36x4	36x4	Ell.	Ell.	124	Right.	Right	Right	Bevel.	Rad Rd.	Semi F	Cone	Sel	3	Unit M	2,400
Plain, 4	Ball.	Ball.	Ball	I-Beam	36x4½	36x4½	Ell.	Ell.	138	Right.	Right	Right	Bevel.	Rad Rd.	Float	Cone	Sel	3	Unit M	2,800
Plain, 4	Ball.	Ball.	Ball	I-Beam	37x4½	36x4	½ Ell.	¾ Ell.	131	Left	Cent.	Cent.	Bevel.	Tor T	Float	Disk	Sel	4	Amid	3,200
Plain	.....	.....	....	.....	32x3½	32x3½	½ Ell.	Flat.	110	Left	Cent.	Cent.	Bevel.	Tor T	Float	Disk	Sel	3	Unit M	.....
Plain	.....	.....	....	.....	34x4	34x4	½ Ell.	Flat.	115	Left	Cent.	Cent.	Bevel.	Tor T	Float	Disk	Sel	3	Unit M	.....
Plain, 3	Ball.	Roll.	Roll	I-Beam	34x4	34x4	½ Ell.	¾ Ell.	116	Right	Right	Right.	Bevel.	Springs	Float	Cone	Sel	3	Amid	.....
Plain, 3	Ball.	Roll.	Roll	I-Beam	35x4½	35x4½	½ Ell.	¾ Ell.	121	Right	Right	Right.	Bevel.	Springs	Float	Cone	Sel	4	Amid	.....
Plain, 3	Ball.	Roll.	Roll	I-Beam	36x4½	36x4½	½ Ell.	¾ Ell.	132	Right	Right	Right.	Bevel.	Springs	Float	Cone	Sel	4	Amid	.....
Plain, 4	Ball.	Roll.	Roll	I-Beam	37x5	37x5	½ Ell.	¾ Ell.	140	Right	Right	Right.	Bevel.	Springs	Float	Cone	Sel	4	Amid	.....
Plain, 5	Ball.	Ball.	Ball	I-Beam	34x4	34x4	½ Ell.	¾ Ell.	115	Right	Right	Right.	Bevel.	Tor T	‡Float	Cone	Sel	4	Amid	.....
Plain, 5	all	Ball.	Ball	I-Beam	36x4	36x4	½ Ell.	¾ Ell.	118	Right	Right	Right.	Bevel.	Tor T	‡Float	Cone	Sel	4	Amid	.....
Plain, 7	all	Ball.	Ball	I-Beam	36x4½	36x4½	½ Ell.	¾ Ell.	126	Right	Right	Right.	Bevel.	Tor T	‡Float	Cone	Sel	4	Amid	.....
Plain, 7	all	Ball.	Ball	I-Beam	37x5	37x5	½ Ell.	¾ Ell.	132	Right	Right	Right.	Bevel.	Tor T	‡Float	Cone	Sel	4	Amid	.....
Plain, 5	Ball.	Ball.	Roll	I-Beam	36x4½	36x4½	½ Ell.	¾ Ell.	122	Right	Cent.	Cent.	Bevel.	Rad Rd.	Float	Disk	Sel	3	Unit M	2,300
Plain, 5	Ball.	Ball.	Roll	I-Beam	37x5	37x5	½ Ell.	¾ Ell.	126	Opt	Cent.	Cent.	Bevel.	Rad Rd.	Float	Disk	Sel	3	Unit M	2,740
Plain, 4	Ball.	Ball.	Roll	I-Beam	38x5	38x5	½ Ell.	¾ Ell.	134	Opt	Cent.	Cent.	Bevel.	Springs	Float	Disk	Sel	3	Unit M	3,700
Plain, 4	Ball.	Ball.	Roll	I-Beam	38x5½	38x5½	½ Ell	¾ Ell.	134	Right	Cent.	Cent.	Bevel.	Rad Rd.	Float	Disk	Sel	3	Unit M	3,120
Ball, 2	Ball	Roll.	Ball	I-Beam	32x3½	32x3½	½ Ell.	Ell.	106	Left	Left.	Left.	Bevel.	Tor T	Semi F	Disk	Sel	3	Unit M	1,500
Plain, 5	.....	Roll.	Ball	I-Beam	32x3½	32x3½	½ Ell.	Ell.	112	Right	Right	Right	Chain	Rad Rd.	Semi F	.....	Frict	.....	Amid	2,000
Plain, 5	.....	Roll.	Ball	I-Beam	34x3½	34x3½	½ Ell.	Ell.	117	Right	Right	Right	Chain	Rad Rd.	Semi F	.....	Frict	.....	Amid	2,100
Plain, 3	Ball.	Ball.	Ball	I-Beam	34x4	34x4	½ Ell	¾ Ell.	118	Left	Cent.	Cent.	Bevel.	Tor T	Float	Cone	Sel	3	Unit X	.....
Plain, 3	Ball.	Ball.	Ball	I-Beam	35x4½	35x4½	½ Ell.	¾ Ell.	130	Left	Cent.	Cent.	Bevel.	Tor T	Float	Cone	Sel	3	Unit X	.....
Plain, 3	Ball.	Roll.	Roll	I-Beam	36x4½	36x4½	½ Ell.	¾ Ell.	129	Left	Cent.	Cent.	Bevel.	Springs	Float	Cone	Sel	3	Unit M	.....
Plain, 3	Roll.	Roll.	Ball	I-Beam	32x3½	32x3½	½ Ell.	¾ Ell.	110	Left	Left.	Cent.	Bevel.	Springs	Semi F	Cone	Sel	3	Amid	1,800
Plain, 3	Plain	B&R.	Ball	Tub	30x3½	30x3½	½ Ell	¾ Ell.	90	Right	Right	.....	.....	Springs	Semi F	Cone	Sel	2	.....	1,640
Plain, 3	Plain	Roll.	Ball	I-Beam	32x4	32x4	½ Ell.	¾ Plat.	106	Left	Cent.	Right.	Bevel.	T & R R	Semi F	Cone	Sel	3	Unit X	.....
Plain, 3	Ball.	Ball.	Roll	I-Beam	34x4½	34x4½	½ Ell.	¾ Ell.	120	Right.	Right	Right.	Bevel.	Rad Rd.	Float	Cone	Sel	4	Amid	3,430
Plain, 7	Ball.	Ball.	Roll	I-Beam	36x4½	36x4½	½ Ell.	¾ Ell.	128	Right.	Right	Right.	Bevel.	Rad Rd.	Float	Disk	Sel	4	Amid	4,180
Plain, 7	Ball.	Ball.	Roll	I-Beam	37x5	36x4½	½ Ell.	¾ Ell.	136	Right.	Right	Right.	Bevel.	Rad Rd.	Float	Disk	Sel	4	Amid	4,380
Plain, 3	Ball.	Ball.	Ball.	I-Beam	36x4½	36x4½	½ Ell.	¾ Ell.	127½	Left	Cent.	Cent.	Bevel.	Tor T	Semi F	Disk	Sel	3	Unit M	.....
Ball, 4	Ball.	Ball.	Roll	I-Beam	37x5	36x4½	½ Ell.	Plat.	131	Left	Cent.	Cent.	Bevel.	Rad Rd.	Float	Disk	Sel	4	Amid	2,990
Plain, 5	Ball.	B&R.	Ball	I-Beam	37x5	37x5	½ Ell.	¾ Ell.	130	Left	Cent.	Left.	Bevel.	Rad Rd.	Float	Disk	Sel	3	Unit M	2,600
Plain, 3	Ball.	B&R.	Ball	I-Beam	36x3½	36x3½	½ Ell.	¾ Ell.	115	Left	Cent.	Cent.	Bevel.	Tor T	Semi F	Disk	Sel	3	Unit M	2,000
Plain, 3	Ball.	B&R.	Ball	I-Beam	32x3½	32x3½	½ Ell.	Ell.	104	Right	Right	Right	Bevel.	Tor T	Semi F	Disk	Sel	3	Unit M	2,200
Plain, 3	Ball.	Ball.	Ball	I-Beam	34x4	34x4	½ Ell.	Ell.	116	Right	Right	Right	Bevel.	Tor T	Float	Disk	Sel	3	Unit M	2,000
Plain, 3	Ball.	Ball.	Ball	I-Beam	36x4	36x4	½ Ell.	Ell.	123	Right	Right	Right	Bevel.	Tor T	Float	Disk	Sel	3	Unit M	2,400
Plain, 3	Ball.	Roll.	Ball	I-Beam	34x4	34x4	½ Ell.	¾ Ell.	112	Right	Cent.	Cent.	Bevel.	S & T T	Semi F	Cone	Sel	3	Unit X	2,540
Plain, 3	Ball.	Roll.	Roll	I-Beam	36x4	36x4	½ Ell.	¾ Ell.	120	Right	Cent.	Cent.	Bevel.	S & T T	Float	Cone	Sel	3	Unit X	2,865
Plain, 3	Ball.	Ball.	Roll	I-Beam	35x4½	35x4½	½ Ell.	Ell	120	Left	Cent.	Cent.	Bevel.	Tor T	Float	Cone	Sel	3	Unit X	2,800
Plain, 7	Ball.	Ball.	Roll	I-Beam	37x5	36x4½	½ Ell.	¾ Ell	145	Left	Cent.	Cent.	Bevel.	Tor T	Float	Disk	Sel	3	Unit X	3,250
Plain, 2	Plain	Roll.	Roll	Tube	32x3½	32x3½	½ Ell.	Ell.	96	Right	Right	Right	Chain	Rad Rd.	Dead	Cone	Plan	2	Unit M	.....
Plain, 2	Ball.	Roll.	Ball	I-Beam	36x3½	36x3½	½ Ell.	¾ Ell.	116	Right	Right	Right	Bevel.	Springs	Semi F	Disk	Sel	3	Unit M	.....
Plain, 4	Ball.	Ball.	Roll	I-Beam	37x5	37x5	½ Ell.	¾ Ell	135	Right.	Cent.	Cent.	Bevel.	Rad Rd.	Float	Disk	Sel	3	Unit X	2,950

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NAME AND MODEL	CYLINDERS			Bore and Stroke, Inches	S. A. E. H. P.	Piston Displacement Cubic Inches	VALVES	CARBURETION		IGNITION			LUBRICATION		COOLING		STARTER
	No. of Cylinders	Shape	How Cast				Location	Make of Carburetor	Fuel Feed	System	Magneto Generator	Control	System	Type of Pump	Circulation	Radiator	Type
Maxwell, 4	4	T Head	Pairs	3.75x4.00	22.50	176.7	Opp	Own	Grav	Dua	Spld'rf	Hand	Splash	Piston	Thermo	Cell	Acet
Maxwell, 8	4	T Head	Pairs	4.00x4.63	25.60	232.5	Opp	Own	Grav	Dual	Spld'rf	Hand	Splash	Gear	Thermo	Cell	Acet
Maxwell, 10	4	T Head	Sep'rt	4.25x5.25	28.90	297.8	Opp	Own	Grav	Dual	Spld'rf	Hand	Splash	Gear	Thermo	Cell	Acet
McFarlan, S	6	T Head	Threes	4.00x5.00	38.40	376.9	Opp	Stromberg	Pres	Dual	Eisemann	Hand	Spl-Pres	Gear	Pump	Cell	Air
McFarlan, T	6	T Head	Block	4.00x6.00	38.40	452.4	Opp	Stromberg	Pres	Dual	Eisemann	Hand	Splash		Pump	Cell	Air
McFarlan, M	6	Straight	Pairs	4.25x5.00	43.40	425.4	Head	Stromberg	Grav	Dual	Eisemann	Hand	Splash	Flywheel	Pump	Cell	Air
McIntyre, G	6	T Head	Block	3.50x4.50	29.40	259.8	Opp	Stromberg	Grav	Dual		Hand	Splash	Piston	Thermo	Cell	
McIntyre	6	T Head	Block	3.50x4.50	29.40	259.8	Opp	Stromberg	Grav	Dual		Hand	Splash	Piston	Thermo	Cell	Elec
Mercer, J&K	4	T Head	Pairs	4.38x5.00	30.63	300.7	Opp	Fletcher	Pres	Dual 2	Bosch	Hand	Spl-Pres	Gear	Pump	Cell	
Mercer, G&H	4	T Head	Pairs	4.50x5.00	32.40	318.1	Opp	Fletcher	Pres	Dual 2	Bosch	Hand	Spl-Pres	Gear	Pump	Cell	
Metz, 22	4	L Head	Block	3.75x4.00	22.50	176.7	Right		Grav	Sing	Bosch	Fixed	Splash	Gear	Thermo	Tub	
Michigan, R & S	4	L Head	Block	4.25x5.25	28.90	297.8	Right	Schebler	Grav	Dual	Briggs	Hand	Splash	Piston	Pump	Cell	Opt
Michigan, L & O	4	L Head	Block	4.06x4.50	26.40	233.3	Right	Schebler	Grav	Dual	Briggs	Hand	Splash	Piston	Pump	Cell	Opt
Midland, T-4	4	T Head	Pairs	4.50x5.00	32.40	318.1	Opp	Optional	Pres	Sing	Gray & Da.	Hand	Splash	Gear	Pump	Cell	Elec
Midland, T-6	6	T Head	Threes	4.00x5.00	38.40	376.9	Opp	Optional	Pres	Sing	Gray & Da.	Hand	Splash	Gear	Pump	Cell	Elec
Miller, 40	4	L Head	Block	4.13x5.15	27.25	294.0	Right	Chapin	Grav	Dual	Kingston	Hand	Pressure	Piston	Pump	Cell	
Mitchell, 5-4	4	T Head	Pairs	4.25x7.00	28.90	397.2	Opp		Pres	Dual	Bosch	Hand	Spl-Pres	Gear	Pump	Cell	Elec
Mitchell, 5-6	6	T Head	Pairs	3.75x6.00	32.75	397.5	Opp		Pres	Dual	Bosch	Hand	Spl-Pres	Gear	Pump	Cell	Elec
Mitchell, 7-6	6	T Head	Pairs	4.25x7.00	43.80	595.8	Opp		Pres	Dual	Bosch	Hand	Spl-Pres	Gear	Pump	Cell	Elec
Moline, M-40	4	L Head	Pairs	4.13x6.00	27.25	327.4	Left	Schebler	Grav	Doub	Bosch	Hand	Spl-Pres	Noncir	Thermo	Tub	Elec
Moon, 39	4	T Head	Pairs	4.00x5.75	25.60	289.0	Opp	Stromberg	Grav	Dual	Remy	Hand	Splash	Gear	Pump	Cell	Elec
Moon, 48	4	T Head	Pairs	4.50x5.00	32.40	318.1	Opp	Stromberg	Grav	Dual	Remy	Hand	Splash	Gear	Pump	Cell	Elec
Moon, 65	6	T Head	Pairs	4.00x5.75	38.40	433.5	Opp	Stromberg	Grav	Dual	Bosch	Hand	Splash	Gear	Pump	Cell	Elec
Morse	4	Straight	Sep'rt	4.63x5.00	34.25	336.0	Head	Stromberg	Grav	Dual	Eisemann	Hand	Splash	Gear	Pump	Cell	Opt
Motorette, L, M & R	2	L Head	Sep'rt	3.75x3.75	11.25	82.8	Side	Holley	Grav	Sing	Bosch	Fixed	Splash	Gear	Thermo	Tub	
Moyer, B &E	4	T Head	Pairs	4.50x5.00	32.40	318.1	Opp	Schebler		Dual	Mea	Hand	Spl-Pres	Gear	Pump	Tub	
Moyer, D & F	6	T Head	Threes	4.00x5.00	38.40	376.9	Opp	Schebler		Dual	Mea	Hand	Spl-Pres	Gear	Pump	Tub	
National, Series V	4	T Head	Pairs	4.88x6.00	38.00	448.0	Opp	Rayfield	Pres	Doub	Bosch	Hand	Spl-Pres	Gear	Pump	Cell	Elec
National, Series V	4	T Head	Pairs	4.88x6.00	38.00	448.0	Opp	Rayfield	Pres	Doub	Bosch	Hand	Spl-Pres	Gear	Pump	Cell	Elec
National, Series V	4	T Head	Pairs	4.88x6.00	38.00	448.0	Opp	Rayfield	Pres	Doub	Bosch	Hand	Spl-Pres	Gear	Pump	Cell	Elec
Norwalk, A	6	T Head	Threes	4.00x5.00	38.40	376.9	Opp	Carter	Grav	Sing	Atw Kent	Hand	Splash	Gear	Pump	Tub	Elec
Norwalk, A	6	T Head	Threes	4.00x5.00	38.40	376.9	Opp	Carter	Pres	Sing	Atw Kent	Hand	Splash	Gear	Pump	Tub	Elec
Norwalk, B	6	T Head	Threes	4.50x5.50	48.60	524.8	Opp	Carter	Pres	Sing		Hand	Splash	Gear	Pump	Tub	Elec
Nyberg, 437	4	L Head	Block	3.75x5.25	22.50	231.9	Left	Optional	Pres	Doub	Remy	Hand	Splash	Gear	Pump	Cell	
Nyberg, 440	4	L Head	Sep'rt	4.25x5.25	28.90	297.8	Left	Optional	Pres	Doub	Remy	Hand	Splash	Gear	Pump	Cell	
Nyberg, 645R	6	L Head	Pairs	3.75x6.00	33.75	397.5	Left	Optional	Pres	Dual	Remy	Hand	Splash	Gear	Pump	Cell	Elec
Nyberg, 645T	6	L Head	Pairs	3.75x6.00	33.75	397.5	Left	Optional	Pres	Dual	Remy	Hand	Splash	Gear	Pump	Cell	Elec
Nyberg, 660R	6	L Head	Sep'rt	4.25x5.25	43.80	446.7	Left	Optional	Pres	Dual	Remy	Hand	Spl-Pres	Gear	Pump	Cell	Elec
Nyberg, 660T	6	L Head	Sep'rt	4.25x5.25	43.80	446.7	Left	Optional	Pres	Dual	Remy	Hand	Spl-Pres	Gear	Pump	Cell	Elec
Oakland, 35	4	L Head	Block	3.50x5.00	19.60	192.4	Left		Grav	Doub	Deaco	Hand	Splash	Piston	Pump	Tub	
Oakland, 42	4	L Head	Pairs	4.13x4.75	27.25	253.9	Left	Schebler	Pres	Doub	Deaco	Hand	Splash	Piston	Pump	Cell	Air
Oakland, 6-60	6	L Head	Pairs	4.13x4.75	40.90	380.8	Left	Stromberg	Pres	Doub	Deaco	Hand	Splash	Piston	Pump	Cell	Air
Oldsmobile, 53	6	L Head	Pairs	4.13x4.75	40.90	380.8	Left	Stromberg	Pres	Sing	Delco	Hand	Spl-Pres		Pump	Cell	Elec
Omaha, 30	4	L Head	Block	4.06x4.50	26.40	233.3	Right	Rayfield	Grav	Dual	Spld'rf	Hand	Splash	Piston	Pump	Tub	
Only, A	4	T Head	Block	4.25x7.88	28.90	446.8	Opp	Own	Pres	Doub	Bosch	Hand	Spl-Pres	Gear	Pump	Tub	
Overland, 69	4	L Head	Sep'rt	4.00x4.50	25.60	226.2	Left	Schebler	Grav	Dual	Remy	Hand	Spl-Pres	Noncir	Thermo	Cell	Acet
Overland, 71	4	L Head	Sep'rt	4.38x4.50	30.63	270.6	Left	Schebler	Grav	Dual	Remy	Hand	Splash	Gear	Thermo	Cell	Acet
Pacific Special, A & B	4	L Head	Pairs	4.50x5.00	32.40	318.1	Left	Stromberg	Grav	Dual	Bosch	Hand	Splash	Gear	Pump	Tub	Acet
Packard, Runabout, 38	6	L Head	Pairs	4.00x5.50	38.40	414.8	Right	Own	Pres	Dual	Bosch	Hand	Pressure	Gear	Pump	Cell	Elec
Packard, Touring, 38	6	L Head	Pairs	4.00x5.50	38.40	414.8	Right	Own	Pres	Dual	Bosch	Hand	Pressure	Gear	Pump	Cell	Elec
Packard, Phaeton, 38	6	L Head	Pairs	4.00x5.50	38.40	414.8	Right	Own	Pres	Dual	Bosch	Hand	Pressure	Gear	Pump	Cell	Elec
Packard, Runabout, 48	6	T Head	Pairs	4.50x5.50	48.60	524.8	Opp	Own	Pres	Dual	Bosch	Hand	Pressure	Gear	Pump	Cell	
Packard, Touring, 48	6	T Head	Pairs	4.50x5.50	48.60	524.8	Opp	Own	Pres	Dual	Bosch	Hand	Pressure	Gear	Pump	Cell	
Paige, 25	4	L Head	Block	3.75x4.00	22.50	176.7	Left	Mayer	Grav	Dual	Spld'rf	Hand	Splash	Piston	Thermo	Cell	
Paige, 36	4	L Head	Block	4.00x5.00	25.60	251.3	Left	Own	Grav	Sing	Bosch	Hand	Spl-Pres	Piston	Pump	Tub	Elec
Palmer-Singer, Brighton	6	T Head	Threes	4.00x5.00	38.40	376.9	Opp	C. R. G	Pres	Dual	Eisemann	Hand	Spl-Pres	Gear	Pump	Cell	Air
Palmer-Singer, LXIV	6	T Head	Pairs	4.88x5.50	57.00	615.0	Opp	C. R. G	Pres	Dual	Eisemann	Hand	Spl-Pres	Gear	Pump	Cell	Air
Paterson, 43	4	L Head	Pairs	4.13x4.75	27.25	253.9	Left	Schebler	Grav	Dual	Deaco	Hand	Spl-Pres	Gear	Pump	Cell	Elec
Paterson, 47	4	L Head	Pairs	4.50x5.25	32.40	334.0	Left	Schebler	Grav	Dual	Deaco	Hand	Spl-Pres	Gear	Pump	Cell	Elec
Pathfinder	4	L Head	Block	4.13x5.25	27.25	280.6	Left	Schebler	Grav	Dual	Eisemann	Hand	Splash	Piston	Thermo	Cell	Elec
Peerless, 29	4	L Head	Pairs	4.00x4.63	25.60	232.5	Left	Own	Grav	Dual	Bosch	Hand	Splash	Piston	Pump	Tub	
Peerless, 35	6	T Head	Pairs	4.00x5.50	38.40	414.8	Opp	Own	Pres	Dual	Bosch	Hand	Splash	Piston	Pump	Tub	Elec
Peerless, 36	6	T Head	Pairs	4.50x6.00	48.60	572.5	Opp	Own	Pres	Dual	Bosch	Hand	Splash	Piston	Pump	Tub	Elec
Peerless, 37	6	T Head	Pairs	5.00x7.00	60.00	824.8	Opp	Own	Pres	Dual	Bosch	Hand	Splash	Piston	Pump	Tub	Elec
Perfex, 2	4	L Head	Pairs	3.75x4.50	22.50	198.8	Left	Stromberg	Grav	Dual	Spld'rf	Hand	Spl-Pres	Gear	Pump	Tub	
Pierce-Arrow, 38C	6	T Head	Pairs	4.00x5.50	38.40	414.8	Opp	Own	Grav	Doub	Bosch	Hand	Pressure	Gear	Pump	Cell	Air
Pierce-Arrow, 48D	6	T Head	Pairs	4.50x5.50	48.60	524.8	Opp	Own	Pres	Dual	Bosch	Hand	Splash	Gear	Pump	Cell	Acet
Pierce-Arrow, 48B	6	T Head	Pairs	4.50x5.50	48.60	524.8	Opp	Own	Grav	Doub	Bosch	Hand	Pressure	Gear	Pump	Cell	Air
Pierce-Arrow, 66A	6	T Head	Pairs	5.00x7.00	60.00	824.8	Opp	Own	Grav	Dual	Bosch	Hand	Pressure	Gear	Pump	Cell	Air

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BEARINGS				RUNNING GEAR						CONTROL			TRANSMISSION							
Crank-shaft Type and No.	Gearset	Rear Axle	Front Wheel	Front Axle	TIRES		SPRINGS		Wheelbase	Location Steering Wheel	Gearshift Location	Emergency Brake Control	Drive	Car Drives Through	Rear Axle	Clutch Type	GEARSET			Chassis Weight, Lbs
					Front	Rear	Front	Rear									Type	Forward Speeds	Location	
Plain, 3	P&R	B&B	Ball	Tub ..	30x3½	30x3½	½ Ell.	½ Ell.	93	Left ..	Cent.	Cent.	Bevel..	Springs..	Semi F	Disk..	Pro .	3	Unit M	1,550
Plain, 3	P&R	B&R	Ball	I-Beam	32x3½	32x3½	½ Ell.	½ Ell.	106	Right.	Right	Right	Bevel..	Springs..	Semi F	Disk..	Prov	3	Unit M	2,000
Plain, 5	P&R	Roll .	Roll	I-Beam	36x4	36x4	½ Ell.	½ Ell.	115	Left ..	Cent.	Cent.	Bevel..	Springs..	Float .	Disk..	Sel ..	3	Unit M	2,900
Plain, 3	B&R.	Ball .	Ball	I-Beam	37x4½	37x4½	½ Ell.	Ell ..	124	Right.	Cent.	Cent.	Bevel..	Tor T ...	Float .	Disk..	Sel ..	3	Unit X	2,400
Plain, 4	B&R.	Ball .	Ball	I-Beam	37x4½	37x4½	½ Ell.	Ell ..	124	Right.	Cent.	Cent.	Bevel..	Tor T ...	Float .	Disk..	Sel ..	3	Unit X	2,400
Plain, 4	Ball .	Ball .	Ball	I-Beam	37x4½	37x4½	½ Ell.	Ell ..	128	Right.	Cent.	Cent.	Bevel..	T & R R.	Float .	Disk..	Sel ..	3	Unit M	2,600
Plain, 3	P&B	Ball .	Roll	I-Beam	34x4	34x4	½ Ell.	½ Ell.	116	Right.	Cent.	Pedal.	Bevel..	Springs..	Float .	Disk..	Sel ..	4	Unit M	2,100
Plain, 3	P&B	Ball .	Roll	I-Beam	34x4	34x4	½ Ell.	½ Ell.	116	Right.	Cent.	Pedal.	Bevel..	S & T T	Float .	Disk..	Sel ..	4	Unit M	2,100
Plain, 3	Ball .	Ball .	Ball	I-Beam	32x4	32x4	½ Ell.	½ Ell	108	Right.	Right	Right	Bevel..	Rad Rd.	Float .	Disk..	Sel ..	4	Amid ..	.....
Plain, 3	Ball .	Ball .	Ball	I-Beam	34x4	34x4	½ Ell.	½ Ell.	118	Right.	Right	Right	Bevel..	Rad Rd.	Float .	Disk..	Sel ..	4	Amid ..	2,550
Plain, 3	Ball .	Ball .	Ball	Tube...	30x3	30x3	Ell ..	Ell ..	90	Left ..	Cent.	Cent.	Chain.	Rad Rd.	Dead .	.....	Frict .	5	Amid ..	.....
Plain, 3	Ball .	Ball .	Ball	I-Beam	35x4½	35x4½	½ Ell.	½ Ell.	118	Left ..	Cent.	Cent.	Bevel..	Springs..	Float .	Cone .	Sel ..	4	Amid ..	3,100
Plain, 2	Roll .	Roll .	Ball	I-Beam	34x4	34x4	½ Ell.	½ Ell.	114	Left ..	Cent.	Cent.	Bevel..	Springs..	Float .	Cone .	Sel ..	3	Amid ..	2,850
Plain, 3	Ball .	Roll .	Roll	I-Beam	34x4	34x4	½ Ell.	½ Ell.	121	Left .	Cent.	Cent.	Bevel..	Springs..	Float .	Disk..	Sel ..	3	Amid ..	2,650
Plain, 3	Ball .	Roll .	Roll	I-Beam	36x4½	36x4½	½ Ell.	½ Ell.	134	Left .	Cent.	Cent.	Bevel..	Springs..	Float .	Disk..	Sel ..	3	Amid ..	3,600
Plain, 3	Plain .	Roll .	Ball	I-Beam	34x4	34x4	½ Ell.	Ell .	116	Right.	Opt..	Cent.	Bevel..	Rad Rd.	Semi F	Cone ..	Sel ..	3	Amid ..	2,300
Plain, 3	B&R.	Roll .	Roll	I-Beam	36x4	36x4	½ Ell.	½ Ell	120	Left ..	Cent.	Cent.	Bevel..	Tor T ..	Float .	Cone ..	Se ..	3	Amid ..	2,800
Plain, 4	B&R.	Roll .	Roll	I-Beam	36x4	36x4	½ Ell.	½ Ell	132	Left ..	Cent.	Cent.	Bevel..	Tor T ..	Float .	Cone ..	Se ..	3	Amid ..	3,400
Plain, 4	B&R.	Roll .	Roll	I-Beam	36x4½	36x4½	½ Ell.	½ Ell	144	Left ..	Cent.	Cent.	Bevel..	Tor T ..	Float .	Cone ..	Sel ..	3	Amid ..	3,800
Plain, 3	Roll .	B&R	Ball	I-Beam	36x4	36x4	½ Ell.	Ell ..	124	Right.	Right	Right	Bevel..	Tor T ..	Semi F	Cone ..	Sel ..	3	Unit M	2,225
Plain, 3	Ball .	B&R.	Roll	I-Beam	34x4	34x4	½ Ell.	½ Ell.	116	Left ..	Cent.	Cent.	Bevel..	Springs..	Float .	Disk..	Sel ..	3	Amid ..	.....
Plain, 3	Ball .	B&R.	Roll	I-Beam	36x4	36x4	½ Ell.	½ Ell	121	Opt ..	Opt .	Opt .	Bevel..	Springs..	Float .	Disk..	Sel ..	3	Amid ..	2,700
Plain, 4	Ball .	B&R.	Roll	I-Beam	36x4½	36x4½	½ Ell.	½ Ell.	132	Left ..	Cent.	Cent.	Bevel..	Springs..	Float .	Disk..	Sel ..	3	Amid ..	.....
Plain, 5	Ball .	Ball .	Ball	I-Beam	36x4½	36x4½	½ Ell.	Ell ..	127	Right.	Right	Right	Bevel..	Tor T ..	Semi F	Disk..	Sel ..	4	Amid ..	2,650
Plain, 2	Plain	Ball .	Ball	I-Beam	28x3	29x3½	Ell ..	½ Ell .	72	Right.	Right	Pedal	Chain.	Springs..	Dead .	Cone .	Plan.	2	Unit M	970
Plain, 3	Roll .	Ball .	Ball	I-Beam	34x4	34x4	½ Ell.	½ Ell.	117	Right.	Right	Right	Bevel..	Rad Rd.	Float .	Cone .	Sel ..	3	Amid ..	2,800
Plain, 3	Roll .	Ball .	Ball	I-Beam	35x4½	35x4½	½ Ell.	½ Ell.	122	Right.	Right	Right	Bevel..	Rad Rd.	Float .	Cone .	Sel ..	3	Amid ..	3,100
Plain, 3	Ball .	Roll .	Roll	I-Beam	36x4½	36x4½	½ Ell.	½ Ell.	128	Left ..	Cent.	Cent.	Bevel..	Springs..	Float .	Cone .	Sel ..	3	Amid ..	2,700
Plain, 3	Ball .	Roll .	Roll	I-Beam	36x5	36x5	½ Ell.	½ Ell.	128	Left .	Cent.	Cent.	Bevel..	Springs..	Float .	Cone .	Sel ..	3	Amid ..	2,700
Plain, 3	Ball .	Roll .	Roll	I-Beam	34x4½	34x4½	½ Ell.	½ Ell.	120	Left .	Cent.	Cent.	Bevel..	Springs..	Float .	Cone .	Sel ..	3	Amid ..	2,600
Plain, 3	Ball .	Ball .	Ball	I-Beam	38x4½	38x4½	½ Ell.	½ Ell.	127	Opt ..	Cent.	Cent.	Bevel..	Springs..	Float .	Disk..	Sel ..	3	Unit M	2,100
Plain, 3	Ball .	Ball .	Ball	I-Beam	40x4½	40x4½	½ Ell.	½ Ell.	136	Opt ..	Cent.	Cent.	Bevel..	Springs..	Float .	Disk..	Sel ..	3	Unit M	2,360
Plain, 3	Ball .	Ball .	Ball	I-Beam	41x5	41x5	½ Ell.	½ Ell.	144	Right.	Cent.	Cent.	Bevel..	Springs..	Float .	Disk..	Sel ..	4	Unit M	2,635
Plain, 3	Ball .	Ball .	Ball	I-Beam	34x4	34x4	½ Ell.	½ Ell.	118	Right.	Cent.	Cent.	Bevel..	..	Float .	Disk..	Sel ..	3	Unit M	.....
Plain, 4	Ball .	Ball .	Ball	I-Beam	36x4	36x4	½ Ell.	½ Ell.	118	Right.	Cent.	Cent.	Bevel..	.....	Float .	Disk..	Sel ..	3	Unit M	.....
Plain, 4	Ball .	Ball .	Ball	I-Beam	36x4	36x4	½ Ell.	½ Ell.	126	Right.	Cent.	Cent.	Bevel..	.....	Float .	Disk..	Sel ..	3	Unit M	.....
Plain, 4	Ball .	Ball .	Ball	I-Beam	36x4	36x4	½ Ell.	½ Ell.	136	Right.	Cent.	Cent.	Bevel..	.....	Float .	Disk..	Sel ..	3	Unit M	.....
Plain, 7	Ball .	Ball .	Ball	I-Beam	36x4	36x4	½ Ell.	½ Ell.	128	Right.	Cent.	Cent.	Bevel..	Springs..	Float .	Disk..	Sel ..	3	Unit M	.....
Plain, 7	Ball .	Ball .	Ball	I-Beam	36x4	36x4	½ Ell.	½ Ell.	138	Right.	Cent.	Cent.	Bevel..	Springs..	Float .	Disk..	Sel ..	3	Unit M	.....
Plain, 3	Ball .	Roll .	Ball	I-Beam	32x3½	32x3½	½ Ell.	½ Ell.	112	Right.	Right	Right	Bevel..	Springs..	Semi F	Cone ..	Sel ..	3	Unit M	2,350
Plain, 3	Ball .	Ball .	Ball	I-Beam	34x4	34x4	½ Ell.	½ Ell.	116	Right.	Right	Right	Bevel..	Springs..	Float .	Cone ..	Sel ..	3	Unit M	3,350
Plain, 4	Ball .	Ball .	Ball	I-Beam	34x4½	34x4½	½ Ell.	½ Ell.	130	Right.	Right	Right	Bevel..	Springs..	Float .	Cone ...	Sel ..	3	Unit M	3,900
Plain, 4	Ball .	Ball .	Ball	I-Beam	36x4½	36x4½	½ Ell.	½ Ell.	135	Right.	Right	Right	Bevel..	Tor T ..	Float .	Cone ..	Sel ..	3	Unit M	3,700
Plain, 2	Roll .	B&R	Ball	I-Beam	36x4	36x4	½ Ell.	½ Ell.	116	Right.	Right	Right	Bevel..	Tor T ..	Semi F	Cone .	Sel ..	3	Unit X	2,000
Ball, 4	Ball .	.....	Ball	I-Beam	32x3½	32x3½	½ Ell.	½ Ell.	112	Right.	Right	Right	Bevel..	Tor T ..	Float .	Cone .	Sel ..	3	Amid ..	2,400
Plain, 5	Ball .	B&R.	Roll	I-Beam	32x3½	32x3½	½ Ell.	½ Ell.	110	Right.	Cent.	Cent.	Bevel..	S & T T	‡Float	Cone .	Sel ..	3	Unit X	1,900
Plain, 5	Ball .	Roll .	Roll	I-Beam	34x4	34x4	½ Ell.	½ Ell.	114	Right.	Cent.	Cent.	Bevel..	S & T T	Float .	Cone .	Sel ..	3	Unit X	2,100
Plain, 3	Roll .	Roll .	Roll	I-Beam	34x4	34x4	.....	.....	121	Right.	Right	Right	Bevel..	Tor T ..	Float .	Disk..	Sel ..	3	.....	2,700
Plain, 7	Ball .	Ball .	Roll	I-Beam	36x4½	37x5	½ Ell.	½ Ell.	115½	Left ..	Left .	Left .	Bevel..	T & R R.	Semi F	Disk..	Pro	3	Unit X	3,500
Plain, 7	Ball .	Ball .	Roll	I-Beam	36x4½	37x5	½ Ell.	½ Ell.	134	Left ..	Left .	Left .	Bevel..	T & R R.	Semi F	Disk..	Pro	3	Unit X	3,500
Plain, 7	Ball .	Ball .	Roll	I-Beam	36x4½	37x5	½ Ell.	½ Ell.	138	Left ..	Left .	Left .	Bevel..	T & R R.	Semi F	Disk..	Pro	3	Unit X	3,500
Plain, 4	Ball .	Ball .	Roll	Tub ...	36x4½	37x5	½ Ell.	½ Ell.	121½	Right.	Right	Right	Bevel..	T & R R	Semi F	Disk..	Pro	3	Unit X	4,050
Plain, 4	Ball .	Ball .	Roll	Tub ...	36x4½	37x5	½ Ell.	½ Ell.	139	Right.	Right	Right	Bevel..	T & R R.	Semi F	Disk..	Pro	3	Unit X	4,050
Plain, 2	B&R.	B&R.	Ball .	I-Beam	32x3½	32x3½	½ Ell.	Ell ..	110	Right.	Right	Right	Bevel..	Rad Rd.	Semi F	Disk..	Sel ..	3	Unit M	2,180
Plain, 3	B&R.	B&R.	Ball .	I-Beam	34x4	34x4	½ Ell.	Ell ..	116	Left ..	Cent.	Cent.	Bevel..	Rad Rd.	‡Float	Disk..	Sel ..	3	Unit M	2,700
Plain, 3	Roll .	B&R.	Ball .	I-Beam	36x4	36x4	½ Ell.	½ Ell.	127	Right.	Right	Right	Bevel..	Rad Rd.	Float .	Disk..	Sel ..	3	Unit X	2,510
Plain, 4	Ball .	Ball .	Roll	I-Beam	36x4	36x5	½ Ell.	½ Ell.	138	Right.	Right	Right	Bevel..	Rad Rd.	Float .	Disk..	Sel ..	4	Amid ..	2,929
Plain, 3	Ball .	Ball .	Ball	I-Beam	34x4	34x4	½ Ell.	½ Ell.	116	Right.	Right	Right	Bevel..	Springs..	Float .	Cone ..	Sel ..	3	Unit M	2,700
Plain, 3	Ball .	Ball .	Ball	I-Beam	36x4	36x4	½ Ell.	½ Ell.	122	Right.	Right	Right	Bevel..	Springs..	Float .	Cone ..	Sel ..	3	Unit M	3,100
Plain, 3	Ball .	Ball .	Roll	I-Beam	36x4	36x4	½ Ell.	½ Ell.	120	Right.	Right	Right	Bevel..	Tor T ..	Float .	Cone ..	Sel ..	3	Unit M	2,300
Plain, 3	Ball .	Ball .	Roll	I-Beam	34x4½	34x4½	½ Ell.	Plat	113	Left ..	Cent.	Cent.	Bevel..	Tor T ..	Float .	Exp Bd	Sel ..	4	Amid ..	.....
Plain, 7	Ball .	Ball .	Roll	I-Beam	36x4½	36x4½	½ Ell.	Plat	125	Right.	Right	Right	Bevel..	Rad Rd.	Float .	Exp Bd	Sel ..	4	Amid ..	.....
Plain, 7	Ball .	Ball .	Roll	I-Beam	36x4½	37x5	½ Ell.	Plat	137	Right.	Right	Right	Bevel..	Rad Rd.	Float .	Exp Bd	Sel ..	4	Amid ..	4,750
Plain, 7	Ball .	Ball .	Roll	I-Beam	38x5½	38x5½	½ Ell.	Plat	140	Right.	Right	Right	Bevel..	Rad Rd.	Float .	Exp Bd	Sel ..	4	Amid ..	.....
Plain, 3	.....	Ball .	Ball	I-Beam	32x3½	32x3½	Ell ..	Ell ..	106	Right.	Cent.	.....	Bevel..	Rad Rd.	Semi F	Disk...	Sel ..	3'	Unit M	1,800
Plain, 7	Ball .	B&R.	Roll	I-Beam	36x4½	36x4½	½ Ell.	½ Ell.	132	Right.	Right	Right	Bevel..	Springs..	Semi F	Cone ..	Sel ..	4	Amid .	3,030
Plain, 7	Ball .	B&R.	Roll	I-Beam	37x5	37x5	½ Ell.	½ Ell.	134½	Right.	Right	Right	Bevel..	Springs..	Semi F	Cone ..	Sel ..	4	Amid ..	3,335
Plain, 7	Ball .	B&R.	Roll	I-Beam	37x5	37x5	½ Ell.	½ Ell.	142	Right.	Right	Right	Bevel..	Springs..	Semi F	Cone ..	Sel ..	4	Amid ..	3,510
Plain, 7	Ball .	B&R.	Roll	I-Beam	37x5	38x5½	½ Ell.	½ Ell.	147½	Right.	Right	Right	Bevel..	Springs .	Semi F	Cone ..	Sel ..	4	Amid ..	3,980

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NAME AND MODEL	CYLINDERS					VALVES	CARBURETION		IGNITION			LUBRICATION		COOLING		STARTER
	No. of Cylinders	Shape	How Cast	Bore and Stroke, Inches	S. A. E. H. P.	Piston Displacement Cubic Inches	Location	Make of Carbureter	Fuel Feed	System	Magneto Generator	Control	System	Type of Pump	Circulation	Radiator	Type
Pilot, 50	4	T Head	Block	4.50x6.00	32.40	381.7	Opp	Optional	Grav	Dual	Opt	Hand	Splash		Pump	Cell	Elec
Pilot, 60	6	T Head	Block	4.00x6.00	38.40	452.4	Opp	Optional	Grav	Dual	Opt	Hand	Splash		Pump	Cell	Elec
Pope-Hartford, 31	4	Straight	Pairs	4.32x5.13	30.90	299.9	Head	Own	Grav	Dual		Hand	Spl-Pres	Piston	Pump	Tub	Elec
Pope-Hartford, 33	4	Straight	Pairs	4.75x5.50	36.10	389.9	Head	Own	Grav	Dual	Bosch	Hand	Spl-Pres	Piston	Pump	Tub	Elec
Pope-Hartford, 29	6	Straight	Pairs	4.32x5.38	46.35	471.9	Head	Own	Grav	Dual	Bosch	Hand	Spl-Pres	Piston	Pump	Tub	Elec
Pratt, 30	4	L Head	Pairs	4.00x4.50	25.60	226.2	Left	Schebler	Grav	Dual	Deaco	Hand	Splash	Gear	Thermo	Tub	Acet
Pratt, 40	4	L Head	Pairs	4.50x4.75	32.40	302.2	Left	Schebler	Grav	Dual	Bosch	Hand	Splash	Gear	Pump	Cell	Acet
Pratt, 50	4	L Head	Pairs	4.50x5.75	32.40	365.8	Left	Schebler	Grav	Dual	Bosch	Hand	Splash	Gear	Pump	Cell	Elec
Premier, 6-40	6	T Head	Threes	4.00x5.00	38.40	376.9	Opp	Optional	Grav	Dual	Eisemann	Hand	Splash	Gear	Pump	Cell	Air
Premier, 6-60	6	T Head	Pairs	4.50x5.25	48.60	501.0	Opp	Carter	Grav	Dual	Eisemann	Hand	Splash	Gear	Pump	Cell	Air
Pullman, 36	4	T Head	Pairs	4.06x5.00	26.40	259.2	Opp	Stromberg	Grav	Dual	Bosch	Hand	Splash	Gear	Pump	Cell	
Pullman, 44	4	T Head	Pairs	4.50x5.50	32.40	349.9	Opp	Stromberg	Grav	Dual	Bosch	Hand	Splash	Gear	Pump	Cell	Spring
Pullman, 66	6	T Head	Pairs	4.50x5.50	48.60	523.5	Opp	Stromberg	Grav	Dual	Bosch	Hand	Splash	Gear	Pump	Cell	Spring
Rambler, Cross-Country	4	L Head	Sep'rt	4.50x4.50	32.40	286.3	Right	Stromberg	Grav	Sing	U.S.L	Hand	Spl-Pres	Piston	Pump	Tub	Elec
Rayfield, C	6	T Head	Pairs	3.50x5.50	29.40	317.4	Opp	Rayfield	Pres	Sing	Mea	Hand	Pressure		Thermo	Cell	
R. C. H.	4	L Head	Block	3.25x5.00	16.90	165.9	Left	B. D	Grav	Sing	Bosch	Fixed	Splash	Wheel	Thermo	Tub	
Reeves, Sextoauto	4	T Head		4.75x5.50	36.10	389.9	Opp	Optional	Grav	Dual	Eisemann	Hand	Pressure		Pump	Cell	
Regal, T & N	4	L Head	Block	3.75x4.50	22.50	198.8	Left	Own	Grav	Dual	Michigan	Hand	Spl-Pres	Piston	Thermo	Tub	
Regal, Coupe	4	L Head	Block	3.75x4.50	22.50	198.8	Left	Own	Grav	Dual	Michigan	Hand	Spl-Pres	Piston	Thermo	Tub	
Regal, H	4	L Head	Pairs	4.25x4.50	28.90	255.3	Left	Own	Grav	Dual	Michigan	Hand	Spl-Pres	Piston	Thermo	Tub	
Regal, C	4	L Head	Block	4.00x5.00	25.60	251.3	Left	Schebler	Grav	Dual	Michigan	Hand	Spl-Pres	Piston	Pump	Tub	
Reo, The Fifth	4	L Head	Pairs	4.00x4.50	25.60	226.2	S&H	Holley	Grav	Dual	National	Hand	Spl-Pres	Piston	Pump	Tub	Acet
Republic, D	4	T Head	Pairs	4.25x5.00	28.90	283.6	Opp	Stromberg	Grav	Dual	Delco	Hand	Pressure	Gear	Pump	Cell	
Republic, E	6	T Head	Pairs	4.25x5.00	43.35	425.4	Opp	Stromberg	Pres	Dual	Delco	Hand	Pressure	Gear	Pump	Cell	Elec
Richmond, O	4	L Head	Sep'rt	4.00x4.50	25.60	251.3	Left	Schebler	Grav	Sing	Michigan	Hand	Spl-Pres	Piston	Thermo	Tub	Opt
Richmond, P	4	L Head	Sep'rt	4.50x5.00	32.40	318.1	Left	Schebler	Grav	Sing	Michigan	Hand	Spl-Pres	Piston	Thermo	Tub	Elec
Schacht, NS, KL	4	L Head	Block	4.25x5.50	28.90	312.0	Right	Optional	Grav	Dual		Hand	Spl-Pres	Piston	Pump	Cell	Elec
Schlosser	4	T Head	Pairs	5.00x6.00	40.00	471.2	Opp	G. & A	Pres	Dual	Bosch	Hand	Splash	Noncir	Pump	Cell	
Selden, 48	4	L Head	Pairs	4.75x5.00	36.10	354.4	Left	Stromberg	Grav	Doub	Bosch	Hand	Splash	Gear	Pump	Tub	Acet
S. G. V., A	4	L Head	Block	3.75x4.38	22.50	193.3	Left	Own	Pres	Sing	Bosch	Fixed	Pressure	Gear	Pump	Cell	
S. G. V., D	4	L Head	Block	4.00x5.25	25.60	263.9	Left	Own	Pres	Sing	Bosch	Hand	Pressure	Gear	Pump	Cell	
Simplex, 127	4	T Head	Pairs	4.88x6.50	38.00	485.3	Opp	Own	Pres	Dual	Bosch	Hand	Spl-Pres	Noncir	Pump	Cell	Acet
Simplex, 137	4	T Head	Pairs	4.88x6.50	38.00	485.3	Opp	Own	Pres	Dual	Bosch	Hand	Spl-Pres	Noncir	Pump	Cell	Acet
Simplex, 129	4	T Head	Pairs	5.75x5.75	53.00	597.2	Opp	Own	Pres	Dual	Dosch	Hand	Spl-Pres	Noncir	Pump	Cell	Acet
Simplex, 139	4	T Head	Pairs	5.75x5.75	53.00	597.2	Opp	Own	Pres	Dual	Bosch	Hand	Spl-Pres	Noncir	Pump	Cell	Acet
Spaulding, G	4	L Head	Block	4.25x5.50	28.90	312.0	Right	Schebler	Grav	Dual	Eisemann	Hand	Splash	Piston	Pump	Cell	Elec
Speedwell, G	6	L Head	Threes	4.13x5.25	40.90	420.9	Left	Schebler	Pres	Dual	Bosch	Hand	Splash	Piston	Pump	Cell	Elec
Speedwell Rotary	6	Mead	Threes	4.13x5.25	40.90	420.9	Opp	Schebler	Pres	Dual	Bosch	Hand	In Fuel		Pump	Cell	Elec
Spoerer, 40-C	4	T Head	Pairs	4.88x5.50	38.00	410.6	Opp		Grav	Dual	Bosch	Hand	Pressure	Gear	Pump	Cell	Elec
Spoerer, 25-A	4	L Head	Pairs	4.13x5.50	27.25	294.0	Left		Grav	Dual	Bosch	Hand	Pressure	Gear	Pump	Cell	Elec
Staver, 45	4	T Head	Block	4.50x5.00	32.40	318.1	Opp	Schebler	Grav	Dual	Remy	Hand	Splash	Gear	Pump	Cell	Air
Staver, 45	4	T Head	Block	4.50x5.00	32.40	318.1	Opp	Schebler	Pres	Dual	Remy	Hand	Splash	Gear	Pump	Cell	Air
Staver, 55	4	T Head	Block	4.50x6.00	32.40	381.7	Opp	Schebler	Grav	Dual	Remy	Hand	Splash	Gear	Pump	Cell	Air
Staver, 55	4	T Head	Block	4.50x6.00	32.40	381.7	Opp	Schebler	Pres	Dual	Remy	Hand	Splash	Gear	Pump	Cell	Air
Staver, 65	6	T Head	Block	4.00x6.00	38.40	452.4	Opp	Rayfield	Pres	Dual	Remy	Hand	Splash	Gear	Pump	Cell	Air
Stearns, Knight, 4	4	Knight	Pairs	4.25x5.50	28.90	312.0	Opp	Stromberg	Pres	Dual	Mea	Hand	Spl-Pres	Gear	Pump	Cell	Spring
Stearns, Knight, 4 Road	4	Knight	Pairs	4.25x5.50	28.90	312.0	Opp	Stromberg	Pres	Dual	Mea	Hand	Spl-Pres	Gear	Pump	Cell	Spring
Stearns, Knight, Light Tou	4	Knight	Pairs	4.25x5.50	28.90	312.0	Opp	Stromberg	Pres	Dual	Mea	Hand	Spl-Pres	Gear	Pump	Cell	Spring
Stearns, Knight, 6 Road	6	Knight	Pairs	4.25x5.75	43.80	489.4	Opp	Stromberg	Pres	Dual	Mea	Hand	Spl-Pres	Gear	Pump	Cell	Elec
Stearns, Knight, 6	6	Knight	Pairs	4.25x5.75	43.80	489.4	Opp	Stromberg	Pres	Dual	Mea	Hand	Spl-Pres	Gear	Pump	Cell	Elec
Stevens-Duryea, C	6	L Head	Pairs	4.32x5.50	46.33	481.9	Left	Own	Grav	Doub	Bosch	Hand	Spl-Pres		Pump	Cell	Acet
Stevens-Duryea	6	L Head	Pairs	4.32x5.50	46.33	481.9	Left	Own	Grav	Doub	Bosch	Hand	Spl-Pres		Pump	Cell	Acet
Stoddard-Day, 30	4	L Head	Block	4.00x4.50	25.60	226.2	Right	Stromberg	Grav	Dual	Spld'rf	Hand	Splash	Piston	Thermo	Cell	Acet
Stoddard-Day 38	4	L Head	Block	4.25x5.13	28.90	290.7	Left	Stromberg	Grav	Dual	Bosch	Hand	Splash	Piston	Pump	Cell	Acet
Stoddard-Day, 48	4	Straight	Pairs	4.75x5.00	36.10	354.4	S&H	Stromberg	Pres	Doub	Posch	Hand	Spl-Pres	Gear	Pump	Cell	
Stoddard-Day, Knight	6	Knight	Threes	4.50x5.50	48.60	524.8	Opp	Stromberg	Pres	Doub	Bosch	Hand	Splash	Gear	Pump	Cell	
Studebaker, 20	4	L Head	Block	3.62x3.75	20.30	154.8	Left	Own	Grav	Dual	Spld'rf	Hand	Splash	Gear	Pump	Tub	
Studebaker, 25	4	L Head	Block	3.50x5.00	19.60	192.4	Left	Own	Grav	Dual	Spld'rf	Hand	Splash	Gear	Pump	Tub	Acet
Studebaker, 30	4	L Head	Pairs	4.00x4.50	25.60	226.2	Left	Own	Grav	Dual	Spld'rf	Hand	Splash	Gear	Pump	Tub	
Studebaker, 35	4	L Head	Block	4.13x5.00	27.25	267.3	Left	Own	Grav	Dual	Spld'rf	Hand	Splash	Gear	Pump	Tub	Elec
Studebaker, Six	6	L Head	Block	3.50x5.00	29.40	288.6	Left	Own	Grav	Dual	Spld'rf	Hand	Splash	Gear	Pump	Tub	Elec
Stutz, 4 Bearcat	4	T Head	Pairs	4.75x5.50	36.10	389.9	Opp	Optional	Grav	Dual	Eisemann	Hand	Pressure	Gear	Pump	Cell	
Stutz, 4 Touring	4	T Head	Pairs	4.75x5.50	36.10	389.9	Opp	Optional	Grav	Dual	Eisemann	Hand	Pressure	Gear	Pump	Cell	
Stutz, 6 Bearcat	6	T Head	Pairs	4.25x5.00	43.80	425.4	Opp	Stromberg	Grav	Doub	Spld'rf	Hand	Pressure	Gear	Pump	Cell	
Stutz, 6 Touring	6	T Head	Pairs	4.25x5.00	43.80	425.4	Opp	Stromberg	Grav	Dual	Eisemann	Hand	Pressure	Gear	Pump	Cell	
Touraine, Race	6	T Head	Threes	4.00x5.25	38.40	395.8	Opp	Fletcher	Pres	Dual	Bosch	Hand	Splash	Gear	Pump	Cell	
Touraine, 6	6	T Head	Threes	4.00x5.25	38.40	395.8	Opp	Fletcher	Pres	Dual	Bosch	Hand	Splash	Gear	Pump	Cell	
Touraine, 7	6	T Head	Threes	4.00x5.25	38.40	395.8	Opp	Fletcher	Pres	Dual	Bosch	Hand	Splash	Gear	Pump	Cell	
Triumph, A&B	4	L Head	Block	4.75x5.50	36.10	389.9	Left	Stromberg	Grav	Dual	Bosch	Hand	Splash	Gear	Pump	Tub	Air
Velie, Dispatch	4	L Head	Block	3.75x5.50	22.50	231.1	Left	Stromberg	Grav	Dual	Bosch	Hand	Splash	Piston	Thermo	Tub	Elec

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BEARINGS				RUNNING GEAR						CONTROL			TRANSMISSION							
Crank-shaft Type and No.	Gearset	Rear Axle	Front Wheel	Front Axle	TIRES Front	TIRES Rear	SPRINGS Front	SPRINGS Rear	Wheelbase	Location Steering Wheel	Gearshift Location	Emergency Brake Control	Drive	Car Drives Through	Rear Axle	Clutch Type	GEARSET Type	GEARSET Forward Speeds	GEARSET Location	Chassis Weight, Lbs.
Plain, 3	Ball ..	Ball .	Ball .	I-Beam	36x4	36x4	½ Ell.	½ Ell	126	Right.	Cent.	Cent.	Bevel. .	Springs..	Float	Cone	Sel ..	3	Amid .	2,400
Plain, 4	Ball ..	Ball .	Ball .	I-Beam	37x4½	37x4½	½ Ell.	½ Ell.	132	Right.	Cent.	Cent.	Bevel...	Springs.	Float	Cone	Sel ..	3	Amid .	2,600
Plain, 3	Roll ..	Roll .	Roll .	I-Beam	38x4½	36x4½	½ Ell.	½ Ell.	118½	Right.	Right	Right	Bevel...	Springs.	Float	Cone	Sel ..	4	Amid.	.....
Plain, 3	Plain .	Roll .	Roll .	I-Beam	36x4½	36x4½	½ Ell.	½ Ell	124	Right.	Right	Right	Bevel..	Rad Rd	Float	Cone	Sel ..	4	Amid .	.....
Plain 4	Roll ..	Roll .	Roll .	I-Beam	37x5	37x5	½ Ell.	½ Fll	133	Right.	Right	Right	Bevel..	Rad Rd	Float	Cone	Sel ..	4	Amid .	.....
Plain, 3	Roll ..	Roll .	Ball .	I-Beam	34x3½	34x3½	½ Ell.	½ Ell	114	Right.	Cent	Cent.	Bevel...	Rad Rd	½Float	Disk.	Sel ..	3	.....	.....
Plain, 3	Ball ..	Ball .	Ball .	I-Beam	36x4	36x4	½ Ell.	½ Ell	120	Right.	Right	Right	Bevel..	Rad Rd.	Float	Cone	Sel ..	3	.....	.....
Plain, 3	Roll ..	Roll .	Roll .	I-Beam	36x4	36x4	½ Ell.	½ Ell	122	Right.	Right	Right	Bevel...	Springs .	Float	Disk.	Sel ..	3	.....	.....
Plain, 3	Ball ..	B&R	Roll .	I-Beam	36x4½	36x4½	½ Ell.	½ Ell	132	Left ..	Cent.	Cent	Bevel..	S & T R	Semi F	Disk.	Sel ..	3	Amid .	3,000
Plain, 4	Ball ..	B&R.	Roll .	I-Beam	37x5	37x5	½ Ell.	½ Ell	139	Left ..	Cent.	Cent.	Bevel...	S & T R	Semi F	Disk.	Sel ..	3	Amid .	3,200
Plain, 3	Ball ..	Ball .	Ball .	I-Beam	34x4	34x4	½ Ell.	½ Ell.	118	Right.	Right	Right	Bevel...	Springs..	Float	Cone	Sel ..	3	Amid ..	.....
Plain, 3	Ball ..	Ball .	Roll .	I-Beam	36x4	36x4	½ Ell.	½ Ell	122	Right.	Right	Right	Bevel...	Springs.	Float	Cone	Sel ..	4	Amid ..	.....
Plain, 4	Ball ..	Roll .	Roll .	I-Beam	36x4	36x4	½ Ell.	½ Ell.	138	Right.	Right	Right	Bevel...	Springs.	Float	Cone	Sel ..	4	Amid .	.....
Plain, 3	Roll ..	Roll .	Roll	I-Beam	36x4	36x4	½ Ell.	½ Ell.	120	Right.	Right	Right	Bevel...	Rad Rd	Semi F	Cone	Sel ..	3	Amid ..	2,700
Plain, 4	Ball ..	Ball.	Ball .	I-Beam	34x4	34x4	½ Ell.	½ Ell.	117	Right.	Right	Right	Bevel...	Rad Rd	Float	Disk.	Sel ..	3	Unit M	.....
Plain, 2	P&R...	B&R.	Ball	I-Beam	32x3½	32x3½	½ Ell.	Ell ..	110	Left ..	Cent.	Cent.	Bevel...	Tor T .	Semi F	Cone	Sel ..	3	Unit X	1,300
.....	Ball ..	Roll .	Roll	I-Beam	34x4½	34x4½	½ Ell.	½ Ell.	158	Right.	Right.	Right	Bevel...	Tor T .	Float	Disk.	Sel .	3	Unit X	.....
Plain, 2	Roll ..	Roll .	Ball	I-Beam	32x3½	32x3½	½ Ell.	½ Ell.	108	Right.	Right	Right	Bevel..	Rad Rd	Semi F	Cone	Sel .	3	Unit X	2,000
Plain, 2	Roll ..	Roll .	Ball	I-Beam	32x3½	32x3½	½ Ell.	½ Ell.	100	Right.	Right.	Right	Bevel...	Rad Rd.	Semi F	Cone	Sel .	3	Unit X	2,365
Plain, 3	Roll ..	Roll .	Ball	I-Beam	34x4	34x4	½ Ell.	½ Ell.	118	Right.	Right.	Right	Bevel...	Rad Rd.	Semi F	Cone	Sel .	3	Unit X	2,650
Plain, 3	Roll ..	Roll .	Ball	I-Beam	34x4	34x4	½ Ell.	½ Ell.	116	Right.	Right.	Right	Bevel...	Rad Rd.	Semi F	Cone	Sel .	3	Unit X	.....
Plain, 3	Roll ..	Roll .	Roll	I-Beam	34x4	34x4	.....	.....	....	Left ..	Cent..	Cent.	Bevel...	Springs..	Semi F	Disk.	Sel .	3	Amid ..	2,700
Plain, 3	Ball ..	Ball .	Ball	I-Beam	36x4	36x4	½ Ell.	½ Ell	120	Right.	Cent..	Cent.	Bevel..	Rad Rd.	Float	Cone	Sel .	3	Unit X	2,800
Plain, 5	Ball ..	Ball .	Ball	I-Beam	36x4½	36x4½	½ Ell.	½ Ell.	132	Left ..	Cent..	Pedal.	Bevel...	Springs.	Float	Cone	Sel .	4	Amid ..	3,300
Plain, 5	Ball ..	B&R.	Ball	I-Beam	34x3½	34x3½	½ Ell.	½ Ell.	112	Right.	Cent..	Cent.	Bevel...	S & T T	Semi F	Cone	Sel .	3	Amid ..	.....
Plain, 5	Ball ..	B&R.	Ball	I-Beam	36x4	36x4	½ Ell.	½ Ell.	120	Right.	Cent.	Cent.	Bevel...	S & T T	Semi F	Cone	Sel .	3	Amid ..	.....
Plain, 3	Ball ..	B&R	Ball	I-Beam	36x4	36x4	½ Ell.	½ Ell.	120	Left ..	Cent.	Cent.	Bevel..	Springs.	Float	Cone	Sel .	3	Amid ..	.....
Plain, 3	Ball ..	Ball .	Ball	I-Beam	36x4½	36x4½	½ Ell.	½ Ell.	124	Right.	Right.	Right	Bevel..	Rad Rd	Float	Disk.	Sel .	4	Amid ..	3,000
Plain, 3	Roll ..	B&R.	Ball	I-Beam	36x4	36x4	½ Ell.	½ Ell.	125	Right.	Right.	Right	Bevel..	Springs.	Float	Disk.	Sel .	3	Amid ..	2,370
Plain, 3	Ball ..	Ball .	Ball	I-Beam	34x4	34x4	½ Ell.	½ Ell.	116	Right.	Right.	Right	Bevel...	Springs.	Semi F	Disk.	Sel .	4	Amid ..	2,400
Plain, 3	Ball ..	Ball .	Ball .	I-Beam	35x4½	35x4½	½ Ell.	½ Ell.	118	Right.	Right	Right	Bevel...	Springs.	Semi F	Disk.	Sel .	4	Amid ..	2,600
Plain, 3	Ball ..	Ball .	Ball .	I-Beam	35x5	35x5	½ Ell.	½ Ell	127	Right.	Right	Right	Bevel..	Tor T .	Semi F	Disk.	Sel .	4	Amid ..	2,800
Plain, 3	Ball ..	Ball .	Ball .	I-Beam	35x5	35x5	½ Ell.	½ Ell	137	Right.	Right	Right	Bevel...	Tor T .	Semi F	Disk.	Sel .	4	Amid ..	2,825
Plain, 3	Ball ..	Ball .	Ball .	I-Beam	36x4	36x5	½ Ell.	½ Ell	129	Right.	Right	Right	Chain .	Rad Rd.	Dead .	Disk.	Sel .	4	Amid ..	2,910
Plain, 3	Ball ..	Ball .	Ball .	I-Beam	36x5	36x5	½ Ell.	½ Ell	139	Right.	Right	Right	Chain .	Rad Rd.	Dead .	Disk.	Sel .	4	Amid ..	2,925
Plain, 3	Roll ..	Roll .	Roll	I-Beam	36x4	36x4	½ Ell.	½ Ell	120	Left ..	Cent.	Cent.	Bevel..	Springs..	Float .	Cone	Sel .	3	Amid ..	....
Plain, 3	Ball ..	Roll .	Roll	I-Beam	36x4½	36x4½	½ Ell.	½ Ell	134	Left ..	Cent.	Cent.	Bevel...	Springs.	Float .	Disk.	Sel .	3	Unit M	3,490
Plain, 4	Ball ..	Roll .	Roll	I-Beam	36x4½	36x4½	½ Ell	½ Ell	134½	Left ..	Cent.	Cent.	Bevel..	S&TT.	Float .	Disk.	Sel .	3	Amid ..	3,300
Plain, 3	Ball ..	Roll .	Roll	I-Beam	37x4½	37x4½	½ Ell.	½ Ell.	120	Right.	Right	Right	Bevel...	Rad Rd	Float .	Cone	Sel .	3	Amid ..	.....
Plain, 3	Ball ..	B&R.	Ball	I-Beam	35x4	35x4	½ Ell.	½ Ell.	120	Right.	Right	Right	Bevel...	Tor T .	Semi F	Cone	Sel .	3	Unit X	2,300
Plain, 3	Ball ..	Ball .	Ball	Tub ..	34x4	34x4	½ Ell.	Ell ..	113	Right.	Right	Right	Bevel..	Rad Rd	Float .	Disk.	Sel .	3	Amid ..	2,250
Plain, 3	Ball ..	Ball .	Ball	I-Beam	34x4	34x4	½ Ell.	½ Ell	116	Left ..	Cent.	Cent.	Bevel .	Springs.	Float .	Disk.	Sel .	3	Amid ..	2,300
Plain, 3	Ball ..	Ball .	Ball	I-Beam	36x4	36x4	½ Ell.	½ Ell	120	Right.	Right	Right	Bevel..	Springs.	Float .	Disk.	Sel .	3	Amid ..	2,575
Plain, 3	Ball ..	Ball .	Ball	I-Beam	36x4	36x4	½ Ell.	½ Ell	124	Right.	Right	Right	Bevel..	Springs.	Float .	Disk.	Sel .	3	Amid ..	2,600
Plain, 5	Ball ..	Ball .	Ball	I-Beam	37x4½	37x4½	½ Ell.	½ Ell	136	Left ..	Cent.	Cent.	Bevel..	Springs.	Float .	Disk.	Sel .	4	Amid ..	2,950
Plain, 5	Ball ..	Roll .	Roll	I-Beam	36x4½	36x4½	½ Ell.	½ Ell	127	Right.	Right	Right	Bevel..	Tor T .	Float .	Disk.	Sel .	3	Unit X	3,200
Plain, 5	Ball ..	Roll .	Roll	I-Beam	36x4½	36x4½	½ Ell.	½ Ell	116	Right.	Right	Right	Bevel..	Tor T .	Float .	Disk.	Sel .	3	Unit X	3,200
Plain, 5	Ball ..	Roll .	Roll	I-Beam	36x4½	36x4½	½ Ell.	½ Ell.	121	Right.	Right	Right	Bevel..	Tor T .	Float .	Disk.	Sel .	3	Unit X	3,200
Plain, 7	Ball ..	Roll .	Roll	I-Beam	37x5	37x5	½ Ell.	½ Ell	134	Right.	Right	Right	Bevel..	Springs.	Float .	Disk.	Sel .	4	Unit X	3,500
Plain, 7	Ball ..	Roll .	Roll	I-Beam	37x5	37x5	½ Ell.	½ Ell	140	Right.	Right	Right	Bevel..	Springs.	Float .	Disk.	Sel .	4	Unit M	3,500
Plain, 4	B&P .	Ball .	Ball	I-Beam	37x4½	37x4½	½ Ell.	½ Ell	131	Right.	Right	Right	Bevel..	Tor T .	Float .	Disk.	Sel .	3	Unit M	.....
Plain, 4	B&P .	Ball .	Ball	I-Beam	37x4½	37x5	½ Ell.	½ Ell	138	Right.	Right	Right	Bevel..	Tor T .	Float .	Disk.	Sel .	3	Unit M	.....
Plain, 2	Roll ..	Roll .	Roll	I-Beam	34x4	34x4	½ Ell.	½ Ell	112	Right.	Right	Right	Bevel..	Rad Rd	Semi F	Cone	Sel .	3	Unit X	2,600
Plain, 3	Roll ..	Roll .	Roll	I-Beam	35x4½	35x4½	½ Ell.	½ Ell	114	Right.	Right	Right	Bevel..	Rad Rd	Float .	Cone	Sel .	3	Unit X	3,300
Plain, 3	Ball ..	B&R.	Roll	I-Beam	36x4½	36x4½	½ Ell.	½ Ell.	122½	Right.	Right	Right	Bevel..	Rad Rd	Float .	Cone	Sel .	3	Amid ..	3,700
Plain, 7	Ball ..	B&R.	Roll	I-Beam	36x5	36x5	½ Ell.	½ Ell.	133	Left ..	Cent.	Cent.	Bevel..	Rad Rd	Float .	Cone	Sel .	3	Amid ..	4,400
Plain, 2	B&R..	Roll .	Ball	I-Beam	32x3	32x3	½ Ell.	Ell ..	102	Right.	Right	Right	Bevel..	Tor T .	Semi F	Cone	Sel .	3	Unit X	.....
Plain, 3	BR&P	Roll .	Ball	I-Beam	30x3½	30x3½	½ Ell.	Ell ..	101	Right.	Right	Right	Bevel..	Tor T .	Semi F	Cone	Sel .	3	Unit X	.....
Plain, 3	B&R.	Roll .	Ball	I-Beam	32x3½	32x3½	½ Ell.	Ell ..	112	Right.	Right	Right	Bevel..	Tor T .	Semi F	Cone	Sel .	3	Unit X	.....
Plain, 3	BR&P	B&R.	Ball	I-Beam	34x4	34x4	½ Ell.	½ Ell	115½	Right.	Right	Right	Bevel..	Tor T .	Float .	Cone	Sel .	3	Unit X	.....
Plain, 3	BR&P	B&R.	Ball	I-Beam	34x4	34x4	½ Ell.	½ Ell	121	Right.	Right	Right	Bevel..	Tor T .	Float .	Cone	Sel .	3	Unit X	.....
Plain, 3	Ball ..	B&R.	Roll	I-Beam	34x4½	34x4½	½ Ell.	½ Ell	120	Right.	Right	Right	Bevel..	Tor T ..	Semi F	Disk.	Sel .	3	Unit X	2,400
Plain, 3	Ball ..	B&R.	Roll	I-Beam	34x4½	34x4½	½ Ell.	½ Ell	124	Right.	Right	Right	Bevel..	Tor T .	Semi F	Disk.	Sel .	3	Unit X	2,400
Plain, 3	Ball ..	B&R.	Roll	I-Beam	34x4½	34x4½	½ Ell.	½ Ell	124	Right.	Right	Right	Bevel..	Tor T .	Semi F	Disk.	Sel .	3	Unit X	2,500
Plain, 3	Ball ..	B&R.	Roll	I-Beam	34x4½	34x4½	½ Ell.	½ Ell	130	Right.	Right	Right	Bevel..	Tor T ..	Semi F	Disk.	Sel .	3	Unit X	2,500
Plain, 3	Ball ..	Ball .	Ball	I-Beam	36x4	36x4	½ Ell.	½ Ell	114	Right.	Right	Right	Bevel..	Tor T ..	Float .	Disk.	Sel .	3	.....	3,200
Plain, 3	Ball ..	Ball .	Ball	I-Beam	36x4	36x4	½ Ell.	½ Ell	124	Right.	Right	Right	Bevel..	Tor T .	Float .	Disk.	Sel .	3	.....	3,200
Plain, 3	Ball .	Ball .	Ball	I-Beam	36x4	36x4	½ Ell.	½ Ell	133	Right.	Right	Right	Bevel..	Tor T ..	Float .	Disk.	Sel .	3	.....	3,200
Plain, 3	Ball .	Ball .	Ball	I-Beam	36x4	36x4	½ Ell.	½ Ell	114	Right.	Right	Right	Bevel..	Tor T ..	Float .	Cone	Sel .	3	Amid .	2,800
Plain, 3	B&P	Roll .	Ball	I-Beam	34x4	34x4	½ Ell	½ Eu	113	Left ..	Cent.	Cent.	Bevel..	Springs.	Semi F	Disk.	Sel .	3	Unit X	2,150

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NAME AND MODEL	CYLINDERS					VALVES	CARBURETION		IGNITION			LUBRICATION		COOLING		STARTER
	No. of Cylinders	Shape	How Cast	Bore and Stroke, Inches	S. A. E. H. P.	Piston Displacement Cubic Inches	Location	Make of Carburetor	Fuel Feed	System	Magneto Generator	Control	System	Type of Pump	Circulation	Radiator	Type
Velie, 32	4	L Head	Block	3.75x5.50	22.50	231.1	Left	Stromberg	Grav ..	Dual .	Spld'rf....	Hand..	Splash	Piston .	Thermo	Tub	.....
Velie, 40	4	L Head	Pairs	4.50x5.25	32.40	334.0	Left	Stromberg	Pres ...	Dual .	Bosch	Hand..	Splash	Piston .	Thermo	Tub	Elec ....
Warren, Wolverine	4	L Head	Block	4.13x4.50	27.25	240.5	Right	Stromberg	Grav ..	Doub .	Bosch	Hand .	Splash	Gear ..	Pump ..	Cell	.....
Warren, Pilgrim	4	L Head	Block	4.25x4.75	28.90	269.4	Left	Stromberg	Opt	Dual .	Bosch	Hand..	Splash	Gear ..	Pump ..	Cell	.....
Warren, Resolute	6	L Head	Block	4.00x5.00	38.40	376.9	Left	Stromberg	Pres ...	Dual .	Bosch	Hand..	Splash	Gear ..	Pump ..	Cell	Elec ....
Westcott, 40	4	L Head	Sep'rt	4.50x5.00	32.40	318.1	Left	Schebler .	Grav ..	Sing ..	Connectic't	.....	Spl-Pres ..	Gear ..	Pump ..	Cell	Elec....
Westcott, 50	6	T Head	Block	4.00x6.00	38.40	452.4	Opp	.....	Grav ..	Sing ..	Electro ...	.....	Splash	.....	Pump ..	Cell	Elec....
White, GRE..	4	L Head	Block	3.75x5.13	22.50	226.4	Right	Own. ...	Grav .	Sing ..	Mea	Hand..	Spl-Pres ..	Noncir..	Pump .	Cell	Elec ....
White, GEB..	4	L Head	Block	4.25x5.75	28.90	326.3	Right	Own. ...	Grav ..	Sing ..	Mea	Hand..	Spl-Pres ..	Noncir..	Pump	Cell	Elec ....
White, GF	6	L Head	Block	4.25x5.75	43.80	489.4	Right	Own.....	Grav ..	Sing ..	Mea	Hand..	Spl-Pres ..	Noncir..	Pump .	Cell	Elec ....
Winton, 17D	6	L Head	Pairs	4.50x5.00	48.60	477.2	Right	Stromberg	Grav ..	Dual .	Bosch .	Hand..	Splash	Piston .	Pump	Cell	Air .....
Zimmerman, Z-40 . ..	4	L Head	Pairs .	4.32x5.00	30.25	292.1	Left	Schebler .	Grav ..	Dual .	...	Fixed.	Spl-Pres ..	Gear .	Thermo	Cell	.....
Zimmerman, Z-6 .	6	L Head	Pairs .	3.75x5.00	33.75	331 4	Left	Schebler .	Pres ...	Sing ..	Deaco	Hand..	Spl-Pres	Gear ..	Pump .	Tub	.....

SPECIFICATIONS OF AMERICAN

Name	Body Style	Seats	Battery	Mileage a Charge	Final Drive	Forward Speeds	Wheelbase	Price
Argo	Rd	4	Ex	75-100	Be	5	108	$2500
Argo	Br	4	Ex	75-100	Be	5	108	2800
Argo	Li	5	Ex	75	Be	5	110	3250
Bailey	Rd	2	Ed	90-100	Ch	6	106	2500
Bailey	QV	3	Ed	75- 90	Ch	4	82	2600
Baker	Co	4	Ex	65-100	Be	6	88	2800
Baker	Br	5	Ex	65-100	Be	6	92	3100
Baker	V	2	Ex	65-100	Be	6	80	2000
Borland	Cl	5	Ex	75	Be	..	96	2500
Borland	Cl	3	Ex	75	Be	..	96	2500
Borland	Br	5	Ex	60	Ch	6	93	2500
Borland	Cl	5	Ex	60	Ch	6	93	2700
Borland	Li	7	Ex	100	Ch	6	123	5500
Broc	St	2	Ex	75	Be	5	84	2100
Broc	Br	5	Ex	90	Be	5	96	3000
Broc	Br	5	Ex	90	Be	5	96	3100
Broc	Br	5	Ex	90	Be	5	96	3500
Buffalo	Rd	2	Ph	50	Be	4	100	2600
Buffalo	Co	4	Ph	50	Be	4	100	2600
Century	Br	5	Ex	65-100	Be	6	98	$2550
Chicago	Co	5	Ex	100	Be	5	96	2800
Chicago	Li	5	Ex	95	Be	5	104	3100
Church-Field	To	2	Ph	75	Be	10	100	2300
Church-Field	Co	5	Ph	75	Be	10	100	2800
Colonial	Co	4	Wil	70	Be	6	96	2700
Columbus	Co	4	Ex	60- 80	Be	6	100	....
Columbus	Co	4	Ex	60- 80	Be	6	86	....
Columbus	Rd	2	Ex	60- 80	Be	6	92	....
Columbus	Co	4	Ex	60- 80	Be	6	92	....
Columbus	Co	4	Ex	60- 80	Be	6	86	....
Columbus	Co	4	Ex	60- 80	Be	6	92	....
Detroit	V	3	Op	65-100	Be	5	85	2300
Detroit	Rd	2	Op	65-100	Be	5	96	2350
Detroit	Co	3	Op	65-100	Be	5	96	2600
Detroit	Br	4	Op	65-100	Be	5	85	2700
Detroit	Br	4	Op	65-100	Be	5	90	2850
Detroit	Br	5	Op	65-100	Be	5	96	3000
Detroit	Br	5	Op	50- 85	Be	5	104	3600

ABBREVIATIONS.

Gasoline.

Acet, acetylene.
Air, compressed air.
Amid, amidships.
Bevel, shaft with bevel gear at rear axle.
B & P, ball and plain.
B R & P, ball, roller and plain.
Cell, cellular.
Cent, centre.
Con Bd, contracting band.
Doub, double.
Dual 2, double distributor.
Elec, electric.
Exp Bd, expanding band.
Float, floating.
Fric, friction.
Gear, spur.
Gov, governor.
Grav, gravity.
Head, both valves in head.
Hel'l, helical.
L & H, left side and in head.
Mech, mechanical.
Noncir, non-circulating.
Opp, valves on opposite sides of cylinder.
Opt, optional.
P & R, plain and roller.
Plan, planetary.
Plat, platform.
Pres, pressure.
Pro, progressive.
Rad Rd, radius rods.
Road, roadster.
Roll, roller.
R & H, right side and in head.
S & R R, springs and radius rods.
R & T R, radius rods and torsion rods.
S & T T, springs and torsion tube.
Sel, selective.
Semi F, semi-floating.
Sep, separate.
Spl'l, spiral.
Spld'rf, Splitdorf.
Spl Pres, combined splash and pressure.
Spr, spring.
Thermo, thermo-syphon.
Tor T, torsion tube.
Tor Rd, torsion rod.
Tour, touring.
Tub, tubular.
Unit M, unit with motor.
Unit X, unit with axle.
Worm, shaft with worm at rear axle.
½ Ell, semi-elliptic.
¾ Ell, three-quarter elliptic.

Electric.

Be, bevel, shaft drive with bevel gear reduction in rear axle.
Br, brougham.
C B, colonial brougham.
Ch, chain.
Cl, colonial.
Co, coupe.
D B, demi-brougham.
Ed, Edison.
Ex, exide.
E R, enclosed roadster.
Ha, Haschke.
Li, limousine.
Op, optional.
Ow, own.
Ph, Philadelphia.
Q V, Queen Victoria.
Rd, roadster.
Rn, runabout.
S, standard.
S B, semi-colonial brougham.
St, stanhope.
To, torpedo.
V, victoria.
Wil, Willard.
Wo, worm.

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BEARINGS				RUNNING GEAR						CONTROL			TRANSMISSION							
Crank-shaft Type and No.	Gearset	Rear Axle	Front Wheel	Front Axle	TIRES Front	TIRES Rear	SPRINGS Front	SPRINGS Rear	Wheelbase	Location Steering Wheel	Gearshift Location	Emergency Brake Control	Drive	Car Drives Through	Rear Axle	Clutch Type	GEARSET Type	GEARSET Forward Speeds	GEARSET Location	Chassis Weight, Lbs.
Plain, 3	B&P	Roll	Ball	I-Beam	34x3½	34x3½	½ Ell.	½ Ell.	113	Right	Right	Right	Bevel.	Springs.	Semi F	Cone	Sel	3	Unit X	2,000
Plain, 3	Roll	Roll	Roll	I-Beam	36x4	36x4	½ Ell.	½ Ell.	118	Left	Cent.	Cent.	Bevel.	S & T T	Float	Disk	Sel	3	Amid	2,550
Plain, 3	Roll	Roll	Ball	I-Beam	34x4	34x4	½ Ell.	½ Ell.	110	Right	Right	Right	Bevel.	Springs.	Semi F	Cone	Sel	3	Amid	2,200
Plain, 3	Roll	Roll	Ball	I-Beam	36x4	36x4	½ Ell.	½ Ell.	115	Right	Right	Right	Bevel.	Tor T	Float	Cone	Sel	3	Amid	2,350
Plain, 3	Roll	Roll	Ball	I-Beam	36x4½	36x4½	½ Ell.	½ Ell.	130	Right	Right	Right	Bevel.	Tor T	Float	Cone	Sel	3	Amid	2,900
Plain, 5	Ball	Roll	Roll	I-Beam	36x4	36x4	½ Ell.	½ Ell.	120	Right	Right	Right	Bevel.	Springs	Float	Cone	Sel	3	Amid	3,000
Plain, 4	Bial	Roll	Roll	I-Beam	37x4½	37x4½	½ Ell.	½ Ell.	127	Right	Right	Right	Bevel.	Springs	Float	Cone	Sel	3	Amid	3,500
Ball, 2	Ball	Ball	Ball	I-Beam	34x4	34x4	½ Ell.	½ Ell.	110	Left	Cent.	Left	Bevel.	S & R R	Semi F	Cone	Sel	4	Amid	2,750
Ball, 2	Ball	Ball	Ball	I-Beam	36x4½	36x4½	½ Ell.	½ Ell.	120	Left	Cent.	Left	Bevel.	S & R R	Semi F	Cone	Sel	4	Amid	3,700
P&R, 3	Ball	Ball	Ball	I-Beam	37x5	37x5	½ Ell.	½ Ell.	132	Left	Cent.	Left	Bevel.	S & R R	Semi F	Cone	Sel	4	Amid	4,500
Plain, 4	Ball	Roll	Roll	I-Beam	36x4½	36x4½	½ Ell.	½ Ell	130	Right	Right	Right	Shaft	Rad Rd	Float	Disk	Sel	4	Amid	.....
Plain, 3	Roll	Roll	Ball	I-Beam	35x4	35x4	½ Ell	Ell	116	Right	Cent.	Cent.	Shaft	Rad Rd	Semi F	Cone	Sel	3	Amid	1,750
Plain, 4	Ball	Ball	Ball	I-Beam	36x4	36x4	½ Ell.	½ Ell.	128	Right	Cent.	Cent.	Shaft	Rad Rd	Float	Disk	Sel	3	Unit M	2,850

ELECTRIC PLEASURE VEHICLES.

Name	Body Style	Seats	Battery	Mileage a Charge	Final Drive	Forward Speeds	Wheelbase	Price
Detroit	Li	7	Ed	50- 75	Be	5	112	$5000
Electra	Rd	2	Ha	75-100	Be	4	90	750
Dayton	Co	4	Ex	75-100	Be	5	86	2600
Flanders	V	4	Ow	75-100	Wo	6	100	2200
Flanders	Cl	5	Ow	75-100	Wo	6	100	2500
Fritchle	Br	5	Ow	100	Be	5	86	3600
Fritchle	Co	4	Ow	100	Be	5	88	3000
Fritchle	Rn	2	Ow	100	Be	5	88	2400
Fritchle	Rd	4	Ow	100	Be	5	88	2500
Grinnell	Co	5	Op	100	Be	5	94	2800
Grinnell	Co	5	Op	85	Be	5	96	2950
Hupp-Yeats	Co	4	Ex	75	Be	5	86	1750
Ohio	SB	5	Ex	100	Be	5	96	2900
Ohio	CB	5	Ex	100	Be	5	96	3200
Ohio	Br	5	Ex	100	Be	5	96	3200
Ohio	SB	5	Ex	100	Be	5	96	3500
Phipps	Co	5	Ex	75-100	Be	5	107	2500
Rauch & Lang	Rd	2	Ex	50	Be	6	92½	2600
Rauch & Lang	ER	2	Ex	50	Be	6	92½	2800
Rauch & Lang	DB	4	Ex	50	Be	6	..	$2800
Rauch & Lang	Br	4	Ex	50	Be	6	92½	2900
Rauch & Lang	CB	4	Ex	50	Be	6	92½	2900
Rauch & Lang	Br	5	Ex	50	Be	6	92½	3000
Rauch & Lang	Br	5	Ex	50	Be	6	103	3100
Standard	Co	4	Ex	75-100	Be	6	96	1885
Waverley	Rd	3	Op	75	Be	5	104	2250
Waverley	Br	4	Op	75	Be	4	104	2375
Waverley	Br	4	Op	75	Be	4	106	2800
Waverley	Li	4	Op	75	Be	4	106	2900
Waverley	Br	4	Op	75	Be	4	109	3250
Waverley	Li	5	Op	75	Be	4	109	3500
Woods	Rd	2	Ex	80	Be	5	92	2400
Woods	V	4	Ex	80	Be	5	92	2500
Woods	Br	5	Ex	80	Be	5	92	2700
Woods	Br	4	Ex	80	Be	5	92	2700
Woods	Br	5	Ex	80	Be	5	92	3100
Woods	Br	5	Ow	80	Be	5	102	3600

FIRST WOMAN DRIVER.

Mrs. John Howell Phillips of St. Louis Claims This Distinction in America.

Mrs. John Howell Phillips, a former Chicago society woman, now residing at Maple Lodge, St. Louis, Mo., is believed to be the first American woman to drive an automobile. Illinois license No. 24 was issued to her 14 years ago. This fact was divulged through the recent effort of Mr. Phillips to repurchase, as a relic, the machine his wife drove in Chicago in 1898.

The car was nameless, but was known as a tri-motor. It was conceived by an Englishman, who came to America in 1898 with a roll of blue prints and $50,000. Subsequently the Western Wheel Works produced several of the machines. The automobile has three wheels, one in front and two in the rear, and a long steering handle reached from the front wheel. Its maximum speed was 18 miles an hour.

Mrs. Phillips is still devoted to motoring, which she declares is woman's best tonic. She now owns and operates a six-cylinder Hudson, made by the Hudson Motor Car Company, Detroit.

In the gymkhana contests held recently at Sydney, Australia, the Cartercar, made by the Cartercar Company, Pontiac, Mich., won two first and two second prizes. These events served to determine ease of control, ease of changing speeds and, especially, ability to pick up speed.

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AMERICAN CARS CLASSIFIED BY MAKE.

$1200 CARS AND UNDER.

Name and Model	Body	Seats	S. A. E. H. P.	Wheel-base	Price
Auburn, 33L	Roadsetr	2	22.50	112	$1150
Auburn, 33L	Touring	5	22.50	112	1150
Buick, 24	Roadster	2	22.50	105	950
Buick, 25	Touring	5	22.50	105	1050
Buick, 30	Roadster	2	25.60	108	1125
Cameron, 28	Touring	4	24.00	104	800
Cameron, 29A	Touring	5	24.00	110	950
Cameron, 30	Flyer	2	36.07	114	1200
Crow Elk-Hart, C-1	Roadster	2	22.50	112	....
Crow Elk-Hart, C-2	Touring	5	25.60	114	....
Detroiter, A-3	Roadster	2	18.25	104	900
Detroiter, A-4	Roadster	2	18.25	104	900
Detroiter, A	Touring	5	18.25	104	850
Detroiter, A-1	Touring	5	18.25	104	900
Detroiter, A-2	Touring	5	18.25	104	900
Duryea, F, P	Runabout	2	....	80	625
Duryea, F, P	Buggy	2	....	80	487
Duryea, F, P	Surrey	4	....	90	537
Duryea, F, P	Victoria	2	....	100	625
Empire, 25	Touring	5	19.60	104	950
Ford, T	Touring	5	22.50	100	600
Ford, T	Runabout	2	22.50	100	525
Ford, T	Town Car	6	22.50	100	800
Gleason, R	Runabout	2	18.00	96	850
Gleason, R	Runabout	3	18.00	96	875
Gleason, R	Touring	5	18.00	96	1000
Halladay, 32	Roadster	2	22.50	112	1200
Halladay, 32	Touring	5	22.50	112	1200
Hupmobile, C	Runabout	2	16.90	86	750
Hupmobile, E	Roadster	2	16.90	110	850
Hupmobile, H	Roadster	2	16.90	106	975
Hupmobile, H	Touring	4	16.90	106	975
Hupmobile, C	Coupe	3	16.90	86	1100
Hupmobile, E	Coupe	3	16.90	110	1150
King	Roadster	2	22.50	110	1190
K-R-I-T	Roadster	2	22.50	106	900
K-R-I-T	Touring	5	22.50	106	900
Lambert, 40	Touring	5	16.90	112	1130
Little Four	Runabout	2	19.60	90	690
Lion, 30	Roadster	2	19.60	110	890
Luck, Utility	Det. Ton.	5	....	115	....
Marathon	Roadster	2	19.60	104	875
Marathon, Runner	Touring	5	19.60	104	950
Marathon, Runner	Coupe	2	19.60	104	1050
Mason, A	Touring	4	20.00	96	....
Mason, C	Touring	5	20.00	96	....
Maxwell, 4	Roadster	2	22.50	93	785
Maxwell, 8	Roadster	2	25.60	106	1110
Maxwell, 8	Touring	5	25.60	106	1145
Metz	Runabout	2	22.50	90	495
Motorette, M	Runabout	2	11.25	74	350
Oakland, 35	Roadster	3	19.60	112	1000
Oakland, 35	Touring	5	19.60	112	1075
Only, A	Runabout	2	28.90	112	1000
Overland, 69	Roadster	2	25.60	110	985
Overland, 69	Touring	5	25.60	110	985
Overland, 69	Touring	4	25.60	110	1010
Paige, 25	Roadster	2	22.50	110	950
Paige, 25	Touring	5	22.50	110	950
Perfex, 2	Roadster	2	22.50	106	1050
R-C-H	Roadster	2	16.90	110	900
R-C-H	Touring	5	16.90	110	900
Regal, N	Roadster	2	22.50	108	900
Regal, T	Touring	4	22.50	108	950
Reo, The Fifth	Roadster	2 & 5	25.60	112	1095
Richmond, O	Roadster	2	25.60	112	1100
Richmond, O	Touring	5	25.60	112	1200
Studebaker, 20	Roadster	2	20.30	102	750
Studebaker, 20	Suburban	4	20.50	102	800
Studebaker, 20	Coupe	2	20.50	102	1050
Studebaker, 20	Touring	4	20.50	102	800
Studebaker, 25	Roadster	2	19.60	101	875
Studebaker, 25	Touring	5	19.60	101	885
Studebaker, 30	Roadster	2	25.60	112	1100
Studebaker, 30	Demi-Ton	4	25.60	112	1100
Studebaker, 30	Touring	5	25.60	112	1100

$1250 TO $1985 CLASS.

Name and Model	Body	Seats	S. A. E. H. P.	Wheel-base	Price
Abbott-Detroit, E	Demi-Ton	4	32.40	121	$1975
Abbott-Detroit, D	Roadster	2	27.30	116	1700
Alpena, P-40	Roadster	2	22.50	135	1750
Alpena, P-40	Touring	4	22.50	135	1800
Alpena, P-40	Touring	5	22.50	135	1800
Alpena, P-40	Touring	6	22.50	135	1890
Albena, P-40	Touring	7	22.50	135	1890
American, Scout, 22A	Roadster	2	22.50	105	1475
Ames, 44	Roadster	2	27.30	118	1595
Ames, 45	Touring	5	27.30	118	1635
Apperson, 4-45	Roadster	2	32.40	114	1600
Apperson, 4-45	Touring	5	32.40	114	1600
Arbenz, F	Touring	5	27.30	120	1875
Arbenz, G	Torpedo	4	27.30	120	1875
Arbenz, H	Roadster	2	27.30	120	1825
Auburn, 37L	Touring	5	28.90	115	1400
Auburn, 40L	Roadster	2	32.40	122	1650
Auburn, 40L	Touring	5	32.40	122	1650
Bergdoll, C-30	Roadster	2	25.60	115	1600
Bergdoll, C-30	Touring	5	25.60	115	1600
Bergdoll, C-30	Fore Door	4	25.60	115	1600
Bergdoll, C-30	Torpedo	4	25.60	115	1600
Bergdoll, D-40	Roadster	2	25.60	115	1800
Bergdoll, D-40	Torpedo	4	25.60	115	1800
Bergdoll, D-40	Touring	5	25.60	115	1800
Buick, 31	Fore Door	5	25.60	108	1285
Buick, 40	Touring	5	28.90	115	1650
Burg, S	Runabout	3	33.75	134	1975
Burg, S	Touring	5	33.75	134	1975
Cadillac, 1913	Roadster	2	32.40	120	1975
Cadillac, 1913	Torpedo	4	32.40	120	1975
Cadillac, 1913	Phaeton	4	32.40	120	1975
Cadillac, 1913	Touring	5	32.40	120	1975
Cameron, 32	Touring	5	36.07	120	1450
Carhartt, K	Runabout	3	26.40	109	1450
Carhartt, K	Touring	5	26.40	109	1450
Carhartt, B	Runabout	3	32.40	119	1850
Carhartt, B	Touring	5	32.40	119	1850
Cartercar, 5	Roadster	2	27.25	116	1600
Cartercar, 5	Touring	5	27.25	116	1700
Cartercar, 5	Coupe	3	27.25	116	1900
Case, N	Roadster	2	27.25	115	1350
Case, N	Touring	5	27.25	116	1500
Case, O	Roadster	2	32.40	125	1985
Colby, C	Roadster	2	27.25	118	1800
Colby, C	Touring	5	27.25	118	1800
Cutting, A-40	Roadster	2	25.60	120	1475
Cutting, B-40	Touring	5	25.60	120	1475
Crawford, 13-30	Roadster	2	27.25	115	1750
Crawford, 13-30	Touring	5	27.25	115	1750
Crow Elk-Hart, C-3	Roadster	2	25.60	114	....
Crow Elk-Hart, C-4	Touring	5	25.60	114	....
Crow Elk-Hart, C-5	Touring	5	27.25	122	....
Correja, T & D	Runabout	2	28.90	125	1650
Correja, T & D	Touring	4	28.90	125	1650
Correja, T & D	Touring	5	28.90	125	1650
Correja, A	Runabout	2	28.90	105	1450
Correja, C	Roadster	2	28.90	105	1450
Correja, B	Coupe	2	28.90	105	1850
Correja, S & R	Runabout	2	28.90	120	1950
Correja, G	Runabout	2	19.60	125	1850
Correja, J	Touring	5	19.60	125	1850
Corbitt, D	Runabout	2	25.60	120	1800
Corbitt, E	Touring	4	25.60	120	1875
Corbitt, F	Touring	5	25.60	120	1875
Cino, 440-A	Touring	5	32.60	120	1600
Cino, 440-R	Roadster	2	32.60	120	1600
Cino, 450	Touring	5	32.60	120	1850
Cole 40	Runabout	2	27.25	116	1685
Cole, 40	Touring	5	27.25	116	1685
Cole, 50	Runabout	2	32.40	122	1985
Cole, 50	Touring	5	32.40	122	1985
Davis, 40C	Runabout	2	27.25	118	1850
Davis, 40E	Touring	4	27.25	118	1850
Davis, 40D	Touring	5	27.25	118	1850
Davis, 50A	Touring	2	32.40	118	1950
Davis, 50B	Runabout	2	32.40	118	1950
Day Utility, D	Touring	5	25.60	115	1500
Enger, F	Touring	5	32.40	120	1475
Enger, J	Touring	4	32.40	120	1475

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AMERICAN CARS CLASSIFIED BY MAKE.

$1250 TO $1985 CLASS.

Name and Model	Body	Seats	S. A. E. H. P.	Wheel-base	Price
Enger, E	Roadster	2	32.40	120	$1475
Enger, P	Touring	5	32.40	120	1750
Falcar, 35	Runabout	2	27.25	116	1850
Falcar, 35	Roadster	3	27.25	116	1850
Falcar, 35	Toy Ton	4	27.25	116	1850
Falcar, 35	Touring	7	27.25	116	1850
Flanders, 40	Touring	5	31.60	118	1550
Franklin, G	Runabout	2	25.60	100	1650
Glide, 36	Speed	2	27.25	118	1690
Glide, 36	Touring	5	27.25	118	1690
Great Southern, 30	Roadster	2	25.60	113	1400
Great Southern, 30	Touring	5	25.60	113	1400
Great Western, 1913	Roadster	2	28.90	118	1585
Great Western, 1913	Touring	4	28.90	118	1585
Great Western, 1913	Touring	5	28.90	118	1585
Halladay, 40	Roadster	2	32.40	118	1800
Halladay, 40	Toy Ton	4	32.40	118	1800
Halladay, 40	Touring	5	32.40	118	1800
Havers, 44	Roadster	2	33.75	122	1850
Havers, 44	Touring	4	33.75	122	1850
Havers, 44	Touring	5	33.75	122	1850
Henderson, 44	Roadster	2	27.25	116	1385
Henderson, 46	Touring	5	27.25	116	1485
Herreshoff, 30	Runabout	2	18.25	100	1250
Herreshoff, 30	Touring	5	18.25	110	1350
Herreshoff, 36	Runabout	2	27.25	124	1700
Herreshoff, 36	Touring	5	27.25	124	1700
Hudson, 37	Roadster	2	27.25	118	1875
Hudson, 37	Torpedo	5	27.25	118	1875
Hudson, 37	Touring	5	27.25	118	1875
Imperial, 34	Touring	5	32.40	118	1650
Imperial, 44	Touring	5	36.10	122	1875
Jackson, Olympic	Touring	5	27.25	115	1500
Jackson, Majestic	Touring	5	32.40	124	1850
King, 1913	Touring	5	25.60	115	1500
Kissel, 30	Semi-Rac.	2	28.90	116	1700
Kissel, 30	Semi-Tour.	5	28.90	116	1700
Kline-Kar, 4-30	Runabout	2	25.60	115	1850
Kline-Kar, 4-30	Toy Ton	4	25.60	115	1850
Kline-Kar, 4-30	Touring	5	25.60	115	1850
Lambert, 99	Touring	5	28.90	117	1250
Little Six	Touring	5	23.06	106	1285
Marathon, Winner	Roadster	2	28.90	116	1275
Marathon, Winner	Touring	5	28.90	116	1350
Marathon, Winner	Coupe	2	28.90	116	1600
Marathon, Champion	Roadster	2	32.40	123	1675
Marathon, Champion	Touring	5	32.40	123	1750
Marathon, Champion	Touring	7	32.40	123	1800
Marion, 37A	Touring	5	25.60	112	1475
Marion, 36A	Roadster	2	25.60	112	1425
Marion, 48A	Touring	5	27.25	120	1850
Mason, K	Runabout	2	25.60	116	1290
Mason, K	Touring	5	25.60	116	1290
Maxwell, 10	Roadster	2	28.90	115	1675
Maxwell, 10	Touring	5	28.90	115	1675
McIntyre, G-13	Runabout	2	29.40	116	1485
McIntyre, G-13	Touring	5	29.40	116	1485
Michigan, R	Touring	5	28.90	118	1585
Michigan, S	Roadster	2	28.90	118	1585
Michigan, L	Touring	5	26.40	114	1400
Michigan, O	Roadster	2	26.40	114	1400
Midland, T-4	Roadster	2	32.40	121	1685
Midland, T-4	Speed	2	32.40	121	1685
Midland, T-4	Touring	5	32.40	121	1685
Miller, 40	Touring	5	27.25	116	1450
Mitchell, 5-4	Runabout	2	28.90	120	1500
Mitchell, 5-4	Touring	5	28.90	120	1500
Mitchell, 5-6	Runabout	2	33.75	132	1850
Mitchell, 5-6	Touring	5	33.75	132	1850
Moline, M-40	Roadster	2	27.25	124	1950
Moline, M-40	Touring	5	27.25	124	1950
Moon, 39	Roadster	2	25.60	116	1650
Moon, 39	Torpedo	4	25.60	116	1650
Moon, 39	Touring	5	25.60	116	1650
Moon, 48	Roadster	2	32.40	121	1985
Moon, 48	Torpedo	4	32.40	121	1985
Moon, 48	Touring	5	32.40	121	1985
Nyberg, 37	Roadster	2	22.50	118	1285
Nyberg, 37	Touring	5	22.50	118	1295
Nyberg, 40	Roadster	2	28.90	118	1400

$1250 TO $1985 CLASS.

Name and Model	Body	Seats	S. A. E. H. P.	Wheel-base	Price
Nyberg, 40	Touring	5	28.90	118	$1450
Nyberg, 40	Touring	7	28.90	128	1550
Nyberg, 6-45R	Roadster	2	33.75	126	1700
Nyberg, 6-45	Touring	..	33.75	136	....
Nyberg, 6-45	Touring	7	33.75	136	....
Oakland, 42	Roadster	3	27.25	116	1600
Oakland, 42	Toy ton	4	27.25	116	1600
Oakland, 42	Touring	5	27.25	116	1600
Omaha, 42	Roadster	2	26.40	116	1385
Omaha, 42	Touring	5	26.40	116	1385
Only, A	Touring	5	28.90	112	1250
Overland, 69	Coupe	3	25.60	110	1500
Overland, 71	Roadster	2	30.63	114	1475
Overland, 71	Touring	4	30.63	114	1475
Overland, 71	Touring	5	30.63	114	1475
Pacific Special, A	Touring	5	32.40	121	1950
Pacific Special, B	Roadster	2	32.40	121	1950
Paige, 25	Coupe	3	22.50	110	1500
Paige, 25	Coupe	5	22.50	110	1600
Paige, 36	Touring	5	25.60	116	1275
Paige, 36	Roadster	2	25.60	116	1275
Paige, 36	Coupe	3	25.60	116	....
Paige, 36	Coupe	5	25.60	116	....
Paterson, 43	Touring	5	27.25	116	1685
Paterson, 47	Touring	7	32.40	122	1985
Pathfinder, 13	Touring	5	27.25	120	1875
Pathfinder, 13	Phaeton	4	27.25	120	1875
Pathfinder, 13	Roadster	2	27.25	120	1875
Pilot, 50	Touring	5	32.40	126	....
Pratt, 30	Roadster	2	25.60	114	1400
Pratt, 30	Touring	5	25.60	114	1400
Pratt, 40	Roadster	2	32.40	120	1850
Pratt, 40	Touring	5	32.40	120	1850
Pratt, 40	Touring	7	32.40	120	1950
Pullman, 4-36	Touring	5	26.40	118	1675
Pullman, 4-36	Touring	5	26.40	118	1850
Rambler, Cross-C	Touring	5	32.40	120	1700
Rambler, Cross-C	Touring	4	32.40	120	1700
Rambler, Cross-C	Roadster	2	32.40	120	1650
Rambler, Cross-C	Touring	7	32.40	120	1900
R-C-H	Coupe	2	16.90	110	1300
Regal	Coupe	3	22.50	100	1250
Regal, H	Touring	5	28.90	118	1400
Regal, C	Touring	5	25.60	116	1250
Reo, The Fifth	Limousine	7	25.60	112	1600
Richmond, P	Touring	5	32.40	120	1750
Schacht, NS	Touring	5	28.90	120	1775
Schacht, KL	Roadster	2	28.90	120	1775
Spaulding, G	Touring	5	28.90	120	1650
Spaulding, G	Roadster	2	28.90	120	1600
Spoerer, 25-A	Runabout	2	27.25	120	1900
Staver, 45	Runabout	2	32.40	113	1750
Staver, 45	Roadster	2	32.40	113	1750
Staver, 45	Touring	5	32.40	113	1750
Staver, 45	Semi-racer	2	32.40	116	1750
Staver, 45	Fore Door	2	32.40	116	1750
Staver, 45	Touring	5	32.40	116	1750
Stoddard-Dayton, 30	Roadster	2	25.00	112	1350
Stoddard-Dayton, 30	Touring	5	25.00	112	1450
Stoddard-Dayton, 38	Roadster	2	28.90	114	1750
Stoddard-Dayton, 38	Touring	5	28.90	114	1850
Studebaker, 30	Coupe	5	25.60	112	1475
Studebaker, 35	Coupe	2	27.25	115½	1850
Studebaker, 35	Touring	6	27.25	115½	1290
Studebaker, Six	Roadster	2	29.40	121	1550
Studebaker, Six	Touring	6	29.40	121	1550
Velie, Dispatch	Roadster	2	22.50	113	1450
Velie, Dispatch	Touring	5	22.50	113	1500
Velie, 32	Touring	5	22.50	113	1350
Warren, 30	Roadster	2	27.25	110	1250
Warren, 30	Touring	5	27.25	110	1250
Warren, 40	Touring	5	27.25	110	1415
Westcott, 40	Touring	5	32.40	120	1975
Westcott, 40	Torpedo	4	32.40	120	1975
Westcott, 40	Roadster	2	32.40	120	1975
Zimmerman, Z-40	Touring	5	30.75	116	1600
Zimmerman, Z-46	Touring	5	33.75	128	1950

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AMERICAN CARS CLASSIFIED BY MAKE.

$2000 TO $2950 CLASS.

Name and Model	Body	Seats	H. P.	S. A. E. Wheel-base	Price
Abbott-Detroit, E	Touring	7	32.40	121	$2000
Abbott-Detroit, E	Roadster	2	32.40	121	2150
A. E. C., 6-45	Touring	5	33.75	130	2500
A. E. C., 6-45	Roadster	2	33.75	130	2500
Alpena, N-6-50	Roadster	2	33.75	135	2200
Alpena, N-6-50	Touring	4	33.75	135	2250
Alpena, N-6-50	Touring	5	33.75	135	2250
Alpena, N-6-50	Touring	6	33.75	135	2390
Alpena, N-6-50	Touring	7	33.75	135	2390
American, Touring, 34A	Touring	4	32.40	118	2350
American, 32A	Roadster	2	32.40	118	2350
Apperson, 4-45	Coupe	4	32.40	114	2100
Apperson, 4-55	Touring	5	36.10	118	2000
Apperson, 4-55	Touring	7	36.10	122	2250
Auburn, 40L	Town Car	5	32.40	122	2500
Auburn, 6-45	Touring	5	33.75	130	2000
Auburn, 6-45	Roadster	2	33.75	130	2000
Auburn, 6-45	Coupe	5	33.75	130	2600
Bergdoll, C-30	Limousine	7	25.60	115	2400
Bergdoll, 40	Touring	5	25.60	121	2000
Bergdoll, 40	Touring	7	25.60	121	2100
Bergdoll, 40	Torpedo	4	25.60	121	2000
Bergdoll, 40	Roadster	2	25.60	121	2000
Bergdoll, D-40	Limousine	7	25.60	115	2600
Burg, R	Touring	5	27.25	134	2450
Cadillac, 1913	Touring	6	32.40	120	2075
Cadillac, 1913	Coupe	4	32.40	120	2500
Carroll, 4E	Roadster	2	32.40	118	2250
Carroll, 4E	Roadster	3	32.40	118	2250
Carroll, 4E	Touring	4	32.40	118	2400
Carroll, 4E	Touring	5	32.40	118	2400
Carroll, 4E	Touring	6	32.40	118	2400
Cartercar, 5	Sedan	5	27.25	116	2000
Case, O	Touring	5	32.40	125	2050
Chalmers, 17	Touring	7	28.90	118	2150
Chalmers, 17	Coupe	4	28.90	118	2250
Chalmers, 18	Touring	5	43.80	130	2400
Chalmers, 18	Touring	7	43.80	130	2600
Chalmers, 18	Torpedo	4	43.80	130	2900
Chalmers, 18	Roadster	2	43.80	130	2400
Chalmers, 18	Coupe	4	43.80	130	2700
Chevrolet, C	Touring	6	31.95	120	2100
Cino, 660	Touring	7	38.25	132	2700
Cino, 660	Roadster	2	38.25	132	2700
Coey, A	Touring	4	38.40	128	2000
Coey, B	Roadster	2	38.40	128	2000
Colby, E	Touring	5	25.60	128	2060
Colby, E	Touring	7	25.60	128	2100
Colby, 6-60	Touring	5&7	40.90	138	2500
Colby, 6-60	Roadster	2	40.90	138	2500
Cole, 50	Coupe	4	32.40	122	2500
Cole, 60	Touring	6	40.90	132	2485
Correja, T & D	Lim'sine	4&6	28.90	125	2300
Correja, S & R	Touring	4&5	43.80	125	2150
Correja, S & R	Touring	7	43.80	125	2350
Correja, S & R	Limousine	4	43.80	125	2750
Correja, S & R	Limousine	7	43.80	125	2950
Correja, R	Runabout	2	38.40	125	2250
Correja, S	Touring	5	38.40	125	2250
Crawford, 13-40	Roadster	2	32.40	125	2050
Crawford, 13-40	Touring	5	32.40	125	2100
Crow Elk-Hart, C-7	Roadster	2	32.40	122	....
Crow Elk-Hart, C-8	Touring	5	32.40	122	....
Crow Elk-Hart, C-9	Touring	7	32.40	122	....
Crow Elk-hart, C-6B	Touring	5	33.75	122	....
Crow Elk-Hart, C-6A	Touring	7	40.90	137	....
Croxton, A-4	Touring	4	27.25	121	2500
Croxton, D-4	Roadster	2	27.25	121	2250
Croxton, 10	Taxi	..	27.25	121	2250
Dorris, H	Touring	5	30.63	121	2500
Dorris, H	Touring	7	30.63	121	2550
Dorris, H	Touring	4	30.63	121	2500
Dorris, H	Touring	6	30.60	121	2550
Duquesne, 50	Touring	5	36.10	124	2500
Duquesne, 50	Roadster	2	36.10	124	2500
Flanders, 50	Touring	4	38.40	130	2200
Flanders, 50	Touring	7	38.40	130	2250
Franklin, G	Touring	5	25.60	103	2000
Franklin, M	Touring	5	31.60	116	2900
Franklin, M	Runabout	2	31.60	116	2800

$2000 TO $2950 CLASS.

Name and Model	Body	Seats	H. P.	S. A. E. Wheel-base	Price
Franklin, M	Phaeton	5	31.60	116	$2900
Garford, G-15	Roadster	2	33.75	128	2750
Garford, G-15	Touring	5	33.75	128	2750
Glide, 45	Roadster	2	36.10	120	2000
Glide, 45	Touring	4	36.10	120	2000
Glide, 45	Touring	5	36.10	120	2150
Glide, 45	Touring	7	36.10	120	2250
Great Southern, 51	Touring	6	43.90	128	2100
Great Western, 1913	Sedan	4	28.90	118	2250
Grout, 35	Touring	5	32.40	116	2000
Grout, 35	Roadster	5	32.40	116	2000
Grout, 45	Touring	7	36.10	123	2850
Grout, 45	Touring	4	36.10	123	2750
Havers, 55	Roadster	2	38.40	128	2250
Havers, 55	Touring	5	38.40	128	2250
Haynes, 22	Touring	5	32.40	120	2250
Haynes, 22	Touring	4	32.40	120	2250
Haynes, 22	Roadster	2	32.40	120	2250
Haynes, 22	Coupe	3	32.40	120	2750
Holly, A	Touring	5	38.40	130	2500
Holly, A	Touring	7	38.40	130	2500
Hudson, 37	Coupe	3	27.25	118	2350
Hudson, 54	Touring	5	40.90	127	2450
Hudson, 54	Touring	5	40.90	127	2450
Hudson, 54	Roadster	2	40.90	127	2450
Hudson, 54	Touring	7	40.90	127	2600
Hudson, 54	Coupe	3	40.90	127	2950
Inter-State	Touring	5	38.40	132	2750
Jackson, Sultanic	Touring	5	40.90	138	2500
Jackson, Sultanic	Touring	7	40.90	138	2650
Keeton, Meadowbrook	Roadster	2	33.75	131	2500
Keeton, Riverside	Touring	5	33.75	131	2500
Keeton, Tuxedo	Coupe	2	33.75	131	2850
Kissel, 40	Touring	5	32.40	121	2000
Kissel, 50	Touring	6	38.00	132	2500
Kline-Kar, 4-40	Touring	5	28.90	118	2250
Kline-Kar, 4-40	Touring	4	28.90	118	2250
Kline-Kar, 4-40	Runabout	2	28.90	118	2250
Kline-Kar, 4-40	Coupe	3	28.90	118	2750
Kline-Kar, 6-50	Touring	5	26.80	126	2850
Kline-Kar, 6-50	Touring	4	26.80	126	2850
Kline-Kar, 6-50	Runabout	2	26.80	126	2650
Kline-Kar, 6-50	Roadster	2	26.80	126	2800
Lenox, 40	Touring	5	28.90	118	2000
Lenox, 40	Speedster	2	28.90	118	2100
Lenox, 40	Roadster	2	28.90	118	2000
Lenox, 40	Roadster	3	28.90	118	2000
Lenox, 40	Roadster	4	28.90	118	2000
Lenox, 40	Touring	4	28.90	118	2000
Lenox, Six	Touring	6	38.40	130	2750
Lenox, Six	Limousine	6	38.40	130	....
Lexington, 13-6	Touring	5	40.90	129	....
Luverne, 76	Touring	7	43.80	130	2850
Marmon, 32	Roadster	2	32.40	120	2900
Marmon, 32	Speedster	2	32.40	120	2850
McFarlan, S	Roadster	2	38.40	124	2300
McFarlan, S	Touring	5	38.40	124	2300
McFarlan, S	Touring	4	38.40	124	2300
McFarlan, T	Roadster	2	38.40	124	2500
McFarlan, T	Touring	4&5	38.40	124	2500
McFarlan, T	Touring	6	38.40	124	2550
McFarlan, M	Roadster	2	43.80	128	2750
McFarlan, M	Touring	4&5	43.80	128	2750
McFarlan, M	Touring	7	43.80	128	2750
Mercer, J	Race	2	30.63	108	2600
Mercer, K	Runabout	2	30.63	108	2700
Mercer, G	Touring	4	32.40	118	2900
Mercer, H	Touring	5	32.40	118	2900
Midland, T-4	Coupe	3	32.40	121	2350
Midland, T-6	Roadster	2	38.40	134	2385
Midland, T-6	Touring	7	38.40	134	2450
Mitchell, 7-6	Touring	7	43.80	144	2500
Moon, 65	Touring	5	38.40	132	2500
Moon, 65	Touring	4	38.40	132	2500
Moon, 65	Roadster	2	38.40	132	2500
Moyer, D	Touring	5	38.40	122	....
Moyer, F	Phaeton	7	38.40	122	....
Moyer, B & E	Touring	5&7	32.40	117	....
Norwalk, A	Touring	5	38.40	127	2750
Norwalk, A	Roadster	2	38.40	127	2750

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AMERICAN CARS CLASSIFIED BY MAKE.

$2000 TO $2950 CLASS.

Name and Model	Body	Seats	H. P.	S. A. E. Wheel-base	Price
Nyberg, 60-T	Touring	5	43.80	138	$2200
Nyberg, 60-T	Touring	7	43.80	138	2300
Nyberg, 60-R	Roadster	2	43.80	128	2200
Oakland, 42	Coupe	4	27.25	116	2500
Oakland, 6-60	Touring	7	40.90	130	2400
Oakland, 6-60	Touring	5	40.90	130	2400
Oakland, 6-60	Touring	4	40.90	130	2400
Oakland, 6-60	Speed	2	40.90	130	2400
Palmer-Singer, Six	Touring	5	38.40	127	2000
Palmer-Singer, Six	Roadster	2	38.40	127	2000
Pathfinder, 13	Coupe	3	27.25	120	2500
Pathfinder, 13	Cruiser	2	27.25	120	2000
Pilot, 50	Touring	5	32.40	126	2250
Pilot, 60	Touring	5	38.40	132	2500
Pope-Hartford, 31	Touring	5	30.10	118½	2250
Pope-Hartford, 31	Phaeton	4	30.10	118½	2250
Pope-Hartford, 31	Roadster	2	30.10	118½	2250
Pope-Hartford, 31	Coupe	3	30.10	118½	2850
Pratt, 50	Touring	4	32.40	122	2150
Pratt, 50	Touring	5	32.40	122	2150
Pratt, 50	Touring	7	32.40	122	2300
Premier, 6-40	Touring	5	38.40	132	2735
Premier, 6-40	Roadster	2	38.40	132	2600
Pullman, 4-44	Touring	5	32.40	122	2150
Pullman, 6-66	Touring	7	48.60	138	2750
Rambler, Cross-C	Coupe	4	32.40	120	2500
Rambler, Cross-C	Limousine	5	32.40	120	2850
Rayfield, C	Touring	5	29.40	117	2500
Rayfield, C	Roadster	2	29.40	117	2500
Republic, D	Touring	5	28.90	120	2350
Republic, D	Touring	4	28.90	120	2350
Republic, D	Roadster	2	28.90	120	2350
Republic, E	Touring	5	43.80	132	2950
Schacht, NS	Touring	6	28.90	120	2500
Selden, 48	Touring	7	36.10	125	2500
Selden, 48	Touring	5	36.10	125	2350
Selden, 48	Touring	4	36.10	125	2350
Selden, 48	Roadster	2	36.10	125	2350
S. G. V., A.	Runabout	2	22.50	116	2500
S. G. V., A.	Touring	5	22.50	116	2500
Speedwell, G	Touring	4	40.90	134	2850
Speedwell, G	Touring	5	40.90	134	2850
Speedwell, G	Touring	7	40.90	134	2950
Speedwell, Rotary	Touring	4&5	40.90	134	2850
Spoerer, 25-A	Touring	5	27.25	120	2000
Staver, 55	Touring	5	32.40	120	2250
Staver, 55	Touring	4	32.40	124	2400
Staver, 65	Touring	5	38.40	138	2750
Staver, 65	Touring	7	38.40	138	2750
Stoddard-Dayton, 38	Land.	..	28.90	114	2750
Stoddard-Dayton, 38	Coupe	..	28.90	114	2350
Stoddard-Dayton, 48	Roadster	..	36.10	122½	2700
Stoddard-Dayton, 48	Touring	..	36.10	122½	2800
Studebaker, 35	Sedan	5	27.25	115½	2050
Studebaker, Six	Limousine	7	29.40	121	2500
Stutz, 4 Bearcat	Roadster	2	36.10	120	2000
Stutz, 4 Tour	Touring	4	36.10	124	2000
Stutz, 4 Tour	Touring	6	36.10	124	2050
Stutz, 6 Bearcat	Roadster	2	43.80	124	2250
Stutz, 6 Tour	Touring	6	43.80	130	2300
Touraine, 7	Race	2	38.40	114	2750
Touraine, 7	Touring	7	38.40	133	2950
Touraine, 6	Runa	2	38.40	124	2750
Touraine, 6	Phaeton	5	38.40	124	2750
Touraine, 6	Touring	4	38.40	124	2750
Triumph, A	Runabout	2	36.10	114	2250
Triumph, A	Roadster	3	36.10	114	2250
Triumph, B	Touring	5	36.10	114	2500
Velie, 40	Touring	5	32.40	118	2000
Velie, 40	Touring	4	32.40	118	2000
Warren, 50	Touring	5	38.40	130	2500
Westcott, 50	Touring	5	38.40	127	2475
Westcott, 50	Touring	7	38.40	127	2525
White, GRE	Touring	5	22.50	110	2500
White, GRE	Roadster	2	22.50	110	2500

$3000 TO $7250 CLASS.

Name and Model	Body	Seats	H. P.	S. A. E. Wheel-base	Price
Abbott-Detroit, E	Limousine	7	32.40	121	$3050
Adams-Farwell, 9	Roadster	5	60.50	120	3000
Adams-Farwell, 9	Touring	7	60.50	120	3500
A. E. C., 6-60	Roadster	2	48.60	138	3000
A. E. C., 6-60	Touring	7	48.60	138	3000
Alco, 7-16	Land.	6	24.90	104	6750
Alco, 11-60	Touring	7	54.10	133½	6000
Alco, 11-60	Touring	5	54.10	133½	6000
Alco, 11-60	Limousine	5	54.10	133½	6750
Alco, 11-60	Berline	7	54.10	133½	7250
American Traveller, 54 A	Touring	4	46.00	124	4250
American Traveller, 65 A	Touring	6	46.00	140	4500
Amplex, F	Touring	5	40.90	130	....
Amplex, F	Roadster	2	40.90	130	....
Atlas, 12	Touring	5	32.40	130	3500
Atlas, 12	Touring	7	32.40	130	3700
Auburn, 6-50	Touring	7	40.90	135	3000
Austin, 55	Touring	4&5	38.40	141	4000
Austin, 55	Touring	7	38.40	141	4000
Austin, 55	Limousine	7	38.40	141	5000
Austin, 66	Touring	4&5	48.60	141	5000
Austin, 66	Touring	7	48.60	141	5000
Austin, 66	Limousine	7	48.60	141	6000
Austin, 77	Touring	4&5	48.60	141	6000
Austin, 77	Touring	7	48.60	141	6000
Austin, 77	Touring	9	48.60	141	6150
Austin, 77	Limousine	7	48.60	141	7000
Bergdoll, 40	Limousine	7	25.60	121	3250
Bergdoll, 40	Coupe	4	25.60	121	3250
Cadillac, 1913	Limousine	7	32.40	120	3250
Carroll, 4D	Roadster	2&3	40.00	128	3000
Carroll, 4D	Touring	4&5	40.00	128	3250
Carroll, 4D	Touring	6&7	40.00	128	3300
Carroll, 6C	Roadster	2&3	40.90	128	3250
Carroll, 6C	Touring	4&5	40.90	128	3500
Carroll, 6C	Touring	6&7	40.90	128	3500
Chadwick, 19	Touring	5&7	60.00	133	5500
Chadwick, 19	Limousine	7	60.00	133	6500
Chadwick, 19	Roadster	2&3	60.00	112	5500
Chalmers, 17	Limousine	7	28.90	118	3250
Chalmers, 18	Limousine	7	43.80	130	3700
Cole, 50	Limousine	4	32.40	122	3250
Cole, 60	Coupe	4	40.90	132	3000
Cole, 60	Limousine	7	40.90	132	3750
Columbia, 88	Roadster	2	38.00	129	4500
Columbia, 88	Touring	4&7	38.00	129	4500
Columbia, 88	Limousine	7	38.00	129	5800
Columbia, 88	Land.	7	38.00	129	5800
Columbia, 88	Touring	6	38.00	129	4500
Columbia, 85-2	Roadster	2&4	38.00	120	3300
Columbia, 85-2	Touring	6	38.00	120	3400
Columbia, 85-2	Touring	7	38.00	120	3500
Columbia, 85-2	Limousine	7	38.00	120	4800
Croxton, B-6	Touring	6	28.90	138	3000
Cunningham, M	Touring	7	36.10	124	3500
Cunningham, M	Phaeton	5	36.10	124	3500
Cunningham, M	Limousine	7	36.10	124	4500
Cunningham, M	Land.	7	36.10	124	4500
Cunningham, M	Roadster	3	36.10	124	3250
Diamond, T	Option	—	40.00	126	3500
Duquesne, 50	Touring	4&5	33.75	133	3000
Duquesne, 50	Roadster	2&3	33.75	133	3000
Edwards, 25	Touring	4&5	25.60	120	3500
Edwards, 25	Roadster	2	25.60	120	3500
Edwards, 25	Limousine	7	25.60	120	4600
Edwards, 25	Land.	7	25.60	120	4700
Fiat, 54	Phaeton	5	31.10	123	4000
Fiat, 54	Touring	7	31.10	123	4000
Fiat, 54	Runabout	4	31.10	123	4000
Fiat, 54	Limousine	7	31.10	123	5000
Fiat, 54	Land.	7	31.10	123	5100
Fiat, 56	Phaeton	5	46.65	135	5000
Fiat, 56	Touring	7	46.65	135	5000
Fiat, 56	Runabout	4	46.65	135	5000
Fiat, 56	Limousine	7	46.65	135	6000
Fiat, 56	Land.	7	46.65	135	6100
Fiat, 55	Phaeton	5	42.00	128	4500
Fiat, 55	Touring	7	42.00	128	4500
Fiat, 55	Roadster	4	42.00	128	4500
Fiat, 55	Limousine	7	42.00	128	5500
Fiat, 55	Land.	7	42.00	128	5600

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AMERICAN CARS CLASSIFIED BY MAKE.

$3000 TO $7250 CLASS.

Name and Model	Body	Seats	S. A. E. H. P.	Wheel-base	Price
Firestone-Columbus, 90E	Touring	5	40.90	130	....
Firestone-Columbus, 90E	Touring	7	40.90	130	....
Firestone-Columbus, 86-E	Roadster	5	27.25	116	....
Firestone-Columbus, 86-E	Touring	3	27.25	116	....
Firestone-Columbus, 60-E	Touring	5	32.40	122	....
Firestone-Columbus, 60-E	Touring	7	32.40	122	....
Firestone-Columbus, 60-E	Limousine	7	32.40	122	....
Franklin, D	Touring	5	38.40	123	$3600
Franklin, H	Touring	7	38.40	126	4750
Franklin, H	Limousine	7	38.40	126	4850
Garford, G-14	Runabout	5 & 7	43.80	139	4500
Garford, G-14	Touring	5 & 7	43.80	139	4500
Garford, G-14	Limousine	7	43.80	139	5650
Garford, G-14	Land.	7	43.80	139	5750
Great Eagle, B	Touring	7	36.10	135	3500
Great Eagle, B	Limousine	7	36.10	135	4000
Great Eagle, B	Limousine	10	36.10	135	4750
Great Eagle, B	Land.	7	36.10	135	3500
Great Eagle, C	Touring	7	40.90	142	4000
Great Eagle, C	Limousine	7	40.90	142	4500
Great Eagle, C	Limousine	10	40.90	142	5250
Great Eagle, C	Land.	7	40.90	142	4000
Haynes, 22	Limousine	7	32.40	120	3400
Haynes, 22	Berline	7	32.40	120	3500
Hudson, 37	Limousine	7	27.25	118	3250
Hudson, 54	Limousine	7	40.90	127	3750
Kissel, 60	Touring	6	48.60	140	3150
Kissel, 60	Touring	7	48.60	140	3150
Kline-Kar, 4-40	Limousine	7	28.90	118	3750
Kline-Kar, 6-50	Limousine	7	40.70	126	4350
Kline-Kar, 6-50	Coupe	3	40.70	126	3150
Kline-Kar, 6-60	Touring	6 & 7	43.80	132	3500
Kline-Kar, 6-60	Phaeton	4	43.80	132	3500
Kline-Kar, 6-60	Runabout	2	43.80	132	3250
Kline-Kar, 6-60	Coupe	3	43.80	132	3750
Kline-Kar, 6-60	Limousine	7	43.80	132	5000
Kline-Kar, 6-60	Meteor	2	43.80	132	3200
Knox, 44	Runabout	2	40.00	122	3350
Knox, 44	Touring	4	40.00	122	3400
Knox, 44	Runabout	4	40.00	122	3350
Knox, 44	Touring	5	40.00	122	3450
Knox, 44	Touring	7	40.00	122	3500
Knox, 45	Touring	6	40.00	126	3700
Knox, 45	Touring	7	40.00	126	3800
Knox, 45	Limousine	7	40.00	126	4700
Knox, 45	Land.	7	40.00	126	4750
Knox, 46	Touring	6 & 7	45.96	134	4350
Knox, 46	Runabout	2	45.96	134	4350
Knox, 46	Limousine	7	45.96	134	5350
Knox, 46	Land.	7	45.96	134	5400
Knox, 46	Runabout	4	45.96	134	4350
Knox, 66	Touring	6 & 7	60.00	134	5000
Knox, 66	Runabout	2 & 4	60.00	134	4800
Knox, 66	Limousine	7	60.00	134	6400
Knox, 66	Land.	7	60.00	134	6400
Locomobile, L	Touring	4 & 5	32.40	120	3600
Locomobile, L	Roadster	2	32.40	120	3600
Locomobile, R	Touring	5	43.80	128	4300
Locomobile, R	Touring	4	43.80	128	4300
Locomobile, R	Roadster	2	43.80	128	4300
Locomobile, R	Limousine	7	43.80	128	5350
Locomobile, R	Berline	7	43.80	128	5500
Locomobile, R	Land.	7	43.80	128	5650
Locomobile, M	Touring	7	48.60	136	5000
Locomobile, M	Touring	5	48.60	136	5000
Locomobile, M	Roadster	2	48.60	136	5000
Locomobile, M	Limousine	7	48.60	136	6000
Locomobile, M	Land.	7	48.60	136	6100
Lozier, 77	Touring	5	31.60	127½	3250
Lozier, 77	Coupe	3	31.60	127½	3850
Lozier, 77	Roadster	3	31.60	127½	3250
Lozier, 77	Limousine	6	31.60	127½	4450
Lozier, 77	Limousine	5	31.60	127½	4450
Lozier, 72	Touring	7	51.60	131	5000
Lozier, 72	Limousine	7	51.60	131	6500
Lozier, 72	Touring	5	51.60	131	5000
Lozier, 72	Land.	7	51.60	131	6500
Lozier, 72	Roadster	2	51.60	131	5000
Marmon, 32	Touring	5	32.40	120	3000
Marmon, 32	Touring	7	32.40	120	3125

$3000 TO $7250 CLASS.

Name and Model	Body	Seats	S. A. E. H. P.	Wheel-base	Price
Marmon, 32	Touring	4	32.40	120	$3000
Marmon, 32	Limousine	7	32.40	120	4000
Marmon, 32	Land.	7	32.40	120	4100
Marmon, 32	Coupe	4	32.40	120	3700
Marmon, Six	Touring	7	48.60	145	5000
Marmon, Six	Touring	5	48.60	145	5000
Marmon, Six	Touring	4	48.60	145	5000
Marmon, Six	Roadster	2	48.60	145	5000
Marmon, Six	Limousine	7	48.60	145	6250
Marmon, Six	Berline	7	48.60	145	6450
Marmon, Six	Land.	7	48.60	145	6350
Matheson, C	Touring	7	48.60	135	4800
Matheson, C	Touring	5	48.60	135	4800
McFarlan, S	Coupe	2	38.40	124	3100
McFarlan, S	Coupe	4	38.40	124	3300
McFarlan, T	Coupe	2	38.40	124	3300
McFarlan, T	Coupe	4	38.40	124	3300
McFarlan, T	Limousine	7	38.40	124	3700
McFarlan, M	Limousine	7	38.40	124	4050
Midland, T-4	Sedan	5	32.40	121	3250
Morse, 34	Touring	5	34.25	127	4200
Morse, 34	Roadster	2	34.25	127	4200
Morse, 34	Limousine	5	34.25	127	5400
Morse, 34	Touring	4	34.25	127	4200
National, V	Touring	5	38.00	128	3300
National, V	Touring	4	38.00	128	3300
National, V	Touring	7	38.00	128	3400
National, V	Limousine	7	38.00	128	4800
National, V	Roadster	2	38.00	120	3150
Norwalk, A	Touring	4	38.40	136	3000
Norwalk, A	Touring	6	38.40	136	3100
Norwalk, B	Touring	4	43.80	144	3850
Norwalk, B	Touring	6	43.80	144	3750
Oldsmobile, 53	Roadster	2	40.90	135	3200
Oldsmobile, 53	Touring	4	40.90	135	3350
Oldsmobile, 53	Touring	5	40.90	135	4800
Oldsmobile, 53	Touring	7	40.90	135	5000
Oldsmobile, 53	Limousine	7	40.90	135	6500
Packard, 38	Runabout	3	38.40	115½	4050
Packard, 38	Coupe	3	38.40	115½	4500
Packard, 38	Coupe	5	38.40	115½	4900
Packard, 38	Touring	5	38.40	134	4150
Packard, 38	Limousine	7	38.40	134	5200
Packard, 38	Land.	7	38.40	134	5300
Packard, 38	Limousine	7	38.40	134	5400
Packard, 38	Phaeton	5	38.40	138	4150
Packard, 38	Phaeton	4	38.40	138	4150
Packard, 38	Brougham	5	38.40	138	5200
Packard, 48	Runabout	3	48.60	121½	4650
Packard, 48	Coupe	3	48.60	121½	5100
Packard, 48	Touring	7	48.60	139	4850
Packard, 48	Limousine	7	48.60	139	5850
Packard, 48	Land.	7	48.60	139	5950
Packard, 48	Limousine	7	48.60	139	6050
Packard, 48	Phaeton	5	48.60	139	4750
Packard, 48	Brougham	5	48.60	139	5800
Palmer-Singer, 64	Touring	7	57.00	138	3200
Palmer-Singer, 64	Touring	5	57.00	138	3000
Palmer-Singer, 64	Roadster	2	57.00	138	3000
Peerless, 29	Limousine	6	25.00	113	4200
Peerless, 29	Land.	6	25.60	113	4300
Peerless, 35	Touring	5	38.40	125	4300
Peerless, 35	Touring	4	38.40	125	4300
Peerless, 35	Roadster	3	38.40	125	4300
Peerless, 35	Limousine	7	38.40	125	5300
Peerless, 35	Land.	7	38.40	125	5400
Peerless, 35	Limousine	7	38.40	125	5500
Peerless, 35	Coupe	3	38.40	125	5000
Peerless, 36	Touring	7	48.60	137	5000
Peerless, 36	Touring	6	48.60	137	5000
Peerless, 36	Limousine	7	48.60	137	6000
Peerless, 36	Land.	7	48.60	137	6100
Peerless, 36	Limousine	7	48.60	137	6200
Peerless, 37	Touring	7	60.00	140	6000
Peerless, 37	Touring	6	60.00	140	6000
Peerless, 37	Limousine	7	60.00	140	7000
Peerless, 37	Land.	7	60.00	140	7100
Peerless, 37	Limousine	7	60.00	140	7200
Pierce-Arrow, 38C	Runabout	3	38.40	132	4300

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AMERICAN CARS CLASSIFIED BY MAKE.

$3000 TO $7250 CLASS.

Name and Model	Body	Seats	S. A. E. H. P.	Wheel-base	Price
Pierce-Arrow, 38C	Touring	4	38.40	132	$4300
Pierce-Arrow, 38C	Touring	5	38.40	132	4300
Pierce-Arrow, 38C	Brougham	7	38.40	132	5200
Pierce-Arrow, 38C	Land.	7	38.40	132	5200
Pierce-Arrow, 48D	Touring	7	48.60	134½	5000
Pierce-Arrow, 48D	Touring	7	48.60	134½	6100
Pierce-Arrow, 48D	Limousine	7	48.60	134½	6100
Pierce-Arrow, 48B	Runabout	3	48.60	142	4850
Pierce-Arrow, 48B	Touring	5	48.60	142	4850
Pierce-Arrow, 48B	Touring	7	48.60	142	5000
Pierce-Arrow, 48B	Limousine	7	48.60	142	6100
Pierce-Arrow, 48B	Land.	7	48.60	142	6100
Pierce-Arrow, 66A	Touring	5	60.00	147½	5850
Pierce-Arrow, 66A	Touring	7	60.00	147½	6000
Pierce-Arrow, 66A	Limousine	7	60.00	147½	7100
Pierce-Arrow, 66A	Land.	7	60.00	147½	7100
Pope-Hartford, 31	Limousine	5	30.25	118½	3250
Pope-Hartford, 33	Touring	5	36.10	124	3250
Pope-Hartford, 33	Touring	7	36.10	124	3500
Pope-Hartford, 33	Phaeton	5	36.10	124	3250
Pope-Hartford, 33	Roadster	2	36.10	124	3250
Pope-Hartford, 33	Limousine	7	36.10	124	4300
Pope-Hartford, 33	Land.	7	36.10	124	4300
Pope-Hartford, 33	Berline	7	36.10	124	4550
Pope-Hartford, 29	Touring	7	46.10	133	4250
Pope-Hartford, 29	Phaeton	5	46.10	133	4250
Pope-Hartford, 29	Roadster	2	46.10	133	4250
Pope-Hartford, 29	Limousine	7	46.10	133	5300
Pope-Hartford, 29	Land.	7	46.10	133	5300
Pope-Hartford, 29	Berline	7	46.10	133	5550
Premier, 6-40	Limousine	7	38.40	132	4250
Premier, 6-40	Coupe	3	38.40	132	3750
Premier, 6-60	Limousine	7	48.60	137	6000
Premier, 6-60	Limousine	7	48.60	137	5500
Premier, 6-60	Touring	7	48.60	137	4000
Premier, 6-60	Touring	5	48.60	137	4000
Premier, 6-60	Coupe	3	48.60	137	5000
Premier, 6-60	Roadster	2	48.60	137	4000
Reeves, Sexto	Touring	7	36.10	158	4500
Republic, E	Touring	7	43.80	132	3150
Schlosser	Optional	..	40.00	124	....
Selden, 48	Limousine	7	36.10	125	3750
S. G. V., A	Land.	7	22.50	116	3500
S. G. V., A	Land.	5	22.50	116	3500
S. G. V., A	Limousine	5	22.50	116	3500
S. G. V., A	Limousine	7	22.50	116	3500
S. G. V., D	Runabout	2	25.60	118	3000
S. G. V., D	Touring	5	25.60	118	3250
S. G. V., D	Touring	4	25.60	118	3250
S. G. V., D	Land.	5	25.60	118	4000
S. G. V., D	Land.	7	25.60	118	4000
S. G. V., D	Limousine	5	25.60	118	4000
S. G. V., D	Limousine	7	25.60	118	4000
Simplex, 127	Touring	5	38.00	127	5600
Simplex, 127	Touring	4	38.00	127	5500
Simplex, 137	Touring	7	38.00	137	5700
Simplex, 137	Limousine	5	38.00	137	6400
Simplex, 137	Limousine	4	38.00	137	6400
Simplex, 137	Land.	4	38.00	137	6400
Simplex, 137	Land.	5	38.00	137	6400
Simplex, 137	Limousine	7	38.00	137	6500
Simplex, 137	Land.	7	38.00	137	6500
Simplex, 137	Brougham	4	38.00	137	6500
Simplex, 129	Touring	5	53.00	129	6100
Simplex, 129	Touring	4	53.00	129	6000
Simplex, 139	Touring	7	53.00	139	6200
Spoerer, 40G	Touring	5	38.00	120	3000
Spoerer, 40G	Touring	7	38.00	120	3200
Spoerer, 40G	Runabout	2	38.00	120	3000
Stearns, 4	Roadster	3	28.90	116	3750
Stearns, 4	Touring	4	28.90	121	3750
Stearns, 4	Touring	5	28.90	121	3750
Stearns, 4	Limousine	5	28.90	121	5000
Stearns, 4	Land.	5	28.90	121	5100
Stearns, 4	Touring	7	28.90	127	3900
Stearns, 4	Limousine	5	28.90	127	5000
Stearns, 4	Land.	5	28.90	127	5100
Stearns, 6	Roadster	3	43.80	134	4850
Stearns, 6	Touring	4	43.80	134	4850
Stearns, 6	Touring	5	43.80	134	4850

$3000 TO $7250 CLASS.

Name and Model	Body	Seats	S. A. E. H. P.	Wheel-base	Price
Stearns, 6	Limousine	5	43.80	134	$6100
Stearns, 6	Land.	5	43.80	134	6200
Stearns, 6	Touring	7	43.80	140	5000
Stearns, 6	Limousine	5	43.80	140	6100
Stearns, 6	Land.	5	43.80	140	6200
Stevens-Duryea, C	Touring	5	46.10	131	4500
Stevens-Duryea, C	Roadster	2	46.10	131	4500
Stevens-Duryea, C	Phaeton	5	46.10	131	5000
Stevens-Duryea, C	Berline	5	46.10	131	5550
Stevens-Duryea, C	Coupe	2	46.10	131	5000
Stevens-Duryea, C	Limousine	7	46.10	131	5500
Stevens-Duryea, C	Berline	7	46.10	131	5700
Stevens-Duryea, C	Touring	7	46.10	138	4750
Stevens-Duryea, C	Phaeton	7	46.10	138	5250
Stevens-Duryea, C	Limousine	7	46.10	138	5750
Stevens-Duryea, C	Berline	7	46.10	138	5950
Stoddard-Dayton, 48	Limousine	7	36.10	122½	3900
Stoddard-Dayton, 13	Touring	7	48.60	133	5000
Stoddard-Dayton, 13	Limousine	7	48.60	133	6250
Stoddard-Dayton, 13	Roadster	2	48.60	133	4900
Winton, 17D	Touring	5	48.60	130	3000
Winton, 17D	Touring	4	48.60	130	3000
Winton, 17D	Touring	6	48.60	130	3250
Winton, 17D	Touring	7	48.60	130	3250
Winton, 17D	Limousine	7	48.60	130	4250
Winton, 17D	Limousine	7	48.60	130	4500
Winton, 17D	Land.	7	48.60	130	4500
Velie, 40	Limousine	5	32.40	118	3000
White, GRE	Coupe	3	22.50	110	3250
White, GEB	Touring	5	28.90	120	3300
White, GEB	Touring	7	28.90	120	3500
White, GEB	Roadster	2	28.90	120	3300
White, GEB	Coupe	3	28.90	120	4100
White, GEB	Limousine	7	28.90	120	5000
White, GF	Touring	7	43.80	132	5000
White, GF	Touring	5	43.80	132	5000
White, GF	Roadster	2	43.80	132	4800
White, GF	Limousine	7	43.80	132	6300

TAUNTON'S SECOND SHOW.

Small but Interesting Exhibit of Machines in Ninth Company Armory.

The second annual show of the dealers in Taunton, Mass., was held in the Ninth Company armory in that city, Feb. 19-22. The lack of space prevented a large showing of cars and only 24 machines were displayed. The color scheme was yellow and white. The following exhibitors were represented:

Carlow Auto Company, Buick; Robertson Motor Car Company, Cadillac; Central Garage, Regal; Perry Auto Company, Premier, Rambler, Ford; S. & M. Garage, Stevens-Duryea, Hudson; Peck & White, Stoddard-Dayton, White; Howard L. White, Overland, Pope-Hartford; Brownell & Burt, Studebaker; Arthur H. White, accessories.

W. S. Jewell, formerly district manager for the R-C-H Company of New York City, has been appointed sales manager for the Boston branch of the Kelly-Springfield Motor Truck Company, Springfield, O., maker of Kelly-Springfield trucks. P. S. Aultman will continue as manager. The Boston branch is located in the Shoe & Leather building, Cambridge.

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VISIT OF BRITISH ENGINEERS AND MAKERS.

ONE of the chief events of the year will be the joint visit of the Institution of Automobile Engineers and the Society of Motor Manufacturers and Traders of Great Britain to the United States. This visit has been arranged in response to the invitation extended by the Society of Automobile Engineers during its trip to England and the Continent in 1912. The British party will leave London, May 17, and is expected to arrive in New York, May 26. During the next two weeks the visitors will inspect a large number of automobile factories and those of allied industries, and otherwise enjoy themselves generally.

The Minnewaska of the Atlantic Transport Line has been selected as the official boat. Upon its arrival in New York two days will elapse before the actual programme of entertainment will begin. This time has been set apart in order to admit of any delay occasioned by the failure of the boat to maintain its schedule, and to permit the visitors to enjoy themselves as they see fit in New York. The official hotel will be the McAlpin.

Wednesday, May 28, the party will leave New York on a special train of compartment cars, going to Pittsburg, taking advantage of the daylight trip over the Allegheny mountains and around the famous Horseshoe curve. This train will be the official headquarters of the party throughout the entire trip, and will be sidetracked in each city for sleeping and living rooms. May 29 the party will inspect at least one of the large steel plants in Pittsburg, leaving in the evening for Indianapolis.

Memorial Day will be devoted to witnessing the 500-mile race on the Indianapolis speedway. The British committee also points out that this occasion will afford an excellent opportunity to observe the privately owned cars of thousands of Americans who will be present at the race. Saturday, May 31, it is planned to inspect the plants of the American, Cole, Henderson, Marion, Marmon, National, Stutz and Waverley companies.

Sunday morning the train will reach Detroit. Monday and Tuesday the visitors will inspect the Cadillac, Chalmers, Ford, Hudson and Packard factories, as well as the plant of the Timken-Detroit Axle Company. The evening of June 3 the Society of Automobile Engineers will tender a banquet to the members of the party, and late the following day the members of the three organizations will embark on the Detroit III for the annual midsummer meeting of the S. A. E. The British engineers will present papers and enter into the discussion following those read by the Americans. Three days will be spent on board the boat, during which time several points of interest about the Great Lakes will be visited.

June 7 the party will transfer at Detroit to the night boat for Cleveland, where the works of the Peerless, Stearns, White and Winton companies will be viewed. After one day in Cleveland another boat will be taken to Buffalo, for the inspection of the Pierce-Arrow plant and a visit to Niagara Falls. Those who wish may return to New York by train from this point, while the remainder of the party will go to Providence, R. I. June 11 will be spent in inspecting the plant of the Brown & Sharpe Manufacturing Company in Providence. The morning of the 12th will find the party at the Locomobile factory in Bridgeport, Conn., and the afternoon at one of the large carriage factories in New Haven. Friday, the 13th, the members will visit the Pope-Hartford plant in Hartford, and possibly the Knox factory in Springfield. That night the Hartford boat will take the visitors down the Connecticut river and along Long Island sound to New York.

The trip is expected to be of mutual benefit to the British and American manufacturers and engineers, through the opportunity afforded for general discussion and for a better understanding of the methods obtaining in each country. The committee in charge of the British party outlines the advantages to be gained as follows: "There is, of course, much in the condition of the two countries which necessitates fundamental difference in method, but Englishmen find, as a rule, quite as much to learn in America, as Americans do in Europe."

In the factory of the Fisk Rubber Company, Chicopee Falls, Mass., maker of Fisk tires, there is an inspector to every six tire makers. These inspectors are themselves past masters in the art of making tires and each shoe is inspected 10 times before the last ply of rubber is laid. On each casing there is the serial number. From this number can be traced the person who made the tire, the date on which it was made, date it was cured, as well as the number of the press it was cured in. In fact this serial number gives the whole history of any particular tire.

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COMING EVENTS.

March.

March 8-15—Pleasure car show, Boston, Mass.
March 10-15—Commercial car show, Des Moines, Ia.
March 12-15—Show, Ogdensburg, N. Y.
March 17-22—Commercial car show, Buffalo, N. Y.
March 17-22—Show, Norfolk, Va.
March 19-26—Commercial car show, Boston.
March 24-29—Show, Indianapolis, Ind.
March 29-April 5—Show, St. John, N. B.

April.

April 1- 6—Commercial car show, San Francisco, Cal.
April 5-19—Show, Pittsburg, Penn.

May.

May 5-8—Motor truck run, Washington, D. C.
May 30—500-mile race, Indianapolis, Ind.

June.

June 25-28—Non-stop run, Chicago-Boston.

July.

July 1—Manufacturers' tour, Indianapolis-San Francisco.
July 27-28—Road races, Tacoma, Wash.
July 12—Grand Prix race, Amiens, France.

November.

Nov. 24—Vanderbilt Cup race, Savannah, Ga.
Nov. 26—Grand Prize race, Savannah, Ga.

TO STANDARDIZE RIMS.

Special Meeting of S. A. E. Committee to Be Held in Cincinnati, March 12.

At the recent annual meeting of the Society of Automobile Engineers a committee was appointed to consider an improvement in the rim situation for pneumatic tires. Inasmuch as this committee is a sub-committee or division of the standards committee of the society, the matter of rim standardization will be included in its investigations. The committee will hold a meeting at Cleveland, O., March 12, for the purpose of organization and hearing the views of representatives of some 50 pneumatic tire, wheel rim, steel band and motorcycle manufacturing companies. The following are the members:

Henry Souther, consulting engineer, chairman; H. L. Barton, assistant director of production, General Motors Company; G. G. Behn, executive engineer, Hudson Motor Car Company; T. W. Guthrie, secretary, Standard Welding Company; F. H. Moyer, experimental engineer, Firestone Tire & Rubber Company; C. E. Reddig, engineer, Timken-Detroit Axle Company; W. C. State, mechanical engineer, Goodyear Tire & Rubber Company; J. G. Vincent, chief engineer, Packard Motor Car Company; C. B. Whittelsey, factory manager, United States Tire Company; C. B. Williams, treasurer, Mott Wheel Works.

BUICK AS MOTOR SLEIGH.

New Hampshire Man Successful in Involving Satisfactory Machine for Snow.

An accompanying illustration presents an interesting motor sleigh produced by Virgil D. White, West Ossipee, N. H. The main construction is a regulation Buick automobile, made by the Buick Motor Company, Flint, Mich., for which Mr. White is agent. The machine has



Buick Car Transformed into Motor Sleigh.

been run several hundred miles over deep snow on rough country roads.

The driving mechanism at the rear consists of two wheels on each side, bound by a five-inch endless chain. The two wheels at the extreme rear of the machine take the drive from the engine, while those immediately in front work as loose pulleys to hold the chain out and make a track for the driving members. These forward rear wheels are hung on an independent axle, which is suspended from the body by a very light spring, thus permitting them to ride over the snow. The two axles are held in position by means of adjustable radius rods, which makes it possible to tighten or loosen the chain.

The front construction, or sled, consists of a pair of iron tired wheels attached to runners, by means of two bolts for each. This permits the detachment of the runners in three or four minutes' time, when the car reaches bare ground.

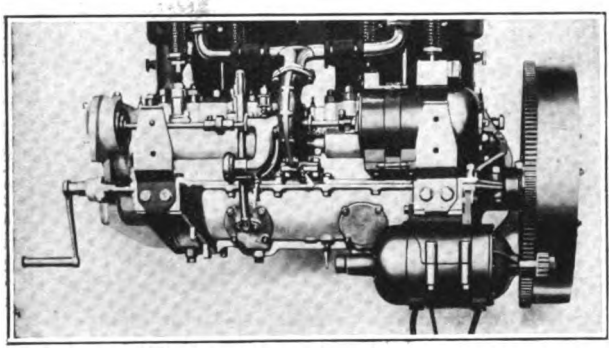
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PRINCIPLES OF MOTOR STARTING SYSTEMS.

Defining the Application and Operation of Various Methods of Cranking the Gasoline Engine, Including Electric, Air, Gas and Mechanical.

MOTOR starting and electric lighting systems were among the features of the New York and Chicago shows and interest in these conveniences will be greatly stimulated in the Boston exhibition of pleasure vehicles. The larger number of cars on display will afford the visitor even better opportunity to inspect the latest equipment, some of which is being shown for the first time.

For the benefit of those not familiar with electric motor starters it is explained that in many instances they are combined with the lighting system, and with some provision is made for ignition as well. While they may be divided into a number of classes, and these sub-divided, for convenience and to avoid confusing the reader, they will be dealt with in this discussion as separate or combined units. The electric lighting system is closely related to the motor starter in that the generator or dynamo serves a double purpose in charging the battery, since the current is drawn from the cells for starting as well as for lighting. It is apparent, therefore, that the storage battery is an important factor in starting, and the equipment must include means for maintaining it in a properly charged condition.



Showing Installation of Rushmore Motor Starter—Actuation of Driving Pinion Is by Spring and Magnetic Pull.

Classes Defined.

In the class designated as separate herein are placed those systems employing the starting motor as a separate unit and in which the storage battery is charged by a generator or dynamo. The combined unit system comprises a combination of the motor and generator, these being utilized alternately for starting and for charging respectively. The system having a motor and storage battery and without means for charging the cells upon the car is not practical, in that its service would be limited, and therefore will not be considered.

There is nothing mysterious about the electric motor utilized nor is the principle new. These methods are employed in many industries for varying purposes; require little if any attention other than lubrication, and seldom give trouble if used properly. Those used on the motor car are of the direct current type and are series wound, a class providing a powerful starting torque, essential to overcome the compression of the gasoline engine. With these motors the speed varies with load changes, increasing as the resistance diminishes and vice versa.

Starting Torque.

This resistance is the same as that experienced when cranking the engine by hand and varies according to the bore and stroke of the cylinders. It is an easy matter to crank a motor having 3.25-inch bore and four-inch stroke, but difficulty may be experienced in turning one with a 4.75-inch bore and six-inch stroke past the compression point. Because of these varying conditions the electric motors employed differ in size.

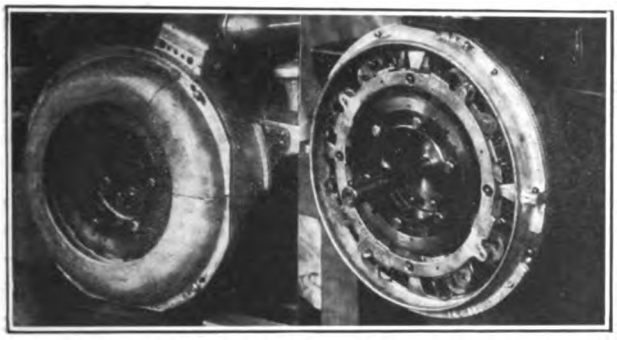
It is calculated that to crank an ordinary motor, one having a 4.5-inch bore and 5.5-inch stroke for example, takes about one pound torque at a one-foot radius to crank it at 60 revolutions a minute. Tests demonstrate that the minimum of power is required at from 40 to 60 revolutions a minute with a cold motor, and this applies to four as well as six-cylinder units. While the number of revolutions a minute the crankshaft of the gasoline engine is revolved is approximately 60, some designers utilize higher speed rotations, especially where the source of ignition is a magneto and an auxiliary is not fitted for starting. With this type of equipment the crankshaft is rotated at sufficiently high speed to insure efficiency from the magneto.

Current Consumption.

As the electric motor starter depends wholly upon the storage battery, it is evident that its size, characteristics and conditions are important factors. It should be capable of high voltage maintenance, as the torque of a starting motor is

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dependent to a great degree upon it, and have ability to maintain the output over a long period. Systems of the separate type employ a six-volt



U. S. L. Motor-Generator, a Combined Unit—Showing Casing Removed to Illustrate Components.

battery having at least 120 ampere-hours capacity and the momentary starting rate of these members, the LBA for example, varies from 250 to 450 amperes. A deviation is noted, however, in the Leece-Neville system, which is of the separate type, employing as it does a 12-volt battery. The makers of the Jesco and Wagner, combined units, utilize 12-volt batteries and the starting rates of these (LBA type) vary from 100 to 300. One Jesco combination system makes use of a 16-volt battery, the starting rate of which varies from 100 to 200. In the combined systems fitted to the White and Franklin cars the battery is an 18-volt member having the same rate as the 16-volt equipments.

This variation in voltage is accounted for by the difference in the systems; that is, the separate and combined units. The former is series wound, as previously explained, and the windings are coarser than those utilized with the generator. Where the unit is employed both as motor and generator it is evident that a different winding must be utilized when the machine is operating as a motor starter than as a generator. It is noticeable that the makers of combination systems are inclined to use higher voltages, explaining that sparking is thus avoided at the commutator. The advocates of the low voltage system claim that the six-volt is the standard current for lighting and that the utilization of high voltage necessitates the use of special lamps, operating the bulbs in series or dividing the battery. The latter plan is adopted with some equipments, a three-wire system being employed.

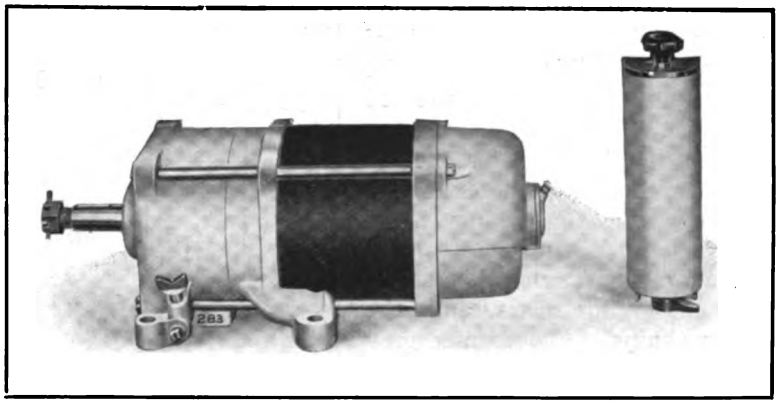
By the starting rate is meant the current drawn from the cells when resistance is first encountered by the motor (or the load), and up to and including that of overcoming the compression. This is further explained by comparing it with cranking the engine by hand. In pulling up on the starting crank the resistance gradually increases, the maximum being at the top of the compression stroke, after which it is an easy matter to spin the motor.

Although the drain upon the cells may appear to be considerable, it is only for a brief instant, and current required to spin the engine may be one-quarter, or less, of the maximum. From the above it is evident that the cells should be maintained in a properly charged condition and be given careful attention as pointed out in an article appearing elsewhere in this issue.

Efficiency of Motor Starter.

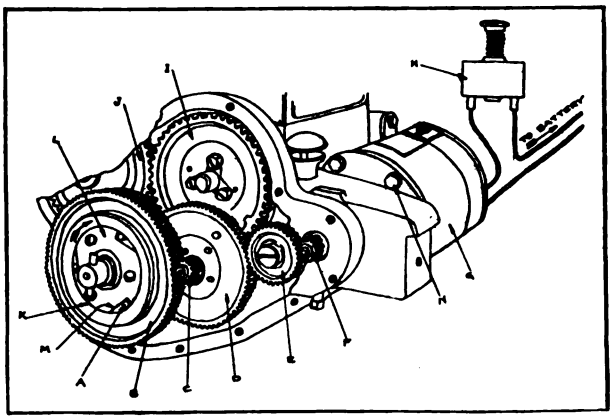
The length of time an electric motor starter will spin the engine depends upon the capacity and condition of the battery and will vary in practise. Makers claim that their systems will spin the crankshaft for so many minutes or hours, or start the engine a certain number of times. The figures differ considerably and although it is possible to assume theoretically how many starts a system will provide or what distance the car can be operated on the motor starter alone, for practical purposes it is sufficient to know that the system will spin the engine sufficiently long for it to operate under its own power. As the average size gasoline motor will take up its cycle in from two seconds when it is warm, to five seconds when it is cold, it is evident that if it fails to start after several trials the driver should search for the cause of trouble and not continue to drain the battery of current.

The gear ratio between the motor and the crankshaft naturally varies with the size of the engine to be cranked and may be from 15-1 in the case of small motor and 20-1 or more with



Jesco Motor-Generator Unit Constructed in Two Forms and Employing a 12 and 16-Volt Current for Energizing the Electric Motor.

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Showing the Application of the Electric Motor Starter on Abbott-Detroit—Note the Gear Reduction Between Electric Unit and Crankshaft.

the large. By proportionating the driving and driven members the crankshaft may be rotated at various speeds, 60 or 100 revolutions a minute for example.

The attaching of the motor starter is a simple matter for the designer of a new car, but on the other hand the application of the unit to standard models involves minor changes in the chassis for the transmission of the energy. Considerable ingenuity is displayed in the latter instance and the various applications are presented in the accompanying illustrations.

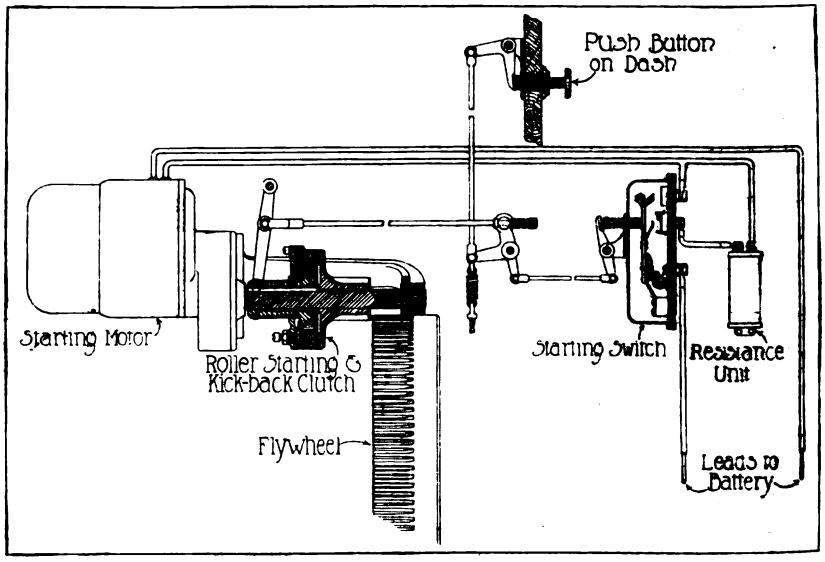
Statistics of the New York show, which may be taken as indicative of the situation, reveal the fact that utilizing the geared flywheel is the most popular with designers. Of 69 different cars 39 employed this form, while 13 actuated the crankshaft through the timing gears and 12 imparted the energy to the clutch or crankshaft. Five makers fitted the flywheel system, a combination motor and generator, which replaces the usual flywheel of the engine. This type may be defined as the direct connected starter.

The application of the energy of the electric motor is depicted in accompanying illustrations and it will be noted that there are two general classes, one employing gears and the other chains. The former may be sub-divided into two classes —one in which the driving pinion is thrown into mesh with the geared flywheel of the power plant, and the other in which constantly meshed gears are provided with over-running clutches or similar mechanical devices.

The Gray & Davis system applied to the Lenox car, the Leece-Neville employed on the Haynes, and the Rushmore are conventional illustrations of the type in which the gear is thrown into mesh. By referring to the installation of the Gray & Davis system on the Lenox it will be noted that the large gear driven by the small pinion on the armature shaft of the electric motor carries a shaft on which a small gear is movably mounted. This large gear is provided with an integral jaw clutch which meshes with a similar member on the driving gear. The actuating pedal carries a fork which engages with the movable gear and when the pedal is moved forward the jaw clutches are meshed, as is the gear with the flywheel. As the double contact is made the current from the storage battery is automatically cut in, actuating the armature shaft and train of gears. Resistance is inserted in the first step to make easy the meshing of gears. In the event of a back fire of the motor the jaw clutches are automatically disengaged; in fact, the principle involved is similar to that of the starting crank.

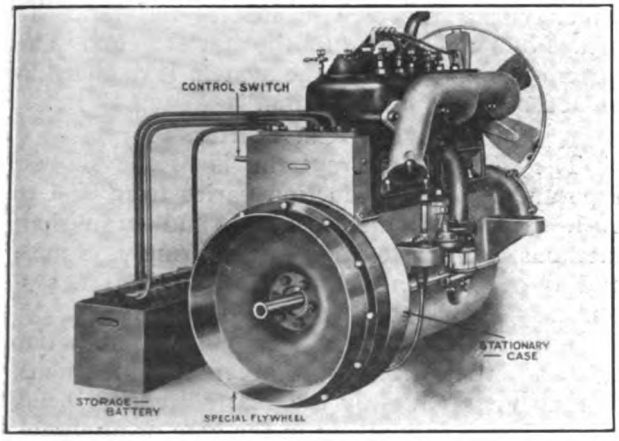
Constant Mesh Types.

The starter utilized on the Abbott-Detroit may be classed in the constant mesh division and employs an over-running clutch. The electric motor is secured to a flange on the crankcase of the gasoline engine and the armature shaft carries a small gear F, which drives through three gears, B, C and D, providing a reduction of 40-1, meaning that the gear F makes 40 revolutions to one of the gear, which is on the crankshaft.



Illustrating the General Plan of the Esterline Motor Starter and Components Utilized for Actuating Flywheel.

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The Apico Flywheel Type of Electric Combination System, Showing the Leads to the Battery.

The over-running clutch body L is pinned to the crankshaft and revolves with it when the motor is operating, rotating inside the gear B on the line K and in the direction indicated by the arrow. On the face of the clutch body L are three flat surfaces M cut at an angle to the inside of the gear B, on each of which is a hardened steel roller A, held against the flat surface of the clutch body and inside of the gear by a light spring. The roller travels with the clutch body and runs free against the side of the gear B when the engine is operating and when the starting gears are idle.

The electric motor is energized by depressing a pedal which is practically a switch, in that it closes the connection between the battery and the motor. Drive is through the train of gears to B as previously explained. As the clutch body is idle the rotation of the gear B rolls the three rollers until they are bound between the clutch body and gear, rotating the latter. As the engine speed increases, the gear B is rotating at about 70 revolutions a minute and the clutch body several times this, so that the contact of the rollers is broken. With this system all gears are enclosed and operate in a bath of lubricant.

White Combination System.

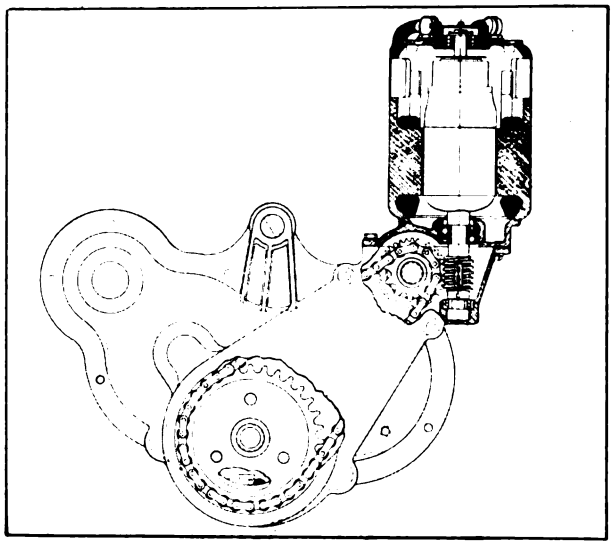
The White Company employs a combination unit on its product and as will be noted by an accompanying illustration the crankshaft of the engine is rotated through gears enclosed in the forward end of the crankcase and these gears are constantly meshed and operate in oil. The electrical unit operates as a generator for charging the battery, but is also utilized as a motor, in which capacity it serves when a switch is closed. This switch is manually operated.

A chain is employed in the electric motor starting system utilized on the Jackson car and the extension of the armature shaft carries a gear meshing with a similar member to which is secured the driving sprocket. Suitable reduction is secured through proportioning the size of the driving and driven members. The latter is secured to the crankshaft of the engine and has an over-running clutch operating in similar manner to that of the Abbott-Detroit system.

Rushmore System.

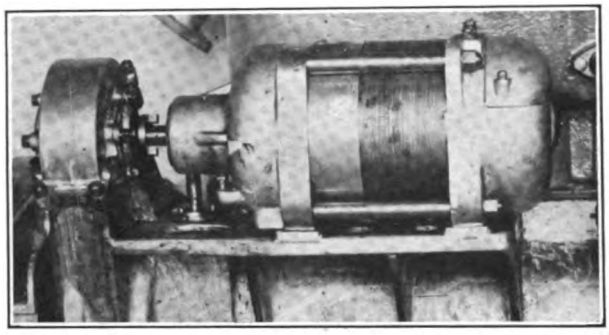
The Rushmore starting system differs from those previously described in the method of meshing with and releasing starting gear. The armature shaft is made longer purposely, the extension being 1.25 inches, and carries a coiled spring which normally moves the armature this distance out of its proper running position in line with the field magnet poles. The principle involved is that of magnetic action and this end pull is utilized to perform the gear shifting.

A series wound motor increases its speed as the load decreases, and with no load would assume high ratios and consume but little current. Without the pinion on the shaft, used with the Rushmore motor, the current would be so small that the field magnets would not hold the armature against the 16-pound push of the spring, but would fly back into a disengaged position when rotating at excessive high ratios. When the pinion is in place, and the motor starts to race, it is held back by the drag or resistance of the engine, and until the latter picks up, the current from the battery, passing through the series field, magnetizes the field so that the armature is held in a working position.



Energy Is Imparted to the Crankshaft of the Jackson Power Plant by Chain to a Sprocket Having an Over-Running Clutch Which Automatically Releases Connection with the Electrical Unit.

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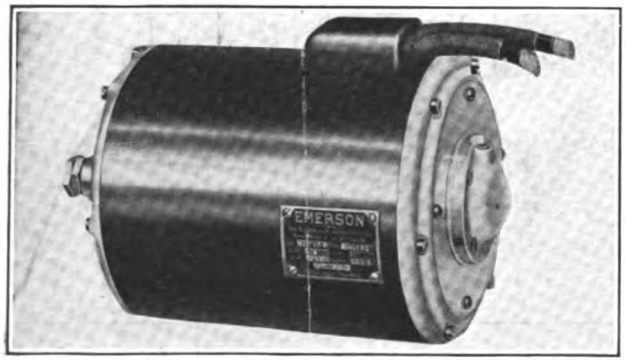


Illustrating the Location of the Aplco Combined Electric Motor-Generator on the Inter-State—The Crankshaft of the Engine Is Actuated by Chain.

Upon the engine beginning to operate it proceeds to drive the electric motor at a very high speed, the battery current falls to almost zero. and as the series field loses its magnetic pull upon the armature, the latter is instantly pushed into a disengaged position by the end spring, stopping when the circuit is broken. The starting switch has several contacts, the first being neutral, and the second causing the field coils alone to become energized. At the second contact the end pull is produced, causing the driving pinion to engage, and the third energizes the armature, which begins to rotate. A small series resistance is interposed between the armature and the third contact. The fourth cuts out all resistance.

Esterline Motor Starter.

The Esterline motor starter is of the separate, six-volt flywheel type and two gear ratios are employed between the motor and the flywheel. The gears are of the double herringbone Weiss type, the pinion of bronze and the gear of high carbon steel. When the speed of the engine exceeds a predetermined number of revolutions, a roller clutch comes into action, disconnecting the electric motor. The operation of the starter is by pressing a push button on the dash,



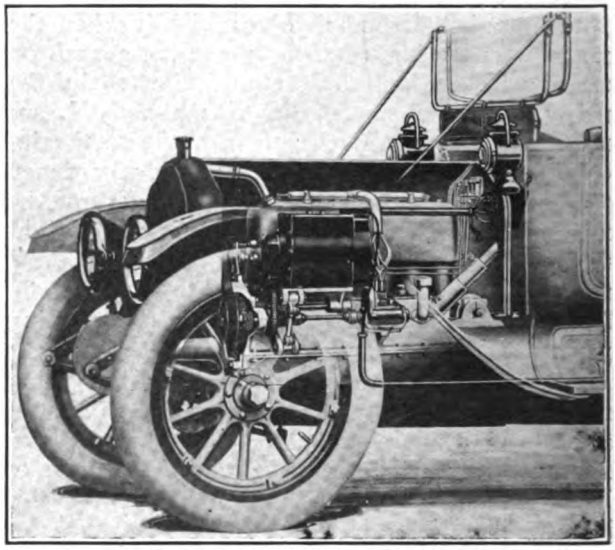
Emerson Motor Starter, an Exemplification of the Separate Unit Type.

which closes the switch, inserts resistance by means of a coil, and shifts the starter gears. The general arrangement of the system is depicted in an accompanying illustration.

Elyria-Dean Starter.

The Elyria-Dean system is of the six-volt type and the gear reduction varies from 35-1 to 20-1, and both the flywheel and crankshaft methods are employed. The gearing is simple and an over-running clutch is utilized. The system may be operated by pedal or lever.

The Leece-Neville starter is a combination unit and differs from those previously mentioned in that operation is by the gear shift lever being moved into a special slot in the gate or quadrant. It is of the flywheel type, a spring being employed to hold the driving pinion out of mesh, and reduction is secured through a train of gears, two being mounted upon a shaft on which the driving pinion slides. Upon moving the gear shift lever into the special slot, the current is cut in and the driving pinion is meshed with the flywheel.



Showing White Electric Motor Starter-Lighting Unit—Energy for Revolving Crankshaft Is by Chain and a Constant Mesh Gear.

A feature of the Jesco device is that the combined starting and lighting system is operated from a single controller, which is usually located between the front seats. One movement of the button connects the battery to the motor and another controls the groups of lights.

Driving by Chains.

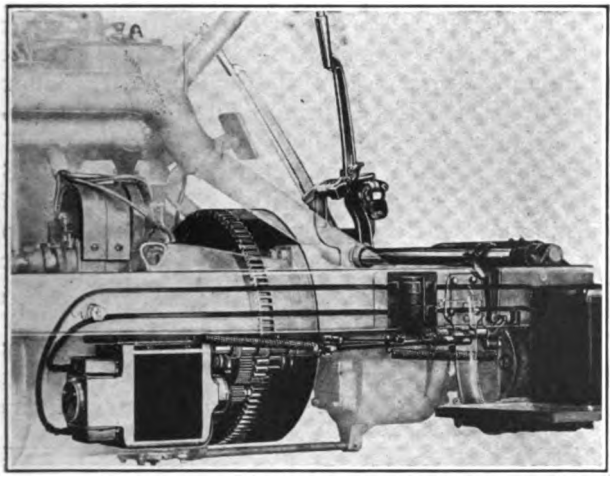
An instance of imparting energy to the crankshaft of the engine by chain is noted on the Inter-State, which is equipped with the Aplco starting and lighting system. The unit is mounted at the rear of the motor and drive is by a silent chain,

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.5-inch pitch and 1.5 inches wide. The chain is entirely enclosed, the driven sprocket being located on the crankshaft just in front of the flywheel, and operates in a bath of lubricant. The ratio of the sprockets provides a dynamo speed of 1.4-1, but when the unit is employed for starting, the ratio becomes about 50-1 through the internal gear, which is a feature of the Aplco system.

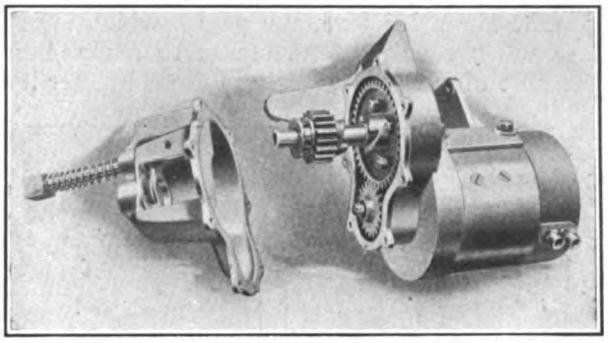
Three-Unit Types.

The Electro starter is of the three-unit type, in that the machine charges the battery, cranks the engine and includes means for ignition. It is a slow speed dynamo driven at crankshaft speed and the gear reduction for starting is automatic. The reduction gear is located in the front casing and the friction principle is employed to compensate for back fires and to prevent the engine



Leece-Neville Electric System Applied to the Haynes Car —The Driving Gear Is Thrown into Mesh with Flywheel by Moving Gear Shift Lever into Special Slot in Gate.

from driving the motor. A fibre faced cone is utilized and a cone ring, the latter having springs so adjusted as to create the proper contact when starting energy is applied. In the event of a back fire the cone simply slips, and the armature immediately carries it over again and contact is remade. It is held that the time of ignition is not affected as the distributor gear is keyed to the drive cone. The advance and retard of the spark is accomplished in the same manner as with the conventional type of magneto. A release operating on the reduction gear permits the engine to take its own speed of rotation after passing the compression point. It is pointed out by the maker that this is an advantage in a starting system in that a higher velocity through the carburetor is assured, producing the same conditions when the engine is rotated at high ratios.

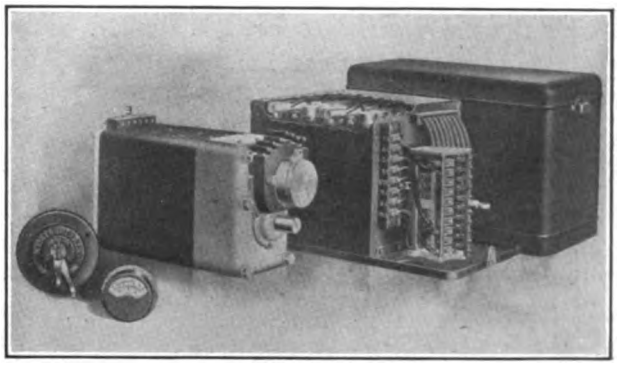


The Gray & Davis Electric Motor Starting Unit Utilized on the Lenox Car—Drive Is Through the Small Pinion with Engagement by Pedal.

The United States Light & Heating Company's system is purely a manufacturer's proposition and as shown in the accompanying illustrations replaces the flywheel of the engine. It is a combination unit, being employed for lighting and starting and the battery is so wired that when connected to the starter it gives a voltage of 24, but when the generator is charging the cells the voltage is 12. This is accomplished by the motor and generator having independent windings, although both are on the armature. When the push switch is operated, a 24-volt current is cut into the motor. Upon the engine starting the motor-generator becomes a shunt wound generator and charges the battery.

Air Systems.

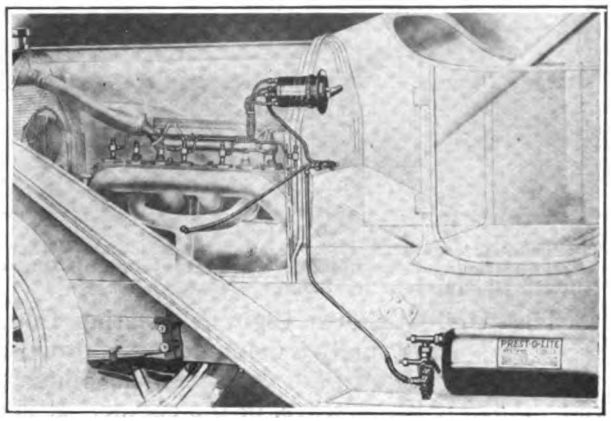
Although the electric motor starter predominates, a number of car manufacturers favor the use of compressed air, among whom is the Pierce-Arrow Motor Car Company. The system is a product of this concern and comprises an air pump on the forward end of the gearbox, a reservoir located horizontally above the muffler on the left hand side of the chassis and a distributor on the motor. The equipment also includes a control lever for bringing the pump into service and a pressure gauge is supplied as well.



A Form of Friction Clutch Is Utilized in the Electro Combined Lighting, Motor Starting and Ignition System to Compensate for Back Firing of the Engine.

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The air is led from the pump, which is utilized when required, and stored to a maximum pressure of 200 pounds. From the container it is



Showing the Components of the Prest-O-Starter, Utilizing Acetylene in Proper Proportions with Air, Ignited by a Spark.

led to the distributor, having a disc and a crescent shaped slot. The supply enters the cover of the distributor centrally and the delivery pipes are attached beneath the disc. As the disc rotates, its slot registers in the firing order of the different cylinders and the air is conveyed by tubing to special constructions having check valves in the cylinder heads.

The Kellogg air starting system comprises a four-cylinder pump driven from the power plant, and the distributor is practically integral with it. A clutch is contained within the distributor case for engaging the pump, and the operating member is conveniently located, being employed when filling of the tank is necessary. The distributor is timed at half engine speed, so that when the engine stops, it is in such position as to allow the air from the tank to flow to the proper cylinder. The admission of air for starting is accomplished by the pressing of a button on the dash. There are several air starters marketed, but the principle upon which they operate is similar.

Acetylene Starters.

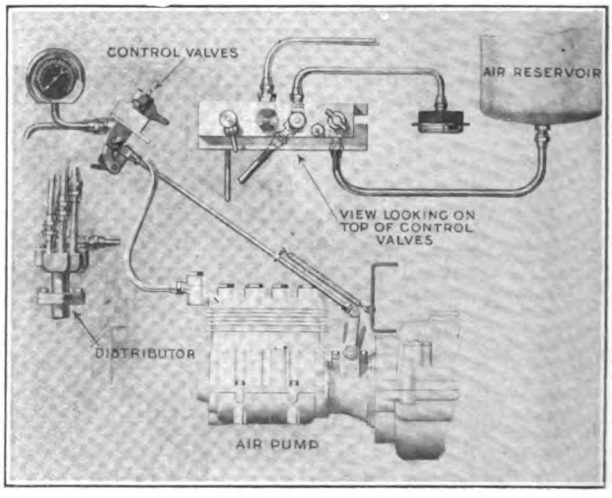
The acetylene or gas starters are legion and a description of one will serve to explain their operation, although the application differs. In the Prest-O-Starter gas is led through an automatic reducing valve to the starter pump on the dash, whence it is forced into the cylinders, where the mixture is ignited by a spark. The pump comprises a centre or feed cylinder, surrounded by a series of compression cylinders, equalling the number of motor cylinders. The operation involves a simple out and in stroke, by means of which the gas is drawn in, then forced by compression to the combustion chambers of the motor. A cut-out by-pass valve is included in the equipment and permits operation of the motor on acetylene if desired.

Under the head of mechanical starters may be included a large number of different devices such as those actuated by springs, levers, etc. But one of these was shown on a car at the New York show, if the memory of the writer serves him correctly. There are a number which are fitted to older models and in the main they are designed for motorists who desire a starting system at a moderate price.

Percy Lambert of London, made a new record on the Brooklands track last month when he drove Lord Shrewsbury's 25 horsepower Talbot car 103 miles and 1470 yards within an hour.

The Eisner-Lenk Company, 1074 Boylston street, Boston, Mass., well known in the New England district as distributor for the Eisemann magneto, also has been appointed New England distributor for the Planhard carburetor, made by the Planhard Manufacturing Company, 1784 Broadway, New York City. The Eisner-Lenk display at the Boston show will include a full line of Planhard carburetors, which will be demonstrated to all who make inquiry.

The Rapp Manufacturing Company, Toledo, O., maker of Viso spark plugs, will change its name to the Toledo Spark Plug Manufacturing



The Pierce-Arrow Employs Compressed Air, Which Is Led to a Distributor, Thence to the Cylinders in Proper Firing Order.

Company. Additional factory space will be secured, and it is planned to place a new plug, to be known as the Ohio, in the market in a short time.

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AUTOMOBILE CLUB HOLDS TESTS.

Eagleine No-Karbon Oil Wins Enviable Position as Result of Unsolicited Competition.

There is no better gauge of quality than the statements of those who have experience, and the Eagle Oil & Supply Company, 104 Broad street, Boston, Mass., maker of Eagleine No-Karbon automobile oil, maintains that the continued use of this lubricant has demonstrated beyond question the value of a light oil for motor vehicle engines. Eagleine No-Karbon oil is not a new product, but has been manufactured and sold for years with unvarying satisfaction, and before it was offered to the motorists it was carefully tested under all conditions of operation. It was learned from long experiment that it gave results that were surprisingly uniform, and this knowledge was the foundation of the selling campaign inaugurated.

Eagleine No-Karbon oil has been subjected to two competitive chemical tests by a chemist of undoubted ability at the instance of one of the leading automobile clubs of the country, and in these the tests were made by number and not by brand, so that there would be no possibility of any determination other than on the basis of quality. In the first Eagleine No-Karbon was placed as the best adapted for gas engine use, and in the second it was placed first in the "very light" group. These tests were not solicited by the manufacturer, but the first was at the instance of club members who were desirous of learning what would be the best lubricant for their own use. The second was made at the request of manufacturers who were not satisfied with the result of the first and asked that their products be again analyzed.

The specific gravity of Eagleine No-Karbon oil is 31.5 and its viscosity is such that it not only affords splendid lubrication, but the fire test is sufficiently high to insure lubricity and yet the oil is entirely consumed by the explosion, so that there are no unconsumed products remaining in the cylinder. In other words, the oil is of such a character that it is entirely consumed and there are no deposits in the cylinder which harden and are generally known by the name of carbon.

The company believes that those who use oil can realize from the experience of the users of Eagleine No-Karbon oil facts that will be of decided benefit to them, and it has consistently given to those who are desirous of this useful information the names of those who can be depended upon to state their honest convictions. Thousands of letters are at the office of the company, from motorists in all parts of the country, and those who wish can be referred to people living close at hand who can tell from their experience the practical value of Eagleine No-Karbon oil.

SELLING NATIONAL CARS.

Show Salesmen Instructed to Emphasize Machine as a Unit, Not Separate Features.

General Manager George M. Dickson of the National Motor Vehicle Company, Indianapolis, Ind., maker of National cars, feels that many visitors at the recent New York and Chicago shows made a mistake in paying too much attention to one or two features when examining the cars on display. In view of the much larger attendance expected at the Boston show he makes the following suggestion:

"It seems that today the main thing people think about in looking over the new models of cars is whether or not these have motor starters. No doubt that one feature is the most looked for. This is all well and good, but I fear that some people lay too much stress upon this one feature and often sacrifice the many other good features by concentrating their attention upon the starters.

"Of course, you may argue that the car that has the best motor starter will perhaps be consistent and be the best car throughout. Take our own case. We sincerely think our electric starter is the best, but I have told our representatives to explain the National as a whole car and not emphasize any one single feature.

"The way to buy a car is to buy it as a unit; buy it with the knowledge in view that it will operate as a whole car satisfactorily for your own needs and desires. I believe that a flexible motor, noiseless operation, comfortable body, ease of control, stability and reliability, the reputation of the builders and, in fact, a hundred other points are just as important as a starter—although I would demand a motor starter if I were a buyer."

Official report has just been made public that the pleasure car sales of the Baker Motor Vehicle Company, Cleveland, maker of Baker electrics, for January, 1913, showed a net increase of 211 per cent. over January, 1912.

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MANY SUCCESSFUL DEALER'S SHOWS.

Importance of the Local Display Fully Demonstrated by Attendance and Business Transacted---Two Buildings Necessary for Exhibition in Toronto.

EVERYTHING seems to indicate that this is to be the biggest year in the history of the automobile industry in Canada. Not only are a number of the smaller cities holding shows, following the example set on this side of the line, but the displays in all the important centres are much larger than heretofore, the attendance is much more encouraging and the business transacted is very promising. Montreal only recently experienced its second exhibition within two weeks, and now comes Toronto with two buildings, and both filled to overflowing.

The Toronto show has outgrown successively the St. Lawrence Market and the Armouries, and this year's exhibit was transferred to the Canadian National Exhibition grounds, where it occupied the Transportation and Dominion Government buildings. It was held Feb. 20-March 1, under the direction of the Toronto Automobile Trade Association, the auspices of the Ontario Motor League and the management of E. M. Wilcox.

The setting in each building was arranged to reflect the coming of spring. The general color scheme was white, green and yellow. Baskets of flowers and a liberal use of green foliage and rambler roses were found in the Transportation building, while the Government building was transformed by the utilization of blooming apple and cherry trees, in the branches of which were a number of singing birds.

About 300 cars were on display in the two buildings, these representing the products of Canada, the United States, Great Britain, Italy and France. Pleasure cars, commercial vehicles and accessories were represented as follows:

Pleasure Cars—Russell Motor Car Company, Russell-Knight; Brintnell Motor Car Company, National; Ford Motor Company of Canada, Ford; Automobile & Supply Company, Pierce-Arrow, Chalmers, Paige, Hupmobile; Hyslop Bros., Cadillac; Pope-Hartford Company of Canada, Pope-Hartford; Reo Sales Company, Reo; Standard Motors, Ltd., Mitchell; Matheson Automobile Company of Canada, Matheson, Auburn; Republic Motor Car Company, Republic, Oakland; Tudhope Motor Car Company, Tudhope; Virtue Motor Sales Company, R-C-H; Norwalk Motor Car Company, Norwalk; T. A. Crow, Alco; McLaughlin Motor Car Company, McLaughlin, Fiat; Studebaker Sales Agency, Studebaker; American Motor Sales Company, American; Provincial Motors, Ltd., Cole, Locomobile; J. I. Case Threshing Machine Company, Case; Bouvier & Son, Winton; Jackson Car Company of Ontario, Jackson; Wolseley Tool & Motor Car Company, Wolseley; Keeton Motors, Ltd., Keeton; Cutting Motor Sales Company, Cutting, Chevrolet, Empire, Little; Nyberg Auto Sales Company, Nyberg; Renolds Bros., Straker-Squire; Dominion Automobile Company, Peerless, Stevens-Duryea, Hudson; White Company, White; Canadian Simplex Auto Company, Sheffield-Simplex; Peck Electric, Ltd., Peck electric; Brockville-Atlas Auto Company, Brockville-Atlas; Maxwell-Stoddard Ontario Company, Stutz; Shaw Overland Sales Company, Overland; Universal Electric Economy Company, Buffalo electric; Stepney Motor Wheel Company of Canada, Humber; Tate Electrics, Ltd., Tate electric; Death & Watson, Rauch & Lang electric; Ross Motor Car Company, Regal; Kissel-Kar Sales Company, KisselKar; Gibson Electrics, Ltd., Ohio electric; Ontario Motor Car Company, Packard, Detroit electric; T. Eaton Company, Lozier.

Commercial Vehicles—Albion Motor Car Company of Canada, Albion; Canadian-Fairbanks-Morse Company, Mack; International Harvester Company of America, I. H. C.; Dominion Automobile Company, Autocar; White Company, White; Industrial Motor Trucks, Ltd., Commer; Shaw Overland Sales Company, Gramm; Tate Electrics, Ltd., Tate electric; KisselKar Sales Company, Kissel-Kar; Ontario Motor Car Company, Packard; Brantford Motor Truck Company, Brantford; Northern Motor Car Company, Northern.

Accessories—Auto Tire Company, S. F. Bowser & Co., Bosch Magneto Company, Canadian Oil Companies, Collett-Sumpson Fibre Tire Company, Canadian Consolidated Rubber Company, Cutten & Foster, Croftan Storage Battery Company, Essenkay Sales Company of Toronto, Goodyear Tire & Rubber Company of Canada, Gutta Percha & Rubber, Ltd.; Indian Refining Company, Imperial Oil Company, Independent Tire Company, Percy McBride, McCord Manufacturing Company, Marburg Bros., National Equipment Company, North British Rubber Company, Polock Manufacturing Company, Weed Chain Tire Grip Company, Zimmer Vacuum Machine Company, Zip Company.

TRI-CITY AUTOMOBILE SHOW.

Dealers in Three Cities Combine for Annual Event Held in Davenport, Ia.

The annual Tri-City automobile show in the Coliseum at Davenport, Ia., was held Feb. 18-22, the dealers in Davenport, Ia., Rock Island and Moline, Ill., uniting to make the event a splendid success. Every opportunity was afforded to bring the different models to the attention of the visitors, many of whom came from towns and cities other than those represented by the dealers. The list of exhibitors follows:

Automobiles—Buick Motor Company, Buick, Packard, Hudson; Iowa Auto & Tire Company, Cadillac; Yeggy-Don Sales Company, KisselKar, Knox, Woods electric; Overland Motor Car Company, Overland; Mason's Carriage Works, Pierce-Arrow, Chalmers, Baker electric; Trevor & Snider, Stearns-Knight, Cole, Chicago electric; H. W. Neuman Machine Company, Auburn; Scott County Mercantile Company, Maxwell, Abbott-Detroit, Paige; Inter-State Auto Company, Studebaker; A. J. Ostlund's Garage, Reo; Horst & Streiter Company, Moline; P. C. Peterson Company, Pope-Hartford; C. R. Parker, Case; Williams-McClean Garage Company, Haynes; H. E. Ross Electric Company, Ohio electric; Dennes-Kuttler Machine Company, Franklin; Glenn & Trevor, Great Western; Detroit Electric Car Company, Detroit electric.

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Motorcycles—Fred J. Barr, Flying Merkel; G. R. Meyers, Indian, Black Hawk.

Accessories—Universal Portland Cement Company, road building materials; Davenport Rubber Company, tires; Positive Tire Vulcanizing Company, tires.

BROOKLYN DISPLAY SUCCESSFUL.

Practically 55,000 People View Cars and Many Sales Are Recorded for Week.

Over 12,000 people witnessed the opening of the third annual show of the Brooklyn Motor Vehicle Dealers' Association in the 23rd Regiment armory, Brooklyn, N. Y., Feb. 22, and the attendance throughout the week was sufficient to bring the grand total to more than 55,000. As was freely predicted previous to the display, the proximity of Brooklyn to the big national show in New York proved no deterrent to the closing of sales. In all respects this third annual exhibition was remarkable for the number of new records created.

Bona fide retail sales were recorded during the first hour after the opening of the doors, the first to report a sale being the Pathfinder agency. This was followed closely by the Hupmobile. Several prospects were secured during this hour, and many of these were closed before the week was over. The attendance was by no means confined to Brooklyn, many people being present from all sections of Long Island, and some even from Manhattan. A full list of the exhibitors was presented in the last issue of The Automobile Journal.



Interior of the 23rd Regiment Armory, Brooklyn, N. Y., During the Progress of the Third Annual Brooklyn Dealer's Show.

MANY CONTRACTS AT ALBANY.

Dealers Considering Plan to Hold Separate Truck Show Another Year.

Everybody appears to be immensely satisfied with the results obtained during the recent show in Albany, N. Y. More than 15,000 people paid to see the display. The dealers report over 100 contracts signed and a large number of others in prospect. So much interest was manifested in the commercial vehicle section that the Albany Automobile Dealers' Association is considering the advisability of holding a two weeks' exhibition next year, the second week to be devoted entirely to motor trucks and their accessories. The event was under the management of Col. C. A. Simmons, and the following made display:

Pleasure Cars—Adirondack Motor Company, Overland; J. J. Aker, Regal, Mitchell; Alco Auto Sales Company, Alco; Albany Garage Company, Simplex, Peerless, White, Chalmers; Albany Rubber Tire Company, Selden; Boulevard Garage Company, Marmon; Buick Motor Company, Buick; Central Auto Company, Knox, Reo, Ford; Congress Auto Company, Nyberg; J. I. Case Threshing Machine Company, Case; Consalus Company, Marion, Premier, Abbott-Detroit; Dominant Motor Company, Packard; Henry Dumary, Jr., S. G. V.; Franklin Automobile Company, Franklin; Jas. N. Kemp Machine Works, Henderson, R-C-H, Metz; Michigan Motor Car Company, Michigan; Miles Garage, Warren; Moyer Auto Sales Company, Moyer; Northern Motor Car Company, Stutz, Apperson; Park Garage Company, KisselKar, National; Pioneer Motor Car Company, Paige; C. S. Ransom, Lozier; W. L. Schupp & Sons, Oldsmobile, Oakland, K-R-I-T; George H. Snyder, Stearns-Knight, Buffalo electric; Sterling Garage, Imperial; E. V. Stratton Company, Hudson, Flanders; Taylor Automobile Company, Locomobile; Troy Automobile Exchange, Pierce-Arrow; Troy Carriage Works, Speedwell, Rauch & Lang electric; C. F. Weeber Manufacturing Works, Haynes, Studebaker; W. M. Whitney & Co., Fiat, Cadillac; Wilbur Auto Sales Company, Cole; Wayne P. Zenk, Pullman.

Commercial Vehicles—Alco Auto Sales Company, Alco; Albany Garage Company, White, Stewart; Albany Rubber Tire Company, Selden; Central Auto Company, Knox, Reo, Adams; Dominant Motor Company, Packard; International Motor Company, Mack, Saurer; Park Garage Company, KisselKar; W. L. Schupp & Sons, Federal; Troy Automobile Exchange, Pierce-Arrow, Lippard-Stewart.

Motorcycles—Normanskill Motor Shop, R-S; Weeber Cycle Works, Indian, Thor.

Accessories—Albany Welding Shop, welding; Albany Vulcanizing Works, tires; Albany Spring Wheel Company, wheels; Albany Hardware & Iron Company, supplies; Austin & Co., insurance; Babbitt & Co., clothing; K. E. Bender, electric supplies; Central Vulcanizing

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Works, tires; Cox Brass Mfg. Co., brass goods and windshields; F. E. Colwell & Co., cameras; Dolan Company, clothing; Empire Essenkay Company, tire filler; John Fuhrman, clocks, etc.; James Goold Company, bodies and wheels; A. R. Justice Company, polishes; Jas. N. Kemp Machine Works, portable garages; Kingsbury-Leahy Company, body sundries; Kupke's Auto School; Chas. E. Miller, general line; Mohawk Welding Company, welding; Meyer Bros., ivory novelties; Post-Lester Company, general line; Rose & Kiernan, insurance; B. Snowden, motor; Standard Oil Company, lubricants; Steefel Bros., clothing; Troy Spring Works, springs; Chas. H. Turner Company, general line; E. Q. Williams, spark plugs.

NEW CARS AT PITTSBURG.

Third Annual Exposition Display Remarkable for Number of Lines Revealed.

The value of the national show as an exhibition at which to bring new products to the attention of the public appears to have been discounted by those who made display at the third annual dealer's show in the Exposition building, Pittsburg, Penn., under the management of Thomas I. Cochran, March 1-8. No less than five trucks and one pleasure car were shown here for the first time at any exhibition. These were the E. P. E. electric truck, Lange, Dart, Shelton and Curtis gasoline commercial vehicles and the Duquesne pleasure car.



Thomas I. Cochran, Manager, Pittsburg Automobile Show.

The interior of the building was completely transformed for the event, and the decorative scheme was thoroughly in keeping with the importance of the display. It must be remembered that Pittsburg is the business centre for a wide area, embracing western Pennsylvania, eastern Ohio and West Virginia, comprising a population which may roughly be estimated at 5,000,000. And it may be added that the report as to attendance is such as to indicate that the people in this territory contributed their full share toward the success of the venture.

Mr. Cochran has achieved an enviable reputation as a show manager, largely because of his success with previous automobile displays in Pittsburg. In the present exhibition he was assisted by the following committee of local dealers: President Elias Lange, Vice President W. M. Laird, Treasurer E. A. Williams, Secretary James D. White, C. C. Laughner, F. J. Curtis, Aaron Deroy, Alfred A. Buhl, J. M. McClarren. The list of exhibitors follows:

Pleasure Cars—Alco-Pittsburg Sales Company, Alco, Abbott-Detroit Company, Abbott-Detroit; Aupke Bros., Enger; Buhl Regal Car Company, Regal; Cole Motor Car Company, Cole; Aaron Deroy Motor Car Company, Studebaker; Duquesne Motor Car Company, Duquesne; Forbes Motor Car Company, Stutz, Henderson; General Auto Company, Knox; Kline-Kar Motor Company, Kline-Kar; Locomobile Company of America, Locomobile; Manchester Garage Company, Staver; Martin & Coulter, G. J. G.; Michigan Auto Company, Michigan; McKeesport & Clairton Transportation Company, Haynes; McCurdy-May Company, Pierce-Arrow; Neighbors Motor Car Company, Hupmobile; Ohio Motor Sales Company, Ohio; Penn Auto Company, Alpena; Pittsburg Motor Sales Company, Marathon; Pullman Auto Company, Pullman, Marion; Schacht Motor Car Company, Schacht; Williams-Hasley Motor Car Company, Mitchell, Empire.

Commercial Vehicles—Alco-Pittsburg Sales Company, Alco, Stewart; Cartney Bros., Indiana; Chicago Pneumatic Tool Company, Little Giant; Aaron Deroy Motor Car Company, B. F. Gramm, Bessemer; Elwell Parker Electric Company, E. P. E.; General Auto Company, Knox; International Harvester Company, I. H. C.; Lange Motor Car Company, Lange; Locomobile Company of America, Locomobile; Martin & Coulter, Dart, Shelton; McCurdy-May Company, Pierce-Arrow; Neighbors Motor Car Company, Hupmobile; Ohio Motor Sales Company, Ohio; Pittsburgh Machine Tool Company, Curtis; Schacht Motor Car Company, Schacht; Taylor Motor Car Company, Lippard-Stewart; Vulcan Service Motor Truck Company, Vulcan, Service; West Penn Auto Company, Kelly, Chase.

Accessories—Atlantic Refining Company, Air Tight Sheet & Tank Company, Automobile Accessories Company, W. H. Bradley, Jr., Buffalo Specialty Company, A. J. Dempsey, Doubleday Hill Company, Dyke Bros., S. C. Hamilton, Hipwell Manufacturing Company, Hoover & Hurst, Iron City Spring Company, Jackson Motor Supply Company, Keystone Motor Supply Company, Murray Manufacturing Company, McCreery & Co., Harry L. Neff, Clarence N. Peacock & Co., Pittsburg Auto Equipment Company, Pittsburg Rubber Company, Perfection Tube Sales Company, Joseph B. Roberts, Ruby Manufacturing Company, John I. Shaw, Tobin Whichway Signal Company, Union Top Manufacturing Company, Van Deman & Wainright, Joseph Woodwell Company, Williams & Co., Wayne Oil Tank & Pump Company.

THIRD ANNUAL IN ELMIRA.

Largest in Number of Exhibits, Attendance and Sales Yet Held in That City.

The third annual show under the auspices of the Elmira Automobile Club was held in the state armory, Elmira, N. Y., Feb. 24-March 1. It was the largest display, measured by number of exhibits, that the city has seen, and the attendance and business transacted was in like proportion. The event was held under the management of M. D. Marks, assisted by the following committee: M. R. Ellis, F. C. Ogden, F. M. Jones, A. W. LaFrance, G. W. Shoemaker and George Middleton. Those who made display were:

LaFrance Garage Company, Southern Tier Motor Company, Wolcott Motor Company, American-LaFrance Fire

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Engine Company, Genesee Motor Company, Elmira Ford Company, Charles W. Bishop Company, T. Wrayburn Keeton, John F. Rhodes, Hudson Motor Company, J. Bruce Bishop, A. J. Strong, D. S. Andrus & Co., Fenton E. Weaver, Geneva Automobile Company, Gaines Automobile Company, Elmira Arms Company, F. E. Tomlinson, W. B. Hallock & Bro., P. H. Rattan, George Ells, Sheehan, Dean & Co., Marsden Gerity, Atterbury Truck Company, L. L. Laskaris, Myer Bros., Hoover Vacuum Cleaning Company.

SALES IN NEW ORLEANS.

Increased Number of Exhibitors Enjoyed Good Business at Third Annual Show.

Col. T. C. Campbell, manager of the third annual show of the automobile dealers in New Orleans, La., which was held in Washington Artillery hall, Feb. 19-24, is authority for the statement that the keenest rivalry was experienced among the various exhibitors. In many respects it was the largest display of this character that has been held in that section, the list of cars shown being much larger than heretofore. The interior of the hall was decorated in true southern style, smilax and palms playing a prominent part in the general scheme. The exhibitors were:

Automobiles—White Company, White; Oakland Motor Company, Oakland; Russell Automobile Company, Ford; Joseph Schwartz & Co., Buick, Premier, Adams truck; Abbott Automobile Company, Packard, Baker electric; H. A. Testard, Hudson; Lyons-Barton Motor Car Company, Pierce-Arrow; Fairchild Auto Company, Peerless, Reo; S. D. Hogue, Overland; G. D. Revol, Cadillac; Auto & Garage Company, Marion; J. A. Landry Motor Car Company, Michigan; Demack Motor Car Company, Haynes, Knox; M. Zilbermann, K-R-I-T; Cooke Auto & Taxi Company, Locomobile; Gulf Motor Company, Rambler, Winton; Woodward, Wright & Co., Mack and Saurer trucks; Portable Sawmill Company, Case; Thompson & Edwards, Pullman, Little; Hood Motor Company, American, Regal; Louisiana Motor Car Company, Stearns-Knight; T. Sidney Weber, Paige, Garford, Halladay; Chalmers Motor Company, Chalmers; R-C-H Sales Company, R-C-H; Automobile Maintenance Company, Locomobile, Cartercar, Mitchell.

Sundries—Chas. E. Miller, accessories; Electric Appliance Company, electrical supplies; Southern Hardware & Woodstock Company, supplies; Shuler Rubber & Supply Company, tires; Standard Oil Company, lubricants; M. Zilbermann, Indian motorcycles.

ATTENDANCE IN NEW HAVEN.

Business of the Week Such as to Indicate That Interest Is Well Maintained.

With increased attendance and a decidedly larger number of sales, the third annual dealer's show in the Second Regiment armory, New Haven, Conn., came to a close March 1. The event was under the management of William Lindsley. Yellow and white bunting and hundreds of electric lights combined with lattice work in transforming the interior of the building for the occasion. The exhibitors of cars follow:

George B. Wuestefeld, Pierce-Arrow; Ray L. Bishop, Hupmobile; N. L. Biever, Maxwell, Commerce truck; Russell Howard, KisselKar, Metz; M. J. Gibbud, Nyberg; C. O. Rischert, Haynes; H. M. Buzzard, Ford; Cowles Tolman, Franklin, R-C-H; N. B. Whitfield, Overland, Apperson; Charles Lee, Detroit electric; Wilbut A. Maynard, Packard; David Currie, Schacht.

BIG SHOW IN OMAHA.

Dealers and Manufacturers Unite in Important Display in Nebraska's Capital.

In past years the Omaha Automobile Show Association has been content to use just enough decorations to relieve the barren appearance of the Auditorium, where the annual show has been held, but this year the interior of the building was treated in an elaborate manner. The prevailing color scheme was green, although streamers and bunting reflected the colors of the association and served to aid in carrying out the general plan. Thousands of electric lights also were used with splendid effect.



Clark G. Powell, Manager, Omaha Automobile Show.

The show opened Feb. 24 and continued throughout the week. General Manager C. G. Powell spent some little time in Chicago during the recent national exhibition in that city and as a result manufacturers assisted local dealers by sending several of the machines seen there for presentation in Omaha. The business transacted was quite in keeping with that of former years. The list of exhibitors follows:

Apperson Jack Rabbit Auto Company, Bradley, Merriam & Smith, Cadillac Company of Omaha, Cartercar Company, Cole Motor Company, John Deere Plow Company, Doty & Hathaway, Droge Auto Company, Drummond Motor Company, Electric Garage Company, Ford Motor Company, Frederickson Auto Company, Freeland Auto Company, Houser & Howes, W. L. Huffman Auto Company, Inter-State Automobile Company, Independent Auto Sales Company, Johnson-Danforth Company, Lininger Implement Company, Marion Auto Company, Michigan Auto Company, Andrew Murphy & Sons, Mitchell Motor Company, Moline Auto Company, Nebraska-Buick Auto Company, T. G. Northwell Company, Omaha Auburn Auto Company, Orr Motor Sales Company, Paige Company of Nebraska, Pioneer Implement Company, Rambler

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Motor Company, Jack Sharp, Guy L. Smith, Studebaker Corporation, Traynor Auto Company, Van Brunt Auto Company, Wallace Auto Company, Western Auto Sales & Manufacturing Company, E. R. Wilson Auto Company, Anderson Coupling & Fire Supply Company, International Harvester Company, Nebraska Cycle Company, Omaha Bicycle Company, Powell Supply Company, R-S Motorcycle Company, Victor H. Roose, Baum Iron Company, Omaha Rubber Company, E. W. Reynolds Manufacturing Company, Arthur Stors Auto Supply Company, Western Auto Supply Company.

The following vehicles were represented:

Pleasure Cars—Abbott-Detroit, Alco, Apperson, Auburn, Baker electric, Buick, Cadillac, Cartercar, Case, Chalmers, Chevrolet, Cole, Detroit electric, Detroiter, Empire, Ford, Franklin, Firestone-Columbus, Glide, Great Western, Haynes, Hudson, Hupmobile, Hupp-Yeats electric, Imperial, Inter-State, Jackson, Lexington, Little, Lozier, Lambert, Locomobile, Marion, Marmon, Michigan, Mitchell, Moline, Mason, Midland, National, Oakland, Ohio electric, Overland, Packard, Peerless, Pierce-Arrow, Pope-Hartford, Paige, R-C-H, Rambler, Rauch & Lang electric, Regal, Reo, Stearns-Knight, Stevens-Duryea, Studebaker, Standard electric, Velie, Woods electric.

Commercial Vehicles—Alco, Avery, Buick, Chase, Commerce, Detroit electric, G. M. C., G. V. electric, Hupmobile, International, Kelly-Springfield, Mason, Packard, Reo, Studebaker, Velie.

Motorcycles—Excelsior, Harley-Davidson, Henderson, Indian, Merkel, Pierce, R-S, Thor, Yale.

PORTLAND'S SECOND SHOW.

Eighth Annual Event Under Management of F. M. Prescott Follows Dealers' Display.

Portland, Me., is one of the cities to hold two automobile displays this year. The first was under the auspices of the Portland Automobile Dealers' Association, while the second was the eighth annual event under the management of F. M. Prescott. Both were held in the new City Hall auditorium, the latter during the week of Feb. 18-25.

The decorations were simple and attractive. About the walls, a lattice work covered with roses and greenery served as a screen, while the same effect was carried out through the main portion of the structure. The attendance was quite as large as during the first show and the amount of business transacted was of similar proportions. The list of exhibitors follows:

Automobiles—Abbott-Detroit Motor Car Company, Abbott-Detroit; Apperson Auto Company, Apperson; Metz & Paterson Garage, Metz, Paterson; Eastern Sales Company, Haynes, White; J. H. McDonald, Overland, Garford; Bath Garage Company, Cutting; O. F. Morris, Jackson; Fred Morse, R-C-H; John Lewis, Hupmobile; George E. Morrison Auto Company, Chase truck; Nelke & Partridge, Winton; Sanborn Motor Company, Stutz; Michigan Motor Company of Portland, Michigan; Regal Motor Car Company, Regal; Henderson Motor Company, Henderson; Imperial Motor Car Company, Imperial; Marion Motor Car Company, Marion, Great Western, Brown truck; Maine Power Truck Company, Stewart truck; J. E. Stephens, Reo; Guy W. Lawrence, Lozier.

Sundries—H. R. Sutton, Thirty-Five Per Cent. Automobile Supply Company, Converse Rubber Company, York & Boothby, Larrabee Electric Company, L. W. Cleveland Company, James Bailey Company, Yeuell Manufacturing Company, Wayne Oil Tank & Pump Company, O. P. Peterson, J. D. Ross, Herist & Towle Company, Cogum Tire Filler, Underwood Springs Corporation.

TOPEKA DEALERS SUCCESSFUL.

They Hold Their First Annual Show Under Circumstances Indicating Continuation.

The Topeka Motor Car Dealers' Association held its first annual show in the City Auditorium, Topeka, Kan., Feb. 24-March 1, under the management of J. S. Warner and W. H. Imes, president and secretary, respectively. The results, particularly in a business way, were such as to indicate that the event will become a regular feature in the activities of the organization. The exhibitors were confined to the dealers located in Topeka and included the following:

Overland Company, Capital Auto & Supply Company, J. A. R. Motor Car Company, West Motor Car Company, Nicholas Auto Company, Imes-Clark Motor Car Company, Stevens & Sons, Hupmobile Motor Company, Cole Motor Company, J. F. Billings Auto Company, J. R. Johnson Motor Company, E. G. Kinley, Seery & Morton, Jesse, Kirkpatrick & Kirkpatrick, J. C. Harding Motor Cycle Company, Excelsior Motor Cycle Company, Central Cycle Company, Shawnee Motor Cycle Company.

The following cars were displayed:

Jackson, Rambler, Auburn, Studebaker, Glide, Hudson, Chalmers, Paige, Detroit electric, Buick, Inter-State, Mitchell, Overland, Velie, Maxwell, Oakland, Cadillac, Stafford, Stoddard-Dayton, Cole, Ford, I. H. C., Hupmobile, Reo, Marion.

TEN DAYS IN CINCINNATI.

National Circuit Show of Pleasure Vehicles to Be Followed by Motor Truck Display.

One of the 10 cities selected by the National Association of Automobile Manufacturers for the national circuit of 1913, Cincinnati, O., had been looking forward with pleasant anticipation to the annual display of the Cincinnati Automobile Dealers' Association, which opened in Music hall, Feb. 24. The show covered a period of 10 days, the exhibition of pleasure vehicles being followed by a special event for commercial cars. There were 52 exhibitors for the first week and 16 for the motor truck section, as follows:

Pleasure Cars—Leyman-Buick Company, Buick; Kruse Motor Car Company, Marmon; Cincinnati Automobile Company, Pope-Hartford; Hanauer Automobile Company, Pierce-Arrow; Citizens' Motor Car Company, Packard; Welbon Motor Car Company, Hudson, R-C-H; Herschede Motor Car Company, Rauch & Lang electric; Charles Behlen's Sons, Locomobile, Detroit electric; Kentucky Motor Car Company, Oakland; Imperial Motor Car Company, Stearns-Knight, Cole, Baker electric; Fischer Auto & Service Company, Fiat, Chalmers, Speedwell; Jungclas Auto Company, Overland; Ratterman Motor Car Company, K-R-I-T; Progressive Garage, Pathfinder; Schacht Motor Car Company, Schacht; Charles Schlear Motor Car Company, Hupmobile, Apperson; Ford Motor Car Company, Ford; Towle Cadillac Company, Cadillac; George C. Miller's Sons, Stevens-Duryea; Payne Motor Car Company, Paige, Herreshoff; Franklin Automobile Company, Franklin; Helman Motor Car Company, Haynes, Regal; Herold Motor Car Company, Premier; Peters & Kleding,

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Alco; Commercial Motor Sales Company, Michigan, Empire; White Motor Car Company, White; J. Ostrander, Peerless; Crescent Motor Car Company, Ohio; H. E. Langdon, McFarlan; L. C. Denison, Winton, Abbott-Detroit; Rose Hill Garage, Mitchell, Ohio electric; Model Garage, Nyberg; H. J. Groesbeck, Chadwick; Eddy Auto Company, Case, Dorris; Rambler Motor Car Company, Rambler; Western Motor Car Company, Havers, Lozier; Hupp-Yeats Electric Car Company, Hupp-Yeats electric.

Commercial Vehicles—Kruse Motor Car Company, United States; Cincinnati Automobile Company, Pope-Hartford; Hanauer Automobile Company, Pierce-Arrow; Citizens' Motor Car Company, Packard; Charles Behlen's Sons, Detroit electric; Schacht Motor Car Company, Schacht; Herold Motor Car Company, Reo; Peters & Kieding, Alco; Commercial Motor Sales Company, Lippard-Stewart, Smith-Milwaukee; White Motor Car Company, White; J. Ostrander, Peerless; Armleder & Co., Armleder, International; Miller, Duhrul & Peters, Avery.

Sundries—Moore Oil Company, oils and greases; Paragon Refining Company, lubricants and tanks; Aull-Sides-Clean Company, polishes; Indian Refining Company, Havoline oils; Ideal Steel Wheel Company, wheels; Tire Interlining Company, tire linings and treads; Bumiller-Remelin Company, Indian motorcycles; E. M. Henderson, shock absorber; Ferd Stenger, motorcycles; Miami Vulcanizing & Rubber Company, tire repairs and vulcanizing; H. W. Johns-Manville Company, brake linings; Standard Oil Company, oils and greases.

AN ATTRACTIVE SETTING.

Dealers in Paterson, N. J., Hold Their Second Show in Southern California Garden.

When the big crowd of visitors reached the Fifth Regiment armory in Paterson, N. J., at the opening of the second annual show of the Paterson Automobile Trade Association, Feb. 25, they were confronted with one of the most beautiful settings that has been attempted in the East, the interior of the building having been transformed into a southern California garden. According to those in charge of the display two new records were established, one in attendance and the other in the number of sales.

The event was under the direction of the following special committees: General, President E. A. Browne, Vice President Thomas Hughes, Secretary Harry McGinley, Treasurer G. M. Dorwort; music, Edward Dunn, Robert Bates; floor and space, Thomas Hughes, E. A. Cooper, Edward Dunn; printing, Harry McGinley, Vernon Ettinger, Charles Feagles; decorations, G. M. Dorwort, Harry McGinley, M. Weinstein.

Among the machines shown was the National, with which Joseph Dawson won the international sweepstakes race on the Indianapolis speedway last Memorial Day. The list of exhibitors:

Automobiles—Cunningham Bros., Havers; Paterson Garage Company, Hupmobile; E. A. Browne Company, National, Henderson, Paige, Cadillac; Oldsmobile Company of New York, Oldsmobile; Sheely Motor Company, Moon; H. Lund Smith, Pullman; Edward K. Hunt, Stewart truck; Vernon Ettinger, Michigan; W. H. May, Empire; H. L. Merrick, Detroiter; Silk City Garage, Metz; Ford Auto Company, Ford, Cole; City Hall Garage, Marion, American; Centre Garage Company, Overland; Hughes Garage Company, Franklin, Alco, Buick; Auto Shop Company, Stevens-Duryea; E. A. Peterson, Studebaker; Standard Auto Company, Fiat, Nyberg; Oakland Motor Company, Michigan, Oakland; N. Finch, Lozier; Paterson Vehicle Company, Chalmers; Passaic Auto Company, Premier, Reo; Foly Motor Car Company, Hudson; Chicago Pneumatic Tool Company, Little Giant truck; W. R. Schoonmaker, Stutz; J. Ackerman, Moyer, Brockway truck; Bridge Garage Company, Abbott-Detroit.

Sundries—James Madden, insurance; H. Lund Smith, supplies; John P. Dean, fire extinguishers; Myer Bros., novelties; Standard Oil Company, lubricants; Taylor Manufacturing Company, garages; Fred D. Harrison, polishes; Proskey's Real Estate Agency, insurance; J. Chester Messenger, accessories; A. G. Arthur, tires; National Rim Company, rims; Coffin Rubber Company, tires; North Jersey Automobile Club.

MILLER'S PARCEL POST.

Results from Original Announcement Warrant Establishment of Separate Departments.

"My announcement of delivering automobile supplies by parcel post, free of postal charge, to any city or residence, or on any rural route in the United States," says Chas. E. Miller, 97-103 Reade street, New York City, who conducts the largest automobile supply house in America with branches in Brooklyn, Detroit, Springfield, Philadelphia, Buffalo, New Orleans, Boston, Albany, Newark, N. J.; Hartford, Conn., and Atlanta, Ga., "has created such an interest and has resulted in such a large number of orders that I have organized a special department for my parcel post business. My idea in establishing this department is to increase our trade with people who live at a great distance from New York and who want to purchase first class goods at New York prices.

"Hence, all they have to do is to write to us for quotations on anything in our catalogue and we will quote a price delivered in the city from which the inquiry comes. Our catalogue, of course, is mailed free on request. By motoring supplies I mean not only equipment for motor cars, but for motorcycles, motor boats and aeroplanes. We use the phrase 'Pioneer Jobber,' because our business was established in 1896 and naturally we have added to it with the growth of the motor industry and its various uses."

The Invader Oil Company, New York City, the Boston branch of which is located at 284 Columbus avenue, will occupy spaces 409 and 410 at the Boston show, where will be exhibited a full line of Invader oils and greases, including the I-O-C gear oil, which is claimed to be the only oil ever manufactured especially and exclusively for automobile transmission gears. The display will show the oils themselves and the trade marked cans and packages in which they are sold.

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MAKING DISTRIBUTOR TERMINALS.

The breaking of distributor terminals is not uncommon as these members are constructed of a hard insulating material which is broken easily. It is often difficult to secure the proper size terminal to replace the damaged member, it depending upon the make of magneto, etc.

In rewiring the car a workman spoiled one of these terminals and being unable to secure one from the local supply house manufactured one from a piece of fibre and a cotter pin. A piece of one-inch square fibre was chucked in a four-jaw lathe chuck and turned down to the outside diameter of the old connection.

After calipering the new cable a hole was drilled about two-thirds the length in the fibre and of slightly less diameter than the wire. A cotter pin was next fitted to the distributor plate of the magneto and a hole drilled in the other end of the fibre block to take the pin. The cable was next stripped and the exposed wire passed through the eye of the cotter pin and soldered. By twisting the cable into the large opening the pin was slipped through the small aperture and the wire held securely. The repair pleased the owner of the car so well that a new terminal was not ordered.

SOLDERING ALUMINUM.

In soldering aluminum difficulty is encountered in getting beneath the slight film of oxide which forms over the surface of the metal and which is caused by exposure to the air. The oxide is the same color as the metal and cannot be distinguished easily. The object sought is to get underneath this oxide while the surface is covered with the molten solder. Remove all dirt and grease with benzine, apply the solder with a copper bit, and when the molten solder is covering the surface of the metal, scratch through it with a steel wire scratch brush. This will break up the oxide underneath the solder, which containing its own flux, takes up the oxide and enables the surface of the aluminum to be tinned properly.

HARDENING LATHE CENTRES.

In hardening lathe centres the point of centre should be heated to a bright red, then cooled in clean, cold water. After it becomes cold it should be withdrawn and the dirt removed so that the color may be noted. One maker of machinery recommends that centres be drawn to a light straw color. Care should be taken not to heat the centre very far back, as it is liable to become sprung.

A PATTERN HINT.

All metal patterns should be thoroughly cleaned with a stiff brush, then coated with a brush having plenty of beeswax in it and dipped in powdered plumbago. Brush the pattern well and it will draw much better and a smoother casting will be the result.

IMPROPER USE OF REAMERS.

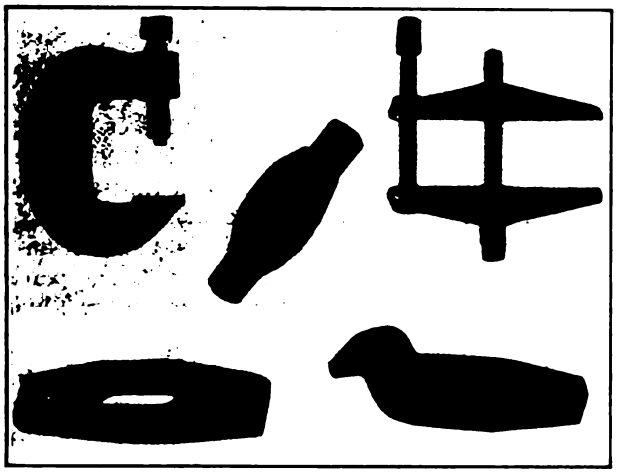
A reamer should never be employed to ream out a pipe of any kind. The scale inside the tubing caused by the flux used in welding or brazing is as hard as glass, and no reamer can be made hard enough to cut it.

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GARAGE AND REPAIR SHOP EQUIPMENT.

VULCAN DROP FORGED CLAMPS.

Steel clamps for holding work on drill press tables or surface plates are very handy tools in the repair shop. J. H. Williams & Co., 40 South Clinton street, Chicago, is marketing a line of drop forged clamps known as the Vulcan and these are produced in a variety of forms to meet the requirements of different service. Several of the line produced by this company are shown in the accompanying illustration, including a machinist's clamp.



Vulcan Drop Forged Machinist's and Strap Clamps.

The last named type is constructed from a tough grade of steel which is submitted to a special process to increase strength. The knurled portion of the hardened and tempered screws permits of rapid and easy adjustment. They are made in three sizes having openings from 1.25 to 4.25 inches and are moderately priced.

The company also produces a number of drop forged strap clamps, time saving devices, for use with the planer, lathe, drill press, milling and boring machines.

INGERSOLL-RAND COMPRESSOR.

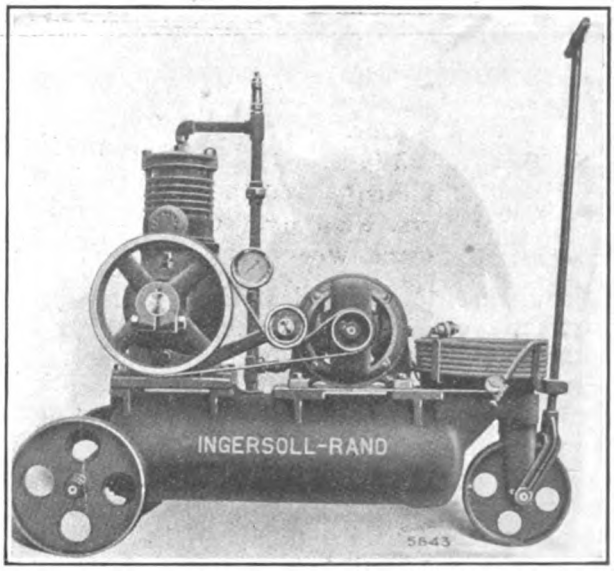
Many applications of compressed air are possible in the garage or service station and among the uses to which it may be put are: Inflating tires, cleaning tops and bodies, operating small pneumatic tools, etc. The Ingersoll-Rand Company, 11 Broadway, New York City, makes a specialty of air compressors, one of which is shown herewith.

It is of the portable vertical type, operated by an electric motor, and is single acting. It has a bore of 2.5 inches and stroke of three and has a capacity of 3.8-6 cubic feet. The horsepower is .76-1.5 based on 100 pounds pressure with revolutions a minute of 450-700. The inlet valve is a large annular port in the cylinder, while the outlet is a single plate in the top of the cylinder. Lubrication is by the constant level splash system and the bearings are removable bronze members. The length overall is 50 inches, width 24 and height from floor 48.

Drive is by a short belt from either two or three-phase, 60-cycle, alternating current motors of 110, 220 or 440 volts. Direct current motors are supplied of 110 or 220 volts. The equipment includes the compressor, motor, belt, gauge, hose and connections, connector plug and switch, pan, receiver, truck and necessary wrenches and duplicate parts list. The unloader and automatic start and stop controller are listed as extra. The company will forward descriptive matter and price list upon application.

TAPS AND DIES.

The American Tap & Die Company, Greenfield, Mass., is issuing a neat illustrated catalogue, showing various forms and sizes of dies, reamers, screw plates, taps, tap wrenches, etc., which will be forwarded free of charge to the trade.



Ingersoll-Rand Imperial Twelve Portable Electrically Operated Air Compressor.

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RACING VS. TOURING CONTESTS.

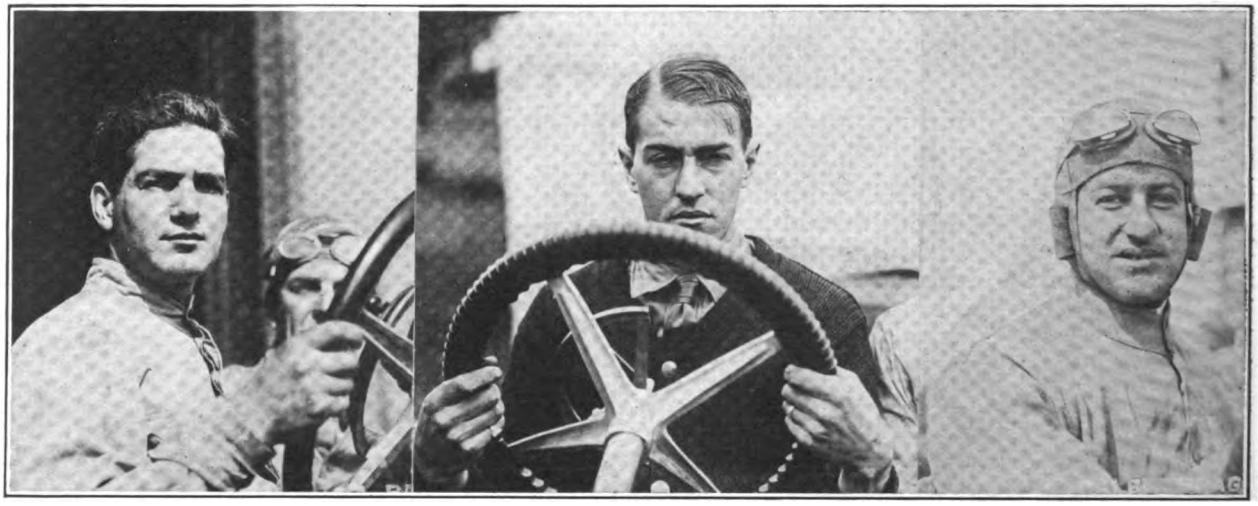
Mercer Official Explains Why Company Prefers Former Test for Its Cars.

Inasmuch as the Mercer Automobile Company, Trenton, N. J., maker of Mercer cars, has been one of the most earnest supporters of properly planned and well conducted races, it has often been asked why it favored this form of contest in preference to touring events. A member of that organization has set forth the reason briefly as follows:

"As a contest the average tour rarely accomplishes any great good. The promoters of these events are well meaning in their efforts, but we believe that by striving to accomplish the impossible—to combine a tour and a contest—they fail in their efforts. For the advancement of the industry, and thereby to assist our manufacturers, what we need are properly conducted long races, where speed with safety will be the only factors. In our opinion the various road races held in this country and in Europe during the past few years have done more to perfect the automobile than all other factors combined. To participate in racing a car must be able to withstand strains that would never be imposed upon it in ordinary touring.

"A conspicuous result of racing during the last two or three years has been the remarkable development of small motors. It has helped in their refinement until today engines of 300 cubic inches piston displacement are able to maintain great speed in races of almost any length. Evidencing this fact was the showing of the 300-inch Mercer in the 500-mile Indianapolis sweepstakes race of May 30, 1912. The Mercer was the smallest car in the race, and yet it finished third, defeating many of the world's most powerful speed creations.

"A touring contest merely shows that good cars can be driven a distance of 150 miles or so a day, at a speed slightly in excess of the legal rate, and under conditions a little more strenuous than those governing ordinary everyday summer tours. We are all fully aware that these same cars do such work every day, and will continue to repeat the performance. We feel that a demonstration of this sort is more or less useless. When the tour is finished it is usually announced that certain cars finished without penalty, and that certain others failed to do so. This is all that is known as a result of the event."



The Mercer Racing Team for 1913: Left to Right, Ralph De Palma, Spencer E. Wishart and Caleb Bragg.

The Mercer team for 1913 will consist of Ralph DePalma, Spencer E. Wishart and Caleb Bragg, and will appear for the first time in the 500-mile race on the Indianapolis speedway, May 30. DePalma and Wishart will soon take up their headquarters at the factory, while Bragg will join them there upon his return from Europe some time this month.

The Perfection Spring Company, Cleveland, O., maker of high grade pleasure car and motor truck springs, is calling attention to its product in a neat wall hanger, reproducing the painting "Indian Maid," by Eugene Carraine of Philadelphia. The subject is treated in a thoroughly pleasing manner and the wall hanger is one which will appear to advantage on the office wall.

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OPENS NEW YORK BRANCH.

French Maker of Gaulois Tires to Compete with American Manufacturers.

Formal announcement is made of the opening in New York City of a United States selling branch for the Etablissements Bergougnan of Clermont-Ferrand, France, maker of the well known Gaulois tires, and the first shipment of 5000 casings has been received at the headquarters, 64th street and Broadway. Jean Grenier, representative of the French firm, explains that his house has refrained from marketing its product in this country heretofore because of the duty of 35 per cent., which is held to be sufficient to wipe out all margin of profit. The action is taken at this time in anticipation of a material reduction in duty by the present administration at Washington.

It is stated that Gaulois tires have been in use abroad for 17 years and that their reputation is of the best. The company has exhibited at all international expositions since 1900 and has received highest awards at Paris, Turin, Hanoi, St. Louis, Liege, Milan, London, Saratoga, Quito, Brussels and Buenos Aires. It has refrained from making special racing shoes and this is held to explain the fact that the product may not be as well known on this side as some, but it is added that in last year's reliability trials of the French war department, 11 out of the 12 prize winners were equipped with Gaulois tires.

The Bergougnan works are said to be the second largest in the world. The number of workmen employed is 3500 and the output is in excess of 1000 tires a day. The concern was encouraged to enter into competition with American makers because of the splendid success achieved in Canada, where Gaulois tires are very much in demand, despite the duty of 35 per cent., which also is in effect there. The popularity of this line in Great Britain, South America, South Africa and other sections where all tires are on an equal footing is held to be a strong point in its favor.



One of the Non-Skid Gaulois Tires.

Gaulois tires are in four styles, two smooth and two non-skid treads. The smooth treads come in a perfectly round and a squared surface, while the non-skids are either metal studded or with corrugations made from the word Gaulois in raised letters. Both American and French sizes are furnished by the New York branch.



Factory of the Etablissements Bergougnan at Clermont-Ferrand, France, Where the Gaulois Tires Are Produced.

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VALUE OF PROPER FOCAL ADJUSTMENT.

WITH electricity replacing other illuminants to a large extent, the automobilist naturally concludes that the work of cleaning burners and mirrors, replacing gas tanks and fussing with

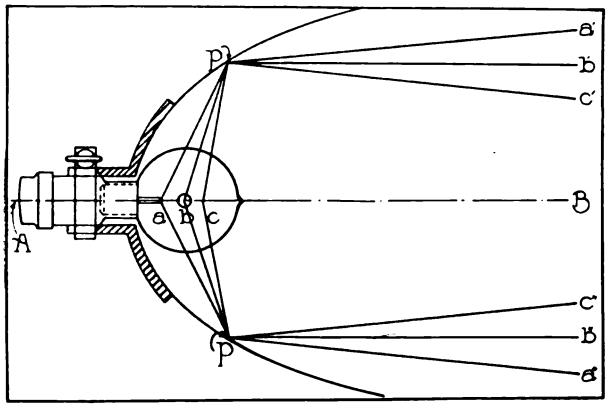


Fig. 1—Depicting Focal Value in Parabolic Automobile Electric Headlight.

leaky tubing and carbide has been eliminated. The pressing of a button or the turning of a switch lever when light is desired, appeals to his sense of convenience. While it is admitted that the newer form of illuminant, insofar as the motor car is concerned, requires less attention than the acetylene system, there are several factors which should be given attention if maximum efficiency is to be secured.

The life of a bulb is limited. By this is meant that its candlepower falls off with its length of life and during its latter half, for example, the loss may be 20 to 30 per cent. or more, depending upon the filament. The watts a candlepower are increased proportionately. Variation in voltage, below or above normal, results in less illumination in the former instance and decreased life in the latter. An example of falling off in candlepower is noted in the ordinary incandescent bulbs having carbon filaments. In time the filament loses its brilliancy, becoming dull.

Another factor to be considered is the breaking of a bulb and its replacement. This brings up the subject of focussing the new lamp, a subject that is attracting considerable attention among electrical engineers, some of whom hold that there is still room for improvement in the design of electric headlights. Going a step further, different dimensions of the filament have an important bearing on the character of the beam and this contention is borne out by a series of experiments conducted by the engineering department of the National Electric Lamp Association, Cleveland, O., the results of which are depicted in an accompanying chart at Fig. 3.

The chart shows the distribution curves of a seven-inch parabolic reflector equipped with different types of electric vehicle lamps. Readings were taken 40 feet from the reflector with a Weber photometer. The apparent candlepower of bulbs of varying filaments will be noted by the curves.

The parabola was first fitted with a 52-volt, 15-watt, 12 candlepower Mazda vehicle lamp, a spider wound G 16.5 bulb, .5 by one inch. The test showed that an apparent candlepower of 750 was derived and that the beam was diverging, being in excess of 20 feet.

The second test was made with a 52-volt, eight candlepower, close coil, carbon G 12 bulb, .1875 by .25 inch. In this instance the apparent candlepower was 2750 and the beam 13 feet.

A 70-volt, 15-watt Mazda, 12 candlepower, concentrated type coil filament, G 12 bulb, .25 by .375 inch, showed an appreciable gain over the other forms, in that over 2800 candlepower was secured and that the beam measured 10 feet.

The final test was with a 24-volt, 15-watt Mazda, concentrated type coil filament, G 12 bulb, .25 by .25 inch which gave an apparent candlepower of 6500 and a beam of approximately nine feet. The concentrated filament type is of recent introduction and the distribution curves show that the dimensions of the filament are im-

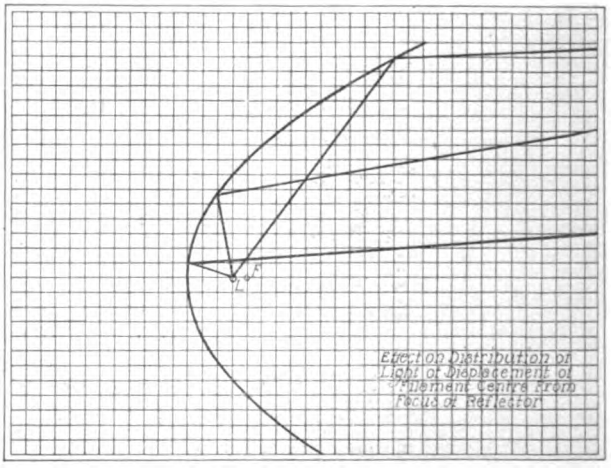


Fig. 2—Showing the Effect of Altering the Distribution of Light from a Headlight.

portant factors in electric lighting systems.

When one attempts to alter the distribution of light from a headlight, fitted with the regular six-volt helical coil filament lamp, upon moving

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the bulb forward or backward along the axis of the reflector, it is found that there is one position at which the nearest approximation to a needle or parallel sided beam is secured. If the lamp be brought nearer the vertex of the reflector a more divergent beam is obtained, while at the same time the field is rendered less uniform. This is made evident from a study of the diagram presented at Fig. 2, which shows three rays of light traced from the lamp, to and from the reflector. It will be noticed that the rays that strike the reflector near the vertex and also those that strike the reflector near the extreme outer edge, are reflected in a direction more nearly parallel to the axis than the rays reaching the reflector at intermediate positions. It is evident that this will result in rings of relatively high and low illumination in the field lighted.

These diverging and parallel beams, as well as the value of focal adjustment, are shown at Fig. 1. For the benefit of those not familiar with the subject it is stated that upon the proper location of the bulb depends the efficiency of the lamp. The drawing depicts a sectional view of the reflector, lamp and socket. There are three cases to be considered, namely: The filament at the successive positions a, b and c, as denoted. Positions a and c are any two locations behind and ahead, respectively, of the geometrical focus of the deflector, and that at b is at the geometrical focus.

Assume that the centre of the filament is at a. A ray of light emanating from this point and incident upon the reflector at any point as at P will be propagated along the line Pa'. It will be noted then that a system of rays taken through a complete revolution about this point will form a truncated cone of rays. A large amount of light will, therefore, be uselessly dissipated in the air.

In the second case to be considered, a ray of light also striking the reflector at P will assume the direction Pb'. Thus a complete series of rays will form a cylinder parallel to the major axis AB. This is held to be an ideal condition for a long concentrated projection.

Thirdly, a ray coming in contact with the reflecting surface at P will in turn follow the direction Pc'. Concentric zones of light and dark on the illuminated plane will be the result.

From the above it will be seen that in the first case the rays are spread out and that distance projection is sacrificed for a wide display of light on the ground close to the machine. In the second instance, a long projection of light; and in the third case an undesirable collection of light and shadow due to the crossing of the rays are the results. It may be added that there is a certain point at the rear of the focus beyond which the rays are spread out, producing an undesirable illumination. This focal tolerance can easily be ascertained by sliding the socket back and forth in its retaining sleeve and noting the illumination produced. This allowable flexibility makes it possible to adjust to suit a difference of opinion as to the proper driving light. It is very evident that appreciation of the influence of the position of the light source is essential in attaining

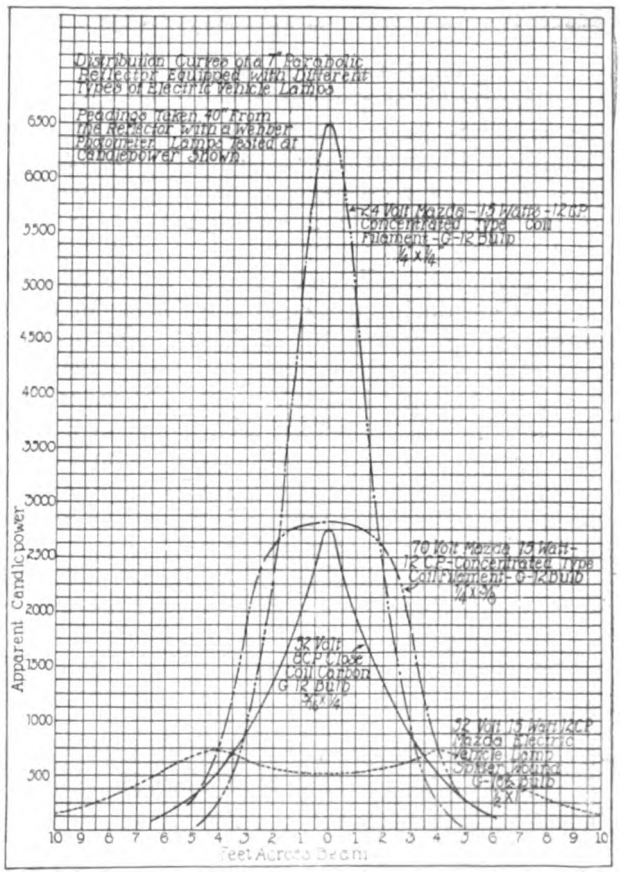
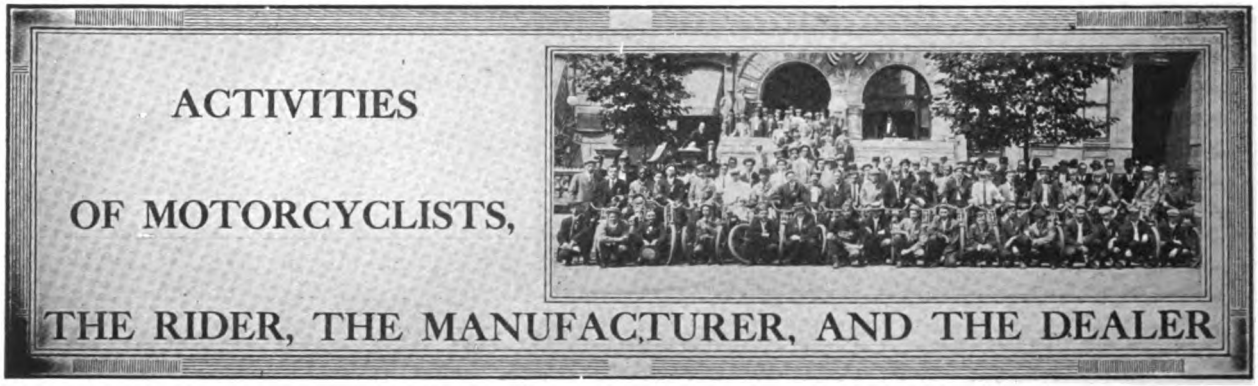


Fig. 3—Chart Depicting Distribution Curves and Effect of Varying the Dimensions of the Lamp Filament—Note the Efficiency of the Concentrated Type Coil Filament.

the best results from the electric headlight, be it a glass or metal reflector.

The Lyons Atlas Company of Indianapolis, Ind., which owns and controls one of the four American Knight engine licenses, has purchased the sample cars, parts, drawings and patterns of the Knight engined cars which were designed by Harry A. Knox of Springfield, Mass. Mr. Knox has located in Indianapolis and will have charge of the automobile work at the Lyons Atlas plant.

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Jacob De Rosier Passes On.

Thousands of persons throughout the country who had known Jacob De Rosier either personally or by reputation as one of the fastest and best motorcycle racers who ever rode a machine, were shocked by the announcement of his death at his home at Springfield, Mass., the night of Feb. 25, as the result of an accident at Los Angeles, Cal., during a race at the Playa del Reyes motordrome, March 10, 1912. Despite his serious injuries De Rosier recovered sufficiently to leave the hospital in Los Angeles last month and accompany his mother to their home in Springfield, where another operation was deemed necessary. His remarkable strength was found to have been so far spent as to make it impossible for him to rally from this added shock.

De Rosier's loss is keenly felt, for he did much to advance the interests of motorcycling and he set an example for honesty and fairness that was exemplary. His fortitude during his year of suffering was remarkable and won for him the admiration of the entire trade. He was born at Quebec, Canada, 33 years ago and took up motorcycle racing at Los Angeles when he was 23. At the time of his injury he was the holder of the records up to 100 miles and his distance for the hour was 83 miles and 135 yards. These marks were set with an Indian machine.



The Late Jacob De Rosier, at Los Angeles, Shortly Before the Accident Which Resulted in His Death at Springfield, Mass.

In July, 1911, he represented the United States in the Tourist Trophy race on the Isle of Man and finished 12th. Following this he raced Charles Collier in a series of contests for the world's title on Brooklands track, England. He won the third and deciding heat of 26 miles, for which he was presented with a purse and banqueted by Collier's father at a brilliant function in London.

De Rosier's death ends a career in motorcycle history that will be difficult to surpass and no testimonial of his popularity is as significant as the sincere regrets expressed at his death by his myriads of friends throughout the country.

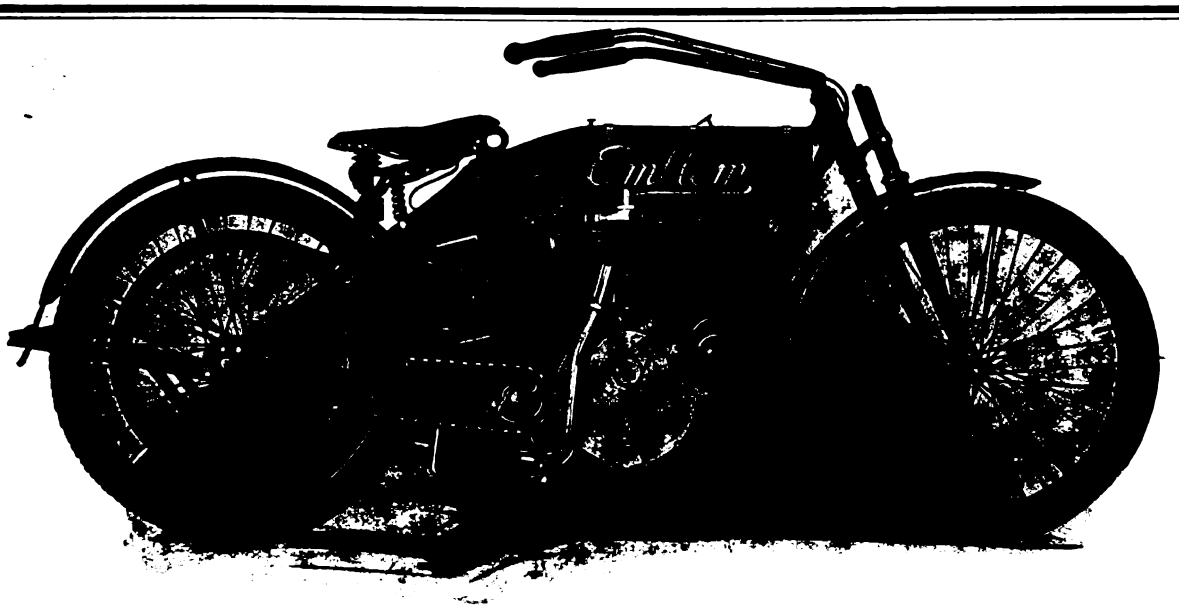
Planning Joint Tour.

One of the most interesting motorcycle runs planned for the coming season is that of the Aberdeen Motorcycle Club, Aberdeen, S. D. This organization, together with the Sioux Falls Motorcycle Club, Sioux Falls, S. D., is completing arrangements for a trip to the Black Hills country. The route will include a visit to the home of the famous Deadwood Dick, and a stop at the greatest quartz gold mines in the West. If the July convention of the F. A. M. be held at Denver, Col., the tour will be arranged to include the convention city on the return trip.

Motorcycle Vacation Trip.

Five cadets from the Manlius Schools at Syracuse, N. Y., accompanied by Prof. W. R. Berger, will make a summer motorcycle trip through the British Isles and portions of Continental Europe. They will leave in June and will return in October. After landing at Liverpool they will proceed to Chester, Oxford and London. The party will ride leisurely through Holland, Bel-

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THE EMBLEM MANUFACTURING COMPANY
Also Makers of the Famous Emblem Bicycles.
ANGOLA ERIE COUNTY NEW YORK

gium, Germany, Switzerland and Italy, returning to London for the international motorcycle race, Sept. 22.

Co-Operating with Rural Drivers.

The St. Louis Motorcycle Club, St. Louis, Mo., has passed the following interesting resolutions: "Resolved, That motorcyclists, when approaching teams on rural highways, signal the driver of the team, who shall either pull to the right of the road, signifying motorcyclists to pass, or hold up his hand as a signal for motorcyclists to approach and pass cautiously. Teamsters are requested to give their support to this rule and assist in its application."

This resolution is the result of frequently expressed anger against motorcyclists by rural drivers when perhaps with an adequate system of signalling all misunderstandings can be overcome and better feeling prevail.

In Memory of Col. Pope.

It has been decided by the Hartford Board of Trade, Hartford, Conn., that on Memorial Day, May 30, the drinking fountain which cost over $5000, will be dedicated at Pope park, that city, as a tribute of the work of the late Col. Albert A. Pope for the bicycle industry and good roads. The fountain is said to be a beautiful creation and has been in preparation for some time by experts. The dedication ceremonies will be conducted with fitting tributes to the memory of Col. Pope by many old friends.

Providence Club's Annual Banquet.

The Providence Motorcycle Club, Providence, R. I., recently gave its annual banquet at Verdani hall, Weybosset street. About 50 members and their friends were present and the event was one of the most successful ever conducted by the club. After the banquet President Buffington,

JOIN THE F. A. M.

which is the National Organization fostering the interests of motorcyclists along legislative and other lines. Cut this out, mail it, and you will get the reasons.

E. M. ESTABROOK
Chairman Membership Committee Federation American Motorcyclists,
BANGOR, MAINE.

Please send me the F. A. M. Booklet and all information interesting to prospective members.

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who acted as toastmaster, introduced Dr. G. B. Gibson of Westboro, Mass., secretary-treasurer of the F. A. M., who spoke of the work and re-



New Office Building of the Miami Cycle & Manufacturing Company, Middletown, O.

cent growth of the organization. He also told of the new tourist map service, recently inaugurated.

An interesting programme was rendered under the direction of the entertainment committee and a general good time was enjoyed by those present. Among the other speakers was B. A. Swenson, who gave an account of his trip through New England and the White Mountains. John Kay gave vocal numbers, while piano selections were rendered by E. G. Luther.

New Merkel Buildings.

Accompanying illustrations present two of the new additions to the plant of the Miami Cycle & Manufacturing Company, Middletown, O., maker of Flying Merkel machines. One is that of the new office building, which was taken over last week and which is held to be one of the most modern of its kind.

The structure is four stories high and is of concrete and steel throughout, the front being faced with artistic buffed brick. Just inside the door is located a waiting room for visitors, while on the left is a large telephone switchboard connecting with every department in the factory. President K. R. Jacoby's office is located on the right and just beyond this is the office of Designer J. F. Merkel. The left side of the first floor is occupied by the accounting, purchasing, paymaster and cashier's departments and the office of H. S. Wise, assistant general manager and treasurer. The sales and advertising department occupies the entire second floor, the production department is on the third, and the experimental department on the fourth.

The other illustration is that of the new wing which has just been added to the plant. This also is of concrete and steel construction, and practically all the sidewall is of glass, affording excellent light and ventilation. The entire first floor is given over to the shipping department and an extra long platform makes it possible to load three cars at one time. As the receiving is done from a special track laid at the other end of the factory, there is no congestion between incoming and outgoing freight.

The motor assembling department occupies the entire second floor and the new specially designed assembling stands make it possible to assemble 100 motorcycles a day. The third and top floor is occupied by the bicycle department and some idea of this branch of the business may be gleaned from the fact that between 300 and 350 machines are shipped every working day of the year.

Pope to Add New Building.

Owing to the increase in business, it is said the directors of the Pope Manufacturing Company, Hartford, Conn., maker of Pope motorcycles, are considering building an addition to the company's factory at Westfield, Mass., to increase the facilities of the motorcycle department.

Middletown Club Opens Season.

The first run of the season was given by the Middletown Motorcycle Club, Middletown, O., recently, the destination being Cincinnati, O. All the riders were mounted on Flying Merkels, made by the Miami Cycle & Manufacturing Company, Middletown. From the home city the riders went to Hamilton and thence to Cincinnati, where they were entertained by the members of



Factory Addition Recently Occupied by Flying Merkel Forces at Middletown, O.

the Queen City Motorcycle Club. F. L. Valiant, advertising manager of the Miami company, was host at a chicken dinner at Shuler's, after which

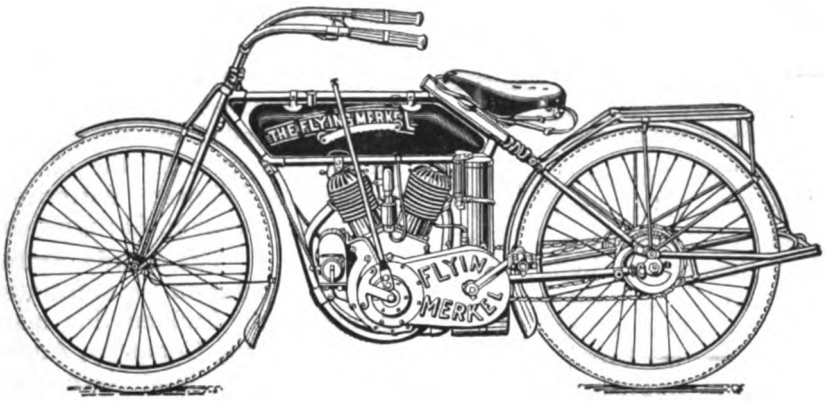
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1913 1913

THE FLYING MERKEL

MOTORCYCLES BICYCLES

The Prize-Winning "YELLOW JACKET" Model



THE ONLY SELF-STARTING, TWO SPEED ADJUSTABLE SPRING FRAME MOTORCYCLE IN THE WORLD

The Real Sensation at the New York and Chicago Shows
Look For It at the Boston Show, March 8 to 17
SPACES 336 and 349 BASEMENT

Years ahead of the nearest competitor. A perfectly working Merkel spring frame machine, built 12 years ago, on exhibition.

EASY TERMS TO ANYONE IN NEW ENGLAND

Any make machine in any condition taken in trade. 150 second-hand machines of every make from $25 up. All second-hand machines are overhauled and guaranteed for one year. Sold on two weeks' free trial.

The Flying Merkel Bicycle with coaster brake at $25 is a wonderful value. Terms $10 on delivery, then $1 per week.

Some Good New England Territory Still Open
Ask about it at the Show, or write

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the party tested their 1913 machines in the Kentucky mountains. Mr. Valiant was the winner of an impromptu hill climb. The journey covered a



Method Adopted by Oron Overton in Introducing 1913 Indian to Riders in Mobile, Ala.

distance of about 110 miles. Among those in the party were the following: L. S. Taylor and L. Huntsberry, the latter of Cleveland; G. R. Mashon, M. E. Jones, Emil Buerger, F. Stenger, H. C. Forster, L. S. Dockstader, F. L. Valiant.

Douglas Visits Indian Chief.

W. W. Douglas of Douglas Bros., one of the most prominent makers of English motorcycles, was a recent visitor at the Indian factory at Springfield, Mass. He stated that his firm built an average of 6000 machines annually, which is much smaller than the number produced at the Hendee factory. He understood how the production could be accomplished on such a large scale in this country, but expressed doubts as to his reputation for veracity when he should give the figures at home.

Additional Merkel Distributors.

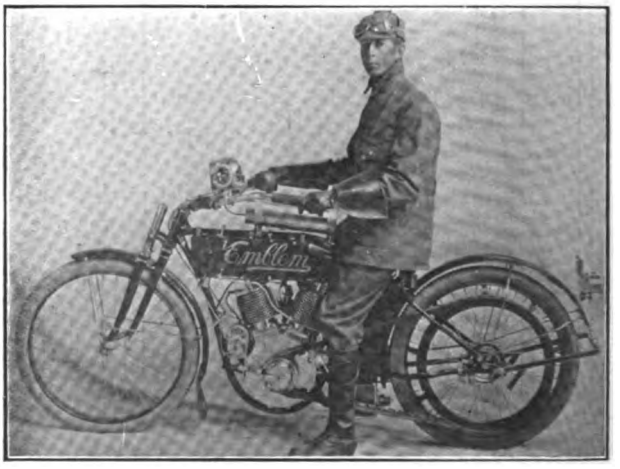
The Miami Cycle & Manufacturing Company, Middletown, O., maker of Merkel motorcycles, has appointed the following distributors for the coming year: Neihaus & Dohse, Dayton, O.; Sawyer & Son, DeKalb, Ill.; Matthew Lamberg, Bridgeport, Conn.; A. A. Stoddard, Jacksonville, Fla.; A. D. Swanson, Galesburg, Ill.; A. L. Marple, Cumberland, Md.; John G. Ledyard, Camden, N. J.; Cliff Tunti, Lorain, O.; C. E. Grass, Troy, O.; H. A. Jackson, Scottdate, Ia.; Roanoke Cycle Company, Roanoke, Va.; Poultney Auto & Machine Company, Poultney, Vt.; H. W. Vandever & Co., Wilmington, Del.; H. S. Brant, Norristown, Penn.; George B. Carter, Petersburg, Va.; Bond Bros., Muscatine, Ia.; C. A. Van Doren, Atlantic City, N. J.; Ropson & Brown, Batavia, N. Y.; Theodore Henn, Eldora, Ia.; Connor & McCargel, Hagerstown, Md.; C. H. Merrill, Winchendon, Mass.; A. L. Aumack, Vineland, N. J.; S. Savaraske, Brooklyn, N. Y.; Cooper & Co., Ashland, O.; J. E. Swank, Bucyrus, O.; Milton & Mathews, Mt. Gilead, O.; D. M. Hottenstein, Lebanon, Penn.; Beloit Motor Garage, Beloit, Wis.; George Dern & Co., Wausau, Wis.

Yale Proves Economical.

News from Washington, D. C., indicates that the government may investigate the feasibility of using motorcycles in the new parcel post service. A. H. Pendl of Chicago, one of the government special delivery messengers, has interesting data on the subject, collected during his regular work, that are decidedly pertinent. He purchased a Yale motorcycle in February, 1912, since which time he has covered more than 12,000 miles in and around Chicago. Mr. Pendl states that his maintenance expense has been less a mile than he formerly expended on his bicycle. His total mechanical expense for the 12,000 miles was $9.50, divided as follows: Batteries, $3; tire repairs, $2; pulley lagging, $1; ignition points, $3.50.

The Sturdy Emblem.

The reputation for sturdiness which has been gained by the Emblem line, made by the Emblem Manufacturing Company, Angola, N. Y., has not suffered in the least since the announcement of the big 10 horsepower twin just previous to the New York show. Those who have seen the new mount are particularly pleased with its general appearance, while it is instantly recognized as a fitting companion for the other Emblem models.



R. P. Colwell, Manawa, Wis., and His Emblem Mount.

The line is expected to make an appeal to the discriminating rider, who desires a machine that will stand up under all conditions to be met on

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long journeys. It is maintained by the company that each of the three models presents everything that a rider could possibly demand, according to the horsepower. There seems to be little doubt that the Emblem for 1913 will maintain the reputation for sturdiness which has served thousands of riders in the past.

More Than 20,000 Members.

During the month of February the membership of the Federation of American Motorcyclists passed the 20,000 mark, the number now being 20,134. During the month a total of 355 new members were enrolled from the various states, as follows: California, 44; New York, 39; Ohio, 36; Illinois, 29; New Jersey, 28; Pennsylvania, 23; Michigan, 21; Oregon, 17; Kansas, 14; Texas, 13; Maryland, 12; Missouri, 12; Massachusetts, 10; Montana, 10; Philippine Islands, eight; Indiana, seven; Wisconsin, six; Virginia, four; Minnesota, four; Iowa, three; Kentucky, three; Maine, New Hampshire, Connecticut, West Virginia, Delaware, District of Columbia, North Carolina, Oklahoma, Utah, Colorado, Idaho and Washington, one each.

Latest F. A. M. News.

The following new repair shops have been registered with the F. A. M.: Mt. Pleasant Motorcycle & Bicycle Company, 3207 14th street, N. W., Washington, D. C.; Garfield Park Auto Garage, 606 Independence boulevard, Chicago; Boller Brothers, 4444 Hudson County boulevard, Union Hill, N. J.; Steen's Hardwood Company, Findlay, O.; Sanford Clark, 2922 Columbus avenue, Anderson, Ind.; Corvallis Bike Works, Corvallis, Ore.

President Patterson has appointed John L. Donovan of 157 North Michigan avenue, Chicago, as state commissioner for Illinois. Ira C. Coombs, 154 West street, Worcester, Mass., has been appointed local commissioner by the Massachusetts state commissioner.

Secretary Gibson announces the receipt of an application for membership from China, the first ever to have been recorded from that country.

Postal cards for return have been sent out to secure the names of the officials and other up-to-date facts relative to the 350 or more motorcycle clubs affiliated with the federation.

New Department Heads.

Among the additions to the Flying Merkel organization within the past month is that of H. Cameron Forster, who has had wide experience in the selling end of other lines. He will take charge of the sales department. A. C. Bryan becomes factory manager and has entire charge of the plant and its production. Louis Weinman is in charge of the order department and will have a number of assistants. C. L. Hartsell is at the head of the pricing department, which is an innovation with this company. C. L. Miller, formerly with the Stoddard-Dayton factory, takes charge of the sales statistics.



H. Cameron Forster of the Flying Merkel Sales Department.

E. W. Adams, who looks after the sales on the Pacific Coast, has been in conference with Sales Manager J. W. Ash concerning the plans for 1914. A night shift was put at work last week and the Merkel plant is now one of the busiest in the country. The present demand for the product is such that the company plans to double its capacity.

Will Hold 24-Hour Run.

The Cleveland Motorcycle Club, Cleveland, O., will hold a 24-hour run to Indianapolis, Ind., May 29-30, to witness the 500-mile automobile race at the speedway on Memorial Day.

INDIAN RIDERS

Cold weather is here. Motor turns over hard. Very hard work to get started. A little kerosene or gasoline injected into cylinder head will remedy this at once. A priming cup is needed in top of cylinder head as it takes too much time to take out spark plug each time. Indian riders, send at once for a finely made and finished priming cup to fit top of cylinder head of your Indian. Price, postpaid, $1 each. Money refunded if you are not satisfied.

B. A. SWENSON 522 Broad St., Cor. Blackstone St., Providence, R.I.

1913 F. N. SHAFT-DRIVE MOTORCYCLES.

Lightweight Single, with Two-Speed Gear $275
Only Machine Built With Handle Bar Control of Clutch.
Four-Cylinder $300
With Handle Bar Control of Clutch $350
Two-Speed Gear, Extra $50
Equipment includes two brakes, footrests if desired, compound spring fork, combined luggage carrier and stand.

American F. N. Company, Boston, Mass.

Branch—415 Trumbull St., Hartford, Ct.

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The following concerns have been incorporated recently to manufacture and deal in motor cars, accessories, etc.:

Hoyt Garage, Inc., Brooklyn, N. Y.; $1000; Louis C. Brooks, Walter J. Kelly, Charles Blaken.

Maxim Tricar Manufacturing Corporation of Manhattan, New York City; $100,000; Otto Kuneman, Charles F. Novothy, A. A. Meschutt.

Williamson Garage Company, Williamson, N. Y.; $20,000; Alfred F. Raynor and others.

United Garage Company, New York City; $14,000; Samuel Ecker and others.

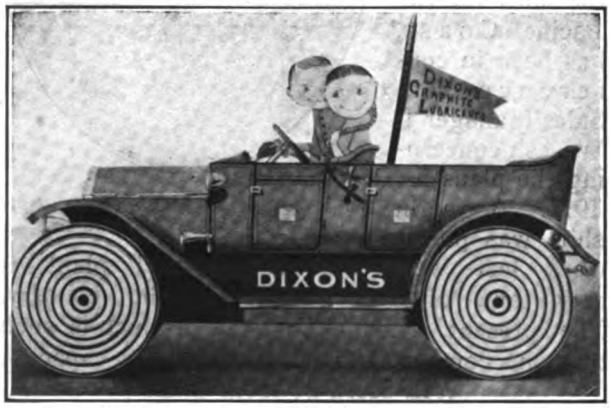
Welch & Suthergreen Company, Fitchburg, Mass.; $30,000; to deal in motor cars; H. C. Mayo, E. J. Welch, F. E. Suthergreen.

Suffolk Street Garage, Inc., Lynn, Mass.; $5000; Daniel Lynch, John Buckley, Henry Thomas.

Donovan Motor Car Company, Boston; $50,000; Joseph S. Donovan, A. D. Adams, G. E. Donovan.

J. D. Maxwell Motor Corporation, Tarrytown, N. Y.; $10,000; motor vehicles; Jonathan D. Maxwell, James P. McManus, Leander F. Sniffen.

Auto Buyers' Company of America, Inc., New York City; $1000; to deal in motor cars; Julius Lichenstein, John P. McClellan, Arthur A. Hill.



Joseph Dixon Crucible Company's Show Souvenir—Move in a Small Circle and Watch the Wheels Go Around.

E. P. Miller Motors Corporation, Utica, N. Y.; $5000; to deal in motor cars; Harry R. Beebe, William T. Cantwell, Francis P. Miller.

Gas Saver Sales Company, New York City; $25,000; to manufacture motor car devices; H. Clarence Fisher, John H. Miller, Eugene Cable.

Miller Tire Sales Company, New York City; $5000; automobile tires; Harry C. Miller, Harrison C. Mills, Warren A. Schenck.

Co-Operative Used Car Company, New York City; $3000; to deal in automobiles; Joseph B. Bauer, Louis Ezechiel, John Custis.

S. J. Wise & Co., Inc., New York City; $20,000; motor vehicles; C. E. Van Vleck, E. M. Dalley, C. M. Kohn.

Bell & Waring Steam Vehicle Company, New York City; automobiles; Harry G. Waring, Harvey W. Bell, Howard C. Phillips.

Glide Sales Company, Inc., Buffalo, N. Y.; $10,000; to deal in automobiles; J. Francis Lynch, Louis P. Fuhrmann, Edward T. Danahey.

National Welding Company, Jersey City, N. J.; $25,000; general automobile business and to weld, braze, repair and work with acetylene and oxygen; E. P. Hoty, S. H. Culver, J. W. Phillips.

Durable Tread & Automobile Sales Company, New York City; $10,000; to deal in tires, tire treads and other accessories; Rose H. Pacobi, Samuel M. Winkler, Henry A. Deimel.

Buffalo Automobile Sales Corporation, Buffalo, N. Y.; $15,000; to manufacture, sell and make motors, machinery, etc.; William J. Harris, William U. Heverley, Maul McDonald.

Mol Stringer's Garage Corporation, Brooklyn, N. Y.; $10,000; to deal in automobiles and conduct garage; Mol Stringer, James Culleeny, Frederick Huntington.

Maxton Auto Company, Maxton, N. C.; $50,000; to deal in and make automobiles; A. J. McKinnon, R. M. Williams, Byron McCallum, Ernest Williams.

Pratt-Hendricks Company, Brooklyn, N. Y.; $1000; to deal in automobiles; William H. Pratt, William J. Hendricks, George L. Robinson.

WITH THE MANUFACTURER.

The Swinehart Tire & Rubber Company, Akron, O., maker of Swinehart tires, announces it has begun the erection of new buildings and the installation of new machinery to provide for a greatly increased output this year.

The Electric Auto Lite Company, Toledo, O., is building an addition to its plant at 133 Michigan street. The concern manufactures a new combined electric lighting and starting system for motor cars.

The Keystone Spring Works, 1313 Buttonwood street, Philadelphia, Penn., maker of motor truck springs, has enlarged its building because of the increase of business which necessitated more space.

The Kernodle-McDaniel Company, Frantfort, Ind., maker of the Easy Starter and speeder, has sold its rights to that invention to the Logan Auto Supply Company, Logansport, Ind. The former company will devote its entire time to the manufacture of a small device that it is claimed will save the automobile owner money on the consumption of gasoline.

The Findeisen & Kropf Company, maker of the Rayfield carburetor, has established its own sales and service branch at New York City, in the location formerly occupied by the Warner Instrument Company, at 1902 Broadway.

The Auto Products Company of America, St. Louis, Mo., has been incorporated with a fully paid capital of $25,000 with offices at St. Louis, to manufacture Punch's original Nu-Tire and other automobile specialties, such as cement, body paints, polishes, etc. The following are the officers of the company: President, J. C. Punch; vice president, S. C. Punch; treasurer, William Grafeman; secretary, D. T. Punch.

The Auto Tire Filling Company, 1422 Fairmount avenue, Philadelphia, Penn., has leased the entire building at 1722 Fairmount avenue, to be used in addition to the old establishment.

The Bosch Magneto Company, New York City, has appointed the Powell Supply Company, 2119 Farnam street, Omaha, Neb., and the Kansas City Automobile Supply

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Company, 1504 Grand avenue, Kansas City, Mo., distributors of the Bosch products in their respective territories.

C. W. Whitson has joined the sales force of the Keeton Motor Company, Detroit, maker of Keeton cars, and will travel in the East, establishing agencies at Pittsburg, Penn., Baltimore, Md., Washington, D. C., and other cities outside of New England.

The Joseph Dixon Crucible Company, Jersey City, N. J., through its Boston branch, has prepared an interesting souvenir for distribution at the Boston show. It is termed a moving picture and is presented in an accompanying illustration. It is expected to prove a unique method of calling attention to the graphite lubricating products made by this concern.

The Henderson Motor Car Company, Indianapolis, Ind., maker of Henderson cars, has appointed the following distributors: R. L. Adams, McColl, S. C.; Blue Ribbon Garage, Quitman, Ga.; Myrl L. Currier, Enfield Center, N. H.; C. C. Dunn, Barnesville, Minn.; Minnesota Motor Car Company, 111 South 10th street, Minneapolis, Minn.; C. E. Betts, Westport, Conn.; Frank Le Flem, 612-614 Broad street, Philadelphia, Penn.; Central Motor Car Company, 1270 Bedford avenue, Brooklyn, N. Y.; Ayr Auto Company, Ayr, N. D.; George J. White, Irene, Tex.; Anger & Knox, 205 Sebastian street, Napa, Cal.; W. E. Hall Motor Car Company, 25th and Broadway, Oakland, Cal.; C. W. Shimel, Casey, Ill.; Guarantee Motors Company, 707-711 Locust street, Des Moines, Ia.; P. V. Denster, 138 Read street, Milwaukee, Wis.; H. J. Cuyle & Son, Hazelton, Penn.; R. D. Bell, Bellwood, Penn.; George Pugh, 236 North Broad street, Tomoqua, Penn.

The Cole Motor Car Company, Indianapolis, Ind., has appointed the following agents to handle Cole cars: Grigsby & Co., Bardstown, Ky.; J. L. Hay, Camilla, Ga.; Hirsch Bros., Chattanooga, Tenn.; P. Watt Richardson, Greensboro, N. C.; Marx & Marx Auto Company, Le Mars, Ia.; Inman & Presse, Lena, Ill.; Koch & Tisch, Tremont, Ill.; F. B. Porter, Silver Creek, N. Y.

The Dyneto Electric Company, Elbridge, N. Y., maker of starting and lighting devices, has increased its capital stock to $200,000. It is said the company intends to establish a factory at Syracuse, N. Y., and another at Detroit.

The Niagara Gasoline Motor Company, Dunkirk, N. Y., which is planning to organize with a capital of $50,000, has a new motor plant now in course of completion in that city.

The Kelly-Springfield Motor Truck Company, Springfield, O., maker of Kelly-Springfield trucks, has opened factory branches at 1829 East 13th street, Cleveland, O., and at 4518 Baltimore avenue, Philadelphia, Penn. D. C. Hathaway, formerly general manager of the Dayton Auto Truck Company, Dayton, O., maker of Dayton trucks, has been appointed manager of the former, and James Joyce, formerly general manager of the Selden Motor Vehicle Company, Rochester, N. Y., maker of Selden trucks, of the latter. W. C. Prickett, formerly district manager in northern Ohio for the Randolph Motor Truck Company, Flint, Mich., maker of Randolph trucks, has been appointed salesman at the Cleveland branch.

The Keeton Motor Company, Detroit, maker of Keeton machines, has appointed H. D. W. Mackaye special factory representative and he is placing Keeton agencies throughout New York State. Since the formation of the Keeton company Mr. Mackaye has been assistant to President Forrest M. Keeton. He started in the automobile business as assistant to the general manager of the Mora Manufacturing Company, Newark, N. J., maker of Mora power wagons; was with the Jenkins Manufacturing Company, Rochester, N. Y., and previous to joining the Keeton company was assistant sales manager of the Metzger Motor Car Company, Detroit, maker of Metzger cars.

The Michigan Automobile Company, Ltd., which recently changed its name to Fuller & Sons Manufacturing Company, Kalamazoo, Mich., maker of automobile specialties, has decided in future to market its products under the name of Fuller, to avoid confusion with the automobile company of similar name in the same city.

William R. McCulla has taken a position with the Packard Motor Car Company, Detroit, maker of Packard cars, as assistant research engineer. Mr. McCulla has had a long experience in the automobile business and has been connected abroad with such well known makes as the Mercedes, Renault, English Napier and Rolls Royce.

GARAGE AND DEALER.

The Providence Auto Equipment Company, 11 Dorrance street, Providence, R. I., has taken the R. I. V. ball bearings for the State of Rhode Island, and as it is carrying a large stock, will be able to fill all orders promptly.

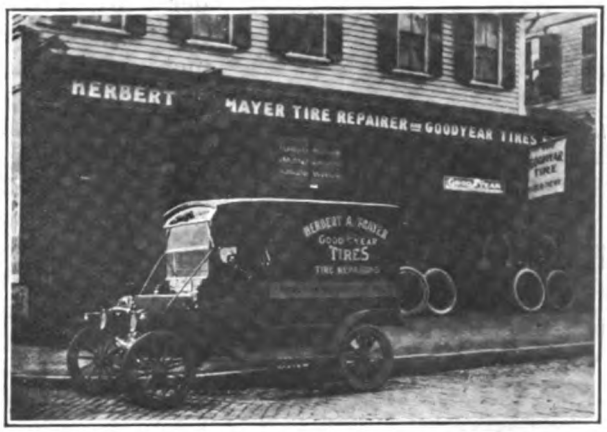
The Auburn Garage & Auto Company, Fort Wayne, Ind., is the name of a new company recently formed to take over the Auburn garage on West Washington street. Lewis Watson is manager of the concern.

The Crescent Garage Company, Ogdensburg, N. Y., has been purchased by H. G. Chandler of that city and W. D. Evans of Hammond, N. Y. The equipment, automobiles and business of the company was sold to J. O. Speer, who will operate the garage, renting the property of Chandler & Evans.

The Austin Tire & Supply Company, Austin, Tex., has opened a store for tires and automobiles, having secured the agency for American and Regal cars and Goodyear tires. The company is capitalized at $2000.

Gordon W. Turner, the pioneer Ford man of Boston, has purchased the business of the Equitable Distributing Company at 245 Columbus avenue, Boston, and will sell new and second hand Ford cars, supplies, etc. Mr. Turner will continue to occupy his old place of business at 45 Stanhope street.

Herbert A. Thayer, 400-404 Weybosset street, Providence, R. I., not only is the local agent for Goodyear tires, made by the Goodyear Tire & Rubber Company, Akron, O., but maintains a general business in repairing



Herbert A. Thayer's Goodyear Tire Agency in Providence, R. I., and Ford Car Used in His Delivery Service.

and vulcanizing casings and tubes. That Mr. Thayer is an enterprising business man is borne out by the fact that he has inaugurated a system of calling for and delivering work, in connection with which he makes use of the Ford car shown in the accompanying illustration.

The Chanslor & Lyon Motor Supply Company, Los Angeles, Cal., has established its business at 945 South Main street, that city.

The E. V. Stratton Company, Albany, N. Y., has secured William D. Paine, for some time with the United States Motor Company of Philadelphia, as representative of the Troy district for Hudson cars and Stewart trucks.

Lew Fales, Washington and Dean streets, Providence, R. I., through the manager, Russell C. Fales, has made a special price for painting Ford cars, which is given for cash payments.

O. R. Baum has purchased a half interest in the Chalmers Auto Sales Company, El Paso, Tex., and will conduct it with M. K. Burkhead. The company has purchased the automobile business of Joy P. Knox at 315 Texas street and a large garage will be erected on Santa Fe street.

The Craig-Centre Auto Company, Pittsburg, Penn., has secured additional property on Craig street and will erect new buildings in the near future.

J. S. Brown, Redlands, Cal., has begun the erection of a new garage and machine shop at 346 Orange street, to be known as the Continental garage. Several popular makes of cars will be handled.

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AGGRESSIVE SALES CAMPAIGN.

Invader Oil Company Adopts New Plan for Distribution of Its Product.

The acquisition by the Invader Oil Company of the business of Charles F. Kellom & Co., Philadelphia, Penn., has been followed by the establishment of a policy for the distribution of Invader oils that will, with the aggressive selling campaign already planned, largely increase the business and insure representation in practically all sections of the country. Charles F. Kellom & Co., was one of the pioneer firms in the production of automobile oils, and Mr. Kellom is maintained to be the first to advocate and exploit the use of light qualities for gas engine use. The firm was established in 1881 and under Mr. Kellom's management developed business that was substantial and enduring. The only branch it maintained was, however, in Boston, where it was originally in the Motor Mart and later was located at 284 Columbus avenue. Elsewhere Invader products were sold by agents.



E. A. Scheu, Manager, Boston Branch, Invader Oil Company.

The head of the Invader Oil Company is Mr. Kellom, but the executive of the concern is T. E. Tomlinson, who is regarded as an expert in automobile lubricants and their sale. He organized the Havoline Oil Company and successfully directed its activities, and later on left that concern and established the Wolverine Lubricants Company. Mr. Tomlinson is noted for the aggressiveness and success of his selling methods and as vice president of the Invader Oil Company he will direct the selling organization. H. Dunthorn is the secretary and treasurer. The company is organized under the laws of New Jersey with capital of $250,000. The general offices of the company have been located at 80 Broad street, New York City, and the former office at 113 Arch street, Philadelphia, where one of the two factories is located, and the Boston branch have been continued as branches, and besides another has been opened at 3556 11th street, N. W., Washington, D. C. A branch at Chicago is to be opened shortly. The selling organization includes men who have been associated with Mr. Tomlinson in his previous business successes, and among them are A. A. Francesconi, Howard Plowman, Harvey Wilkins, E. Kalkhof, F. Menke and A. Radelson.

The Boston branch will remain in charge of E. A. Scheu, who first was agent for Invader oils in that city, and five years ago established the branch, extending its business throughout New England. Mr. Scheu was from 1903 until he became agent for the oil, connected with the Packard Motor Car Company and the Boston Packard agency, and has had long and practical experience with automobile lubricants. He has developed the business and his knowledge of the New England trade is very large. He has perfected plans for the better distribution of Invader oils and a warehouse is to be established in Boston from which shipment will be made to the customers, affording them a quicker and more satisfactory service than ever before, and plans are making for the promotion of the sale and use of greases and gear oil. Mr. Scheu, who is now a stockholder in the company, is to give his personal attention to the trade and is to travel New England by car the present season and will be in close touch with the representatives of his company. As the business requirements demand the selling force will be increased and nothing will be neglected that will in any way contribute to the promotion of the sale of Invader oils.

THE EXHIBIT IN CONCORD.

New Hampshire Motorists Take Advantage of Opportunity to Inspect New Models.

The annual show of the Concord Auto Association in the Auditorium, Concord, N. H., was held during the week of Feb. 18-25. Full advantage was taken of the opportunity to inspect the season's offerings, some 30 different cars being arranged amid simple and effective decorations. A number of sales was recorded and several satisfactory prospects are being followed up by the local dealers. Those who made display were:

Concord Auto Sales Company, Cole; Fred L. Johnson, Buick, Cadillac; Norris A. Dunklee, Hudson; George T. Hillman, Oakland; George C. Chase, Metz; J. W. Hazeltine, Reo, L. Dale Brown, Rambler; John Martin, Haynes; I. E. Gray, Overland, Davis, American; Thompson & Hoague, supplies; Harriott & Co., accessories.

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LIGHTING THE CAR BY A BATTERY SYSTEM.

IF IT were possible to present statistics showing the number of cars the owners of which have converted the gas and oil lamps into electrical units, the figures, no doubt, would surprise even the most observing. Indicative of this following of general practise to employ electricity as an illuminant is the utilization of the current of the magneto by owners of model T Ford automobiles. And a large number of other motorists have installed electric side and tail lamps, utilizing an ample sized storage battery as a source of current. While lighting the motor car by the straight storage battery system was fully discussed in The Automobile Journal some time ago, information upon the subject is presented herein in response to numerous inquiries as to the practicability and the method of proper installation.

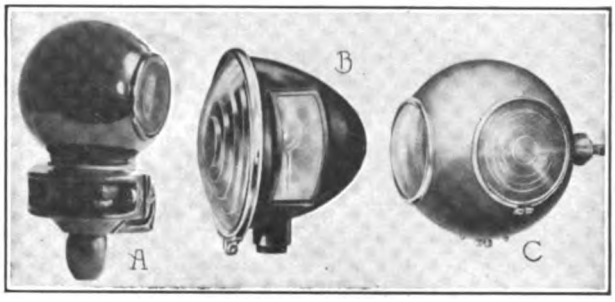
Advantages and Disadvantages.

While some engineers do not advocate the use of electric lighting on the automobile without means for recharging the cells, by a generator for example, it is noticeable that several 1913 models are equipped with the straight storage battery system. It is admitted that the dynamo system is far superior in every respect, but it must be taken into consideration that there are thousands of automobilists who desire electric lighting, but wish to curtail expense.

The disadvantages of the straight storage battery system are that the amount of service is dependent upon the size of the battery, and condition of the cells, and that the latter must be recharged, during which time another battery must be substituted. As the efficiency of the lamps is impaired when the voltage drops below a certain point, it is obvious that the system will require considerable attention from the motorist.

Battery Capacities.

Some motorists make the error of installing a battery having too small an output; that is, the



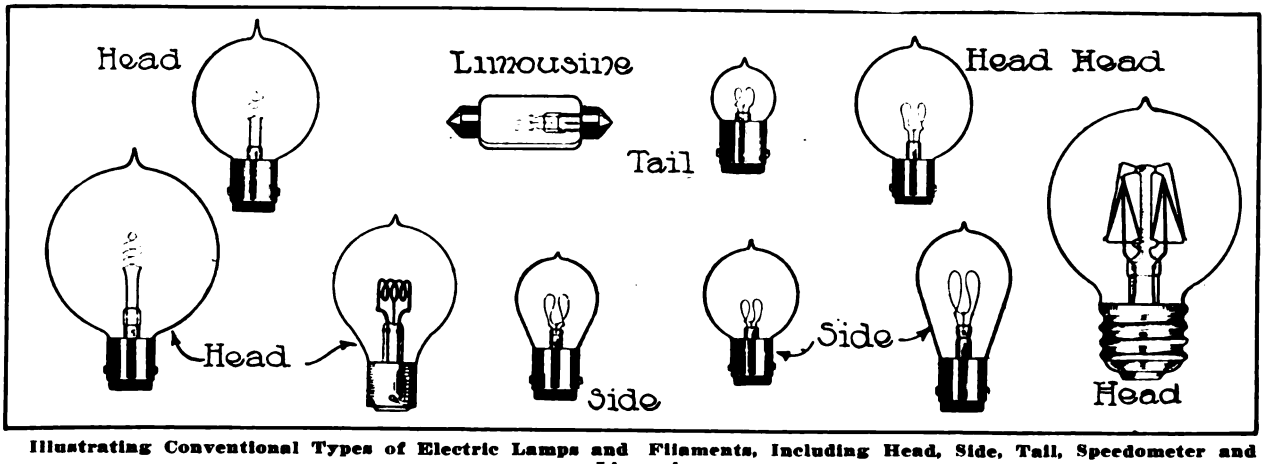
Showing Different Types of Tail Lamps: A, Esterline All Glass; B, Gray & Davis; C, Holt & Beebee.

ampere-hour capacity is limited. It is the opinion of the writer that nothing less than a 100 or 120 ampere-hour member should be employed and especially if the system is to include headlights. Regarding the use of the latter, it is optional with the owner, but it should be borne in mind that with all five lamps burning there is considerable drain upon the cells and the number of hours of service will be greatly reduced thereby. This is made clear in an accompanying table which presents statistics showing the current required to operate various groups of lights.

And it will be seen that it would require but a comparatively short time to drain the battery when employing headlights, although the side members would naturally be cut out when the large lamps were utilized.

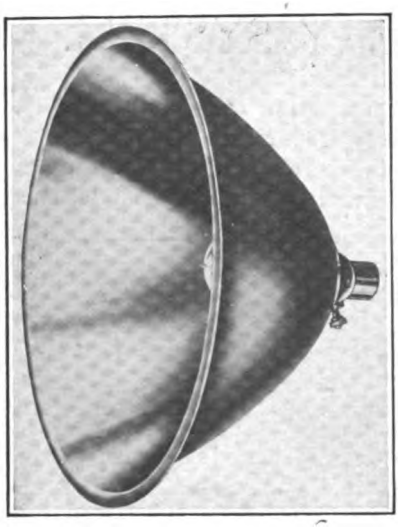
Selecting the Bulbs.

As the side and tail lights are not depended upon other than to meet the requirements of the



Illustrating Conventional Types of Electric Lamps and Filaments, Including Head, Side, Tail, Speedometer and Limousine.

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Apico Reflector for Gas Headlights.

law, it is possible to employ bulbs of low candlepower. By utilizing six-volt Mazda lamps of 1.5 candlepower for the side and rear lights considerable more service will be secured from the battery. These lamps consume .3 ampere respectively and it is obvious that many more burning hours will be derived by their use. If the system is to include headlights, two 15 candlepower bulbs, for example, these would consume five amperes and the hours of service would be approximately 24, with a 120 ampere-hour battery. If utilized with side and rear members, the service would be less. The problem of lamps is one that may be solved easily by the motorist, depending as it does to a great extent upon service desired.

Installation of Battery.

Too much stress cannot be laid upon the importance of proper installation of the battery. Irrespective of whether it be located on the running board or suspended beneath the car, means should be included for clamping it firmly. While batteries are constructed to withstand severe service they must not be allowed to slide or jounce in the container. The bottom of the box should be of wood, with grooves having holes to permit of draining any electrolyte that may be spilled. The wood should be treated with a coat of paraffine (boiling the wood in it being preferred), or some acid resisting material. Suitable ventilation should be provided as in the discharge the temperature rises. While the air should be allowed to reach the battery, foreign elements must be excluded for the reasons defined in an article upon care of batteries appearing elsewhere in this issue.

Keep the terminals bright and clean. Never allow deposits to accumulate. Connections to the positive and negative poles should be of sufficient size and the cables equipped with solid terminals. The three-cell lead type of six-volt battery should not be allowed to fall below 5.4 volts nor permitted to stand in a discharged condition for any length of time.

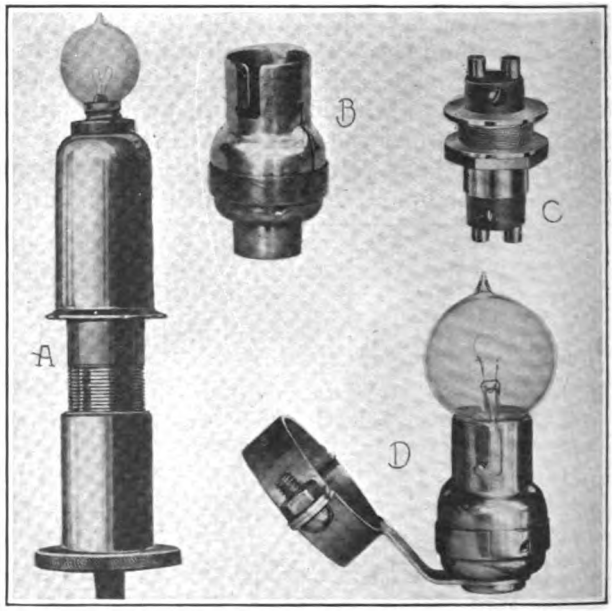
In converting the gas headlights into electrical units care should be exercised to select parabolic reflectors that are well designed for upon the parabola depends the efficiency of the light. There are many designs from which to make choice, but it should be borne in mind that the cheapest are not the most economical in the end.

Current Consumption by Various Lamps.

Lamps	Candlepower, A Lamp	Candlepower, Total	Total Watts	Amperes at 6 volts	Hours, 120 Ampere-Hour Battery
2 Head....	24	48	48.0	8.0	15
2 Head....	18	36	36.0	6.0	20
2 Head....	18				
2 Side.....	4				
1 Rear.....	2	46	48.5	8.1	14
2 Head....	21				
2 Side.....	4				
1 Rear.....	2	52	54.5	9.1	13
2 Side.....	4				
1 Rear.....	2	10	12.5	2.1	57
2 Head*...	18				
2 Side†....	4				
1 Rear†....	2	46	48.5	8.1	23

*Burning half the time. †Burning all the time.

The oil side lamps may be converted into electrical units very easily and a number of ingenious devices are marketed for this purpose. Some are of the adapter type as shown in an accompanying illustration, to install which a hole is cut in the metal part of the lamp and the parts assembled. Other designs permit of attaching the socket over the oil burner, a construction that requires



Devices for Converting Oil Lamps Into Electrical Units: A, Apico Adapter; B, G. E. Bayonet Base Candelabra Socket; C, Metal Dash Connector; D, Bayonet Socket Bracket.

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Tarvia

Preserves Roads
Prevents Dust~



Broadway, Norwich, Conn., Treated with "Tarvia B."

A Dustless Thoroughfare

"TARVIA B" is a tar product which is liquid at normal temperatures and can be applied to the surface of a macadam road from a modified sprinkling cart, no other apparatus being necessary.

The usual procedure is to sweep the road of surface dust and dirt, apply the Tarvia B and keep the traffic away for a few hours until the Tarvia has penetrated into the road surface. This grade of Tarvia is used only on roads where the rolling effect of traffic has made the interstices between the stone very small; on this account a denser grade of bitumen would not do, because it could not percolate into so closely bonded a surface. Tarvia B, however, finds its way into such surfaces and forms a matrix, holding the fine screenings in position, preventing raveling and erosion, preventing the formation of dust by automobile traffic and greatly prolonging the life of the roadway.

A typical instance of the use of Tarvia B is in Norwich, Conn., Mr. E. C. Lillibridge, the Street Commissioner there, wrote as follows:

November 15, 1912

"You ask for my opinion concerning Tarvia B to which I will say I do not believe it has any equal. We have used this material for three years and the more it is used, the better satisfaction it gives, as to preserving the road and lasting longer. We have the last year used this material on two miles of streets and today those streets are in excellent condition after the traffic of heavy teams and autos."

In addition to Tarvia B there is Tarvia A for hot surface application and Tarvia X for road construction.

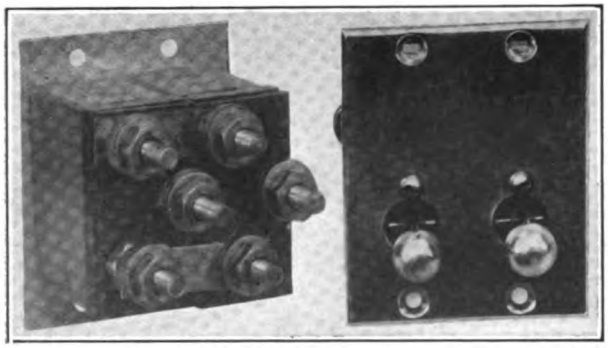
Booklet sent free on request.

BARRETT MANUFACTURING COMPANY

New York Chicago Philadelphia Boston St. Louis Kansas City Cleveland
Cincinnati Minneapolis Pittsburgh Seattle Corey, Ala.

THE PATERSON MFG. CO., Ltd.:—Montreal, Toronto, Winnipeg, Vancouver, St. John, N. B., Halifax, N. S.

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General Electric Two-Gang Flush Tumbler Switch: At Left, Busbar and Terminals; at Right, the Tumblers.

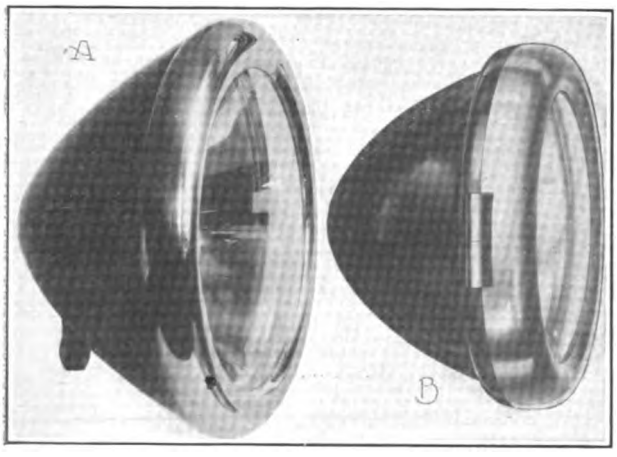
no other work than the use of a screw driver. There are a number of attachments for kerosene lamps which may be fitted without disturbing the oil fount or burner. The equipment may include means for attaching the trouble lamp, the cord carrying a plug device which makes it a simple matter to make connections on the dash.

Switches.

The type of switch will depend upon the number of lamps. If the group includes five it should be of the selective design, which permits of the use of the head, side or tail as desired. If the system comprises but the side and tail members, a single-throw switch may be fitted. A two-gang tumbler flush type switch is depicted in an accompanying illustration and is provided with a busbar and sturdy connections.

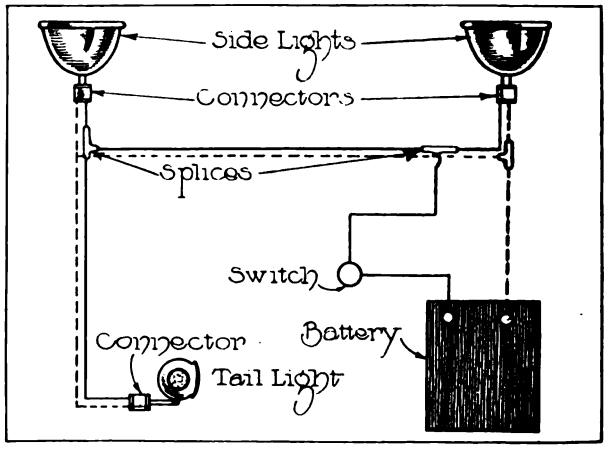
Wires.

The efficiency of the lighting system depends largely upon the wires utilized. Single or double and even triple-strand cables are marketed, but irrespective of the type employed it should be well insulated to withstand abrasion due to wear. Manufacturers of lighting cable have given special attention to the problem of wires and among the makers of standard cable are the Packard Electric Company, Warren, O., and the General Electric Company, Schenectady, N. Y. The latter company produces an armored cable having half-round brass wire armor for protection. With any type of wire it is imperative that it be moisture, heat and oil proof. Too much care cannot be exercised in securing the cable and all connections should be well soldered. Where any metal part is exposed, it may be guarded against possible short circuits by tape. Relative to the sizes of wire, Nos. 10, 12 and 14 are most commonly used.



Conventional Types of Electric Lamps: A, Esterline Golden Glow Headlight; B, Gray & Davis Side Lamp.

The wire between the battery and the switch should not be less than No. 10, while that between the switch and lamps may be No. 14. It



Showing Wiring Plan for Side and Tail Lamps with Straight Storage Battery System.

is recommended to employ No. 14 twin-conductor cable throughout, using the twin conductors of each cable in multiple for the battery leads and using one twin-conductor cable from each lamp to the switch. This makes for simple wiring and avoids cross splices. All connections are made at the binding posts of the switch and battery, and at the cable couplings of each lamp. With an arrangement of five lamps the switch must be adapted for at least three separate circuits, although provision may be made for additional lights if desired. Tampering with the lights may be prevented by locating an extra switch in an inconspicuous place to be employed to cut out the battery.

Complete data upon lamps, adapters, connectors, reflectors, batteries, etc., are supplied by the makers of these members free upon request. No reference has been made to the cost of installation of the straight storage battery system as individual requirements vary. The subject of charging the battery as well as current measuring

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No. 1 fits up to and including four and one half inches.
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devices, etc., is treated elsewhere in this issue. In conclusion it may be stated that the efficiency of the straight storage battery will depend upon the care given the cells. If the instructions of the maker are followed there is no reason why practical results cannot be secured.

PACKARD CLAIMS RECORD.

Completes 284 Miles from Chicago to Detroit in Running Time of 6:54:00.

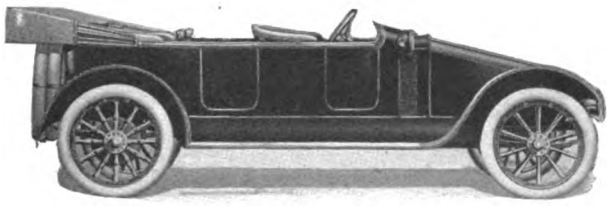
What is believed to be a record for sustained road driving under unfavorable conditions was completed recently when William R. McCulla arrived at the Pontchartrain hotel at Detroit with his new Packard machine. He left Chicago, being checked out of the New Southern hotel in that city by J. T. Murphy, the night clerk, at 2:30 in the morning, and at 9:39 he reached the Pontchartrain and was checked in by the clerk of that hostelry.

The distance was 284 miles, which was made in elapsed running time of 7:09:00. There were three stops for gasoline and tires, which occupied a total of 15 minutes. The actual running time, therefore, was 6:54:00, making the average for the entire distance of a little more than 41 miles an hour.

While automobile manufacturers are discussing the advisability of continuing national shows, accessory makers are invited to open a permanent exhibit of their products, to be known as the Auto Centre, in New York City. It is proposed to have each manufacturer in the United States maintain a booth throughout the year, in order to have its product accessible to visitors from every part of the world without the necessity of making a trip to the factory.

John M. Gorham, a New York City attorney, is at the head of the project. He estimates that at least 110 different exhibits will be in place. The idea is considered somewhat novel, but Mr. Gorham is confident that it will accomplish its main purpose to the benefit of producer and consumer.

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You know the service records of Croxton Taxicabs. They are standing years of grinding wear at the hands of careless, irresponsible drivers.

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The Croxton is made in a full line of models, "Fours" and "Sixes."

The Croxton has an absolutely reliable electric starting and lighting system; full floating rear axle; 140-inch wheel base; six-passenger body; left side drive; center control; four speeds forward, one reverse; demountable Q. D. rims; 36x4 1-2 inch tires; Thermo-syphon cooling system. The radiator is protected from damage and from mud and water splashing by being placed at rear of motor; no hot air from radiator passes over motor; motor protected by hood from dust, dirt and water. Reserve gasoline tank incorporated with cowl dash. The Croxton "Six" fully equipped, **$3,000.**

Our sales force is yet to be completed by the addition of a few good dealers.

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The Croxton Motor Car Co.

WASHINGTON, PA.

If We Were Selling Gasoline at Half Price, Would You Buy?

Well! The M & M Economizer will save you from 40 to 50% of gasoline. It will also increase your SPEED and POWER 20% with less gasoline, and less carbon.
READ THIS: Then look for next month's testimonial.

Fort Washington, Penn.
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Yours very truly,

(Signed) WM. R. WENSTROM.



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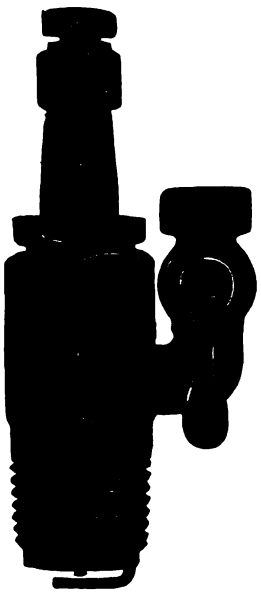
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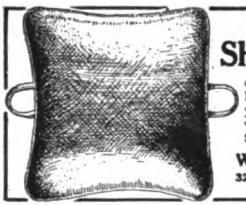
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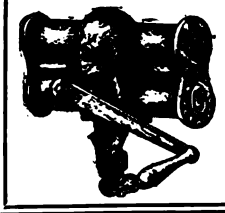
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Set of six used for starting and auxiliary to Bosch magneto, and lighting three 4 C. P. lamps, for 18 months. Afterwards were used 4 months for starting on another car.

Set of six operated Klaxon horn and gauge light from April, 1909, to date, 5 years.

Set of six ran a tail light and Klaxon horn, beside occasional use in starting, for 5 months.

Motor boat ignition: Set of six ran a single cylinder engine 2 seasons.

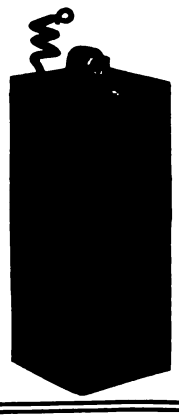
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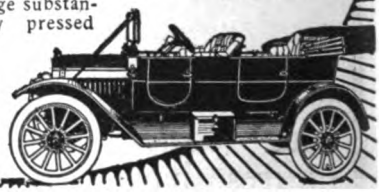
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A person in close touch with the supply and manufacturing ends of the trade was a visitor at our factory recently, and was shown the details of construction, including the machinery, testing, and assembling of the "BLACK EAGLE" Spark Plug. What he said we believe will be of interest to you, as it indicates the effort on our part to supply a high grade plug at a reasonable price. We therefore quote below his impressions.

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Sampson Mfg. Co., Alden, 8 West 61st St., New York. (Sampson.)
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United States Motor Co., 8 West 61st St., New York. (Brush, Maxwell, Sampson, Stoddard-Dayton, Columbia.)
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White Co., The, 828 E. 79th St., Cleveland. (White.)
Branches: See Cars—Gasoline Pleasure.

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Adams Bros. Co., Findlay, O. (Adams.)
Available Truck Co., 2334 Hamilton Ct., Chicago. (Available.)
Bessemer Motor Truck Co., Grove City, Penn. (Bessemer.)
Brush Runabout Co., 8 West 61st St., New York. (Brush.)
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Clark, E. S., 242 Freeport St., Dorchester Dist., Boston. (Clark.)
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Grand Rapids Motor Truck Co., North St., Grand Rapids, Mich. (Hoosier Limited.)
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Reo Motor Car Co., Lansing, Mich. (Reo.)
Sampson Mfg. Co., Alden, 3 West 61st St., New York. (Sampson.)
Sullivan Motor Car Co., 611 East Ave., Rochester, N. Y. (Sullivan.)
United States Motor Co., 3 West 61st St., New York. (Sampson, Brush, Stoddard.)
Willys-Overland Co., Toledo, O. (Overland.)

CARS—ELECTRIC COMMERCIAL.

Atlantic Vehicle Co., Factory, Newark, N. J.; 1600 Broadway, New York City; 10 Postoffice Square, Boston. (Atlantic.)
Anderson Electric Car Co., 458 Clay Ave., Detroit. (Detroit Electric.)
Couple-Gear Freight-Wheel Co., 575 Buchanan St., Grand Rapids, Mich. (Couple-Gear.)
Branches: 30th floor, Singer Bldg., New York; 178 Devonshire St., Boston.
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Branches: See Cars—Gasoline Commercial.
General Vehicle Co., Long Island City, N. Y. (G. V.)

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Cartercar Co., Pontiac, Mich. (Cartercar.)
Couple-Gear Freight-Wheel Co., 575 Buchanan St., Grand Rapids, Mich. (Couple-Gear.)
Branches: See Cars—Electric Commercial.
Knox Automobile Co., Springfield, Mass. (Knox.)
Sampson Mfg. Co., Alden, 3 West 61st St., New York. (Sampson.)
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Bretz Co., J. S., 250 W. 54th St., New York. (Hartford Cone.)

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Moller Brothers Controller & Economizer Co., 700 Betz Bldg., Philadelphia. (M. & M.)

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Canton Foundry & Machine Co., Canton, O. (Portable Floor.)

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Leavens & Co., Wm., 32 Canal St., Boston. (Leavens Shock Absorbing.)

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Milwaukee Auto Specialty Co., 128 Second St., Milwaukee.
Prest-O-Lite Company, 271 East South St., Indianapolis. (Prest-O-Carbon Remover.)
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Dover Stamping & Manufacturing Co., Cambridge, Mass. (Dover.)

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Brown Co., Inc., Chas. D., 49 Federal St., Boston. (Vellumoid.)

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Goodnow Manufacturing Co., 754 Old South Bldg., Boston. (Gasoline Gallon.)
National Motor Supply Co., 1911 Euclid Ave., Cleveland. (Tire Pressure and Gasoline Tank.)
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Ross Gear & Tool Co., 794 Heath St., Lafayette, Ind. (Ross.)

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HOISTS. (See Cranes.)

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Automobile Supply Manufacturing Co., 220 Taaffe place, near De Kalb Ave., Brooklyn, N. Y. (Newtone.)
Dean Electric Co., Elyria, O. (Tuto.)
Randall-Faichney Co., Boston. (Jericho, Jubilee.)
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Morse, Frank W., 516 Atlantic Ave., Boston.

LICENSE NUMBER BRACKETS.

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Geiszler Bros. Storage Battery Co., 514-520 W. 57th St., New York.
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Invader Oil Co., 80 Broad St., New York. (Invader.)
Branches: 284 Columbus Ave., Boston; 113 Arch St., Philadelphia; 3556 11th St., N. W., Washington, D. C.
Miller, Chas. E., 97-103 Reade St., New York. (Pan-American.)
Branches: See Accessory Manufacturers and Jobbers.
New York & New Jersey Lubricant Co., 165 Broadway, New York. (MoToRol, Non-Fluid, Kejex.)
Standard Oil Co., New York. (Polarine.)
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Branches: Boston, Philadelphia, Chicago, St. Louis, Norfolk, Atlanta, New Orleans, Dallas, El Paso, Pueblo, Tulsa, Houston.
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Emblem Manufacturing Co., Angola, N. Y. (Emblem.)
Branches: Los Angeles, San Francisco.

Hawthorne Manufacturing Co., 29 Spruce St., Bridgeport, Conn. (Old Sol Lamps.)

Miami Cycle & Manufacturing Co., 320 Hanover St., Middletown, O. (Flying Merkel.)

Swenson, B. A., 522 Broad St., Cor. Blackstone St., Providence. (Indian.)

MOTORING ORGANIZATIONS.

Federation American Motorcyclists, E. M. Estabrook, Bangor, Me.

MOTORS AND POWER PLANTS.

Rutenber Motor Co., Marion, Ind. (Rutenber.)

PATCHES.

Invincible Puncture Proof Tire Co., 53 Sabin St., Providence, R. I. (Invincible.)

National Motor Supply Co., 1911 Euclid Ave., Cleveland.

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International Metal Polish Co., Quill St. and Belt R. R., Indianapolis, Ind. (Blue Ribbon.)

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RIMS—REMOVABLE AND DETACHABLE.

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National Gas Engine Starter Co., 30-32 N. Dearborn St., Chicago. (National.)

Willard Storage Battery Co., 5716 Euclid Ave., Cleveland. (LBA.)
Branches: See Batteries.

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Boyd, F. Shirley, 903 Boylston St., Boston.

"J-M" Shock Absorber Co., 210 So. 17th St., Philadelphia. ("J-M.")
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Sager Co., J. H., 271 South Ave., Rochester, N. Y. (Peerless.)

Sumner, George, Inc., 1841 Broadway, New York. (Velvet Auxiliary.)

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Hopewell Brothers, Newton, Mass. (Paos.)
Branch: 1974 Broadway, New York.

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Simplex Aluminum Solder Co., 108 Broadway, Long Island City, N. Y. (Simplex.)

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Bosch Magneto Co., 223-225 W. 46th St., New York.
Branches: See Magnetos and Magneto Supplies.

Frontier Specialty Co., 734 Main St., Buffalo. (All-in-One.)

Heinze Electric Co., Lowell, Mass. (H. E. Co. Priming.)

Janney, Steinmetz & Co., Philadelphia.

Mosler, A. R., & Co., P. O. Box M, Mt. Vernon, N. Y. (Spit Fire.)

Randall-Faichney Co., Boston. (Mac-Kae.)
Branches: See Horns.

Splitdorf Electrical Co., 98 Warren St., Newark, N. J.
Branches: See Magnetos and Magneto Supplies.

Standard Co., The, Torrington, Conn. (Black Eagle.)

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Randall-Faichney Co., Boston. (Mac-Kae Blits.)
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Hoffecker Co., The, Motor Mart, Boston. (Hoffecker.)

Jones Speedometer, New Rochelle, N. Y.
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Warner Instrument Co., 1221 Wheeler Ave., Beloit, Wis. (Auto-Meter.)
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Marburg Bros., 1790 Broadway, New York. (Marburg-Hagen.)

Perfection Spring Co., No. 1 Plant, 2414 Superior Ave., N. W.; No. 2 Plant, East 65th and Central Ave., Cleveland.

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Boyd, F. Shirley, 903 Boylston St., Boston. (Baldwin.)

STEEL PARTS, SEAMLESS.

Standard Welding Co., Cleveland.

STORAGE SYSTEMS—GASOLINE AND OIL.

Janney, Steinmetz & Co., Philadelphia.

Scaife & Sons Co., Wm. B., Pittsburg, Penn.
Branch: New York City.

SWITCHES, LOCK.

Blackburn Specialty Co., 1120 Prospect Ave., S. E., Cleveland. (Autolock.)

TANKS, ACETYLENE GAS.

Prest-O-Lite Company, 271 East South St., Indianapolis. (Prest-O-Lite.)
Branches: See Cylinder Cleaning Compound.

TANKS FOR FUEL AND WATER.

Janney, Steinmetz & Co., Philadelphia.

Scaife & Sons Co., Wm. B., Pittsburg, Penn.
Branch: New York City.

TANKS, TIRE INFLATING.

Prest-O-Lite Co., 271 East South St., Indianapolis. (Baby Tire Filler, The Emancipator.)
Branches: See Cylinder Cleaning Compound.

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National Rubber Co., 4433 Papin St., St. Louis, Mo. (Tirenew.)
Page-Lester Co. 2644 Indiana Ave., Chicago. (Tite-Wad Rubber Putty.)

TIRES—CASINGS AND INNER TUBES.

Diamond Rubber Co., Akron, O. (Diamond.)
Firestone Tire & Rubber Co., Akron, O. (Firestone.)
Branches: See Rims—Removable and Detachable.
Fisk Rubber Co., Chicopee Falls, Mass. (Fisk.)
Branches: 811-813 Boylston St., Boston; 17½ Dorrance St., Providence.
Frontier Tire & Rubber Co., 1054 Main St., Buffalo, N. Y. (Frontier.)
Goodyear Tire & Rubber Co., Madison St., Akron, O. (No-Rim-Cut.)
Branches: In all principal cities.
Hood Rubber Co., Watertown, Mass. (Shawmut.)
United States Tire Co., Broadway and 58th St., New York. (Continental, G & J, Hartford, Morgan & Wright.)
Branches: See Rims—Removable and Detachable.

TIRES—CUSHION.

Cataract Rubber Co., Wooster, O. (Cataract.)
Branches: Boston, New York, Providence.
Firestone Tire & Rubber Co., Akron, O. (Firestone.)
Branches: See Rims—Removable and Detachable.
Motz Tire & Rubber Co., The, Akron, O. (Electric Special Motz Cushion.)
Branches: Boston, New York, Philadelphia, Pittsburg, Chicago, Kansas City, Detroit, Cleveland, Los Angeles.

TIRES—MOTORCYCLE.

United States Tire Co., Broadway and 58th St., New York. (Morgan & Wright. G & J.)
Branches: See Rims—Removable and Detachable.

TIRES—SOLID AND COMMERCIAL.

Diamond Rubber Co., Akron, O. (Diamond.)
Firestone Tire & Rubber Co., Akron, O.
Branches: See Rims—Removable and Detachable.
Fisk Rubber Co., Chicopee Falls, Mass.
Branches: See Tires—Casings and Inner Tubes.
Motz Tire & Rubber Co., The, Akron, O. (Motz.)
Branches: See Tires—Cushion.
Republic Rubber Co., Youngstown, O. (Republic.)
United States Tire Co., Broadway and 58th St., New York.
Branches: See Rims—Removable and Detachable.

TOPS AND ATTACHMENTS.

Springfield Metal Body Co., 20 Medford Ave., Springfield, Mass.

TROUBLE FINDERS.

Hopewell Brothers, Newton, Mass. (Vibrator.)
Branch: 1974 Broadway, New York.

TRUCKS—See Cars, Commercial.

TRUNK RACKS.

Connecticut Steel & Wire Co., Hartford, Conn.

TURNTABLES.

Beach Co., T. C., 108 Ottawa St., St. Johns, Mich. (Beach.)
Canton Foundry & Machine Co., Canton, O. (Universal.)

UNIVERSAL JOINTS.

Bretz Co., J. S., 520 W. 54th St., New York. (Hartford.)
Kinsler-Bennett Co., The, P. O. Box 124, Hartford, Conn. (Kant-Break.)

VALVE GRINDERS.

Wall, J. H., 290 Hope St., Bristol, R. I. (Ford.)

VULCANIZERS.

McVey Manufacturing Co., Third and Canal Sts., Dayton, O. (McVey.)
National Motor Supply Co., 1911 Euclid Ave., Cleveland. (Garage and Individual.)
Branches: In all principal cities.
Williams Foundry & Machine Co., Akron, O.

WELDING OUTFITS.

Prest-O-Lite Co., 309 W. South St., Indianapolis. (Prest-O-Welder.)
Branches: See Cylinder Cleaning Compound.

WELDING, STEEL.

Standard Welding Co., Cleveland.

WHEELS.

Eberly & Orris Mfg. Co., Mechanicsburg, Penn.

WIRES AND CABLES.

Diamond Rubber Co. of N. Y., Akron, O. (Diamond.)

WIRE MECHANISM.

Bretz Co., J. S., 250 W. 54th St., New York. (Bowden.)

WRENCHES AND COMBINATION OUTFITS.

Coes Wrench Co., Worcester, Mass.
Cutter, George A., Taunton, Mass.
Walworth Manufacturing Co., Boston. (Stillson.)

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THE ACCESSORY AND GARAGE JOURNAL

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American Motors Co.	Indianapolis, Ind.
Ames Motor Car Co.	Owensboro, Ky.
Apperson Bros. Automobile Co.	Kokomo, Ind.
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Auburn Automobile Co.	Auburn, Ind.
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Velie Motor Vehicle Co.	Moline, Ill.
Warren Motor Car Co.	Detroit, Mich.
Wayne Works	Richmond, Ind.
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Westcott Motor Car Co.	Richmond, Ind.
White Company	Cleveland, Ohio.
Wichita Falls Motor Co.	Wichita Falls, Tex.
Winton Motor Car Co.	Cleveland, Ohio.
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Willard Storage Battery Co.

Cleveland, Ohio

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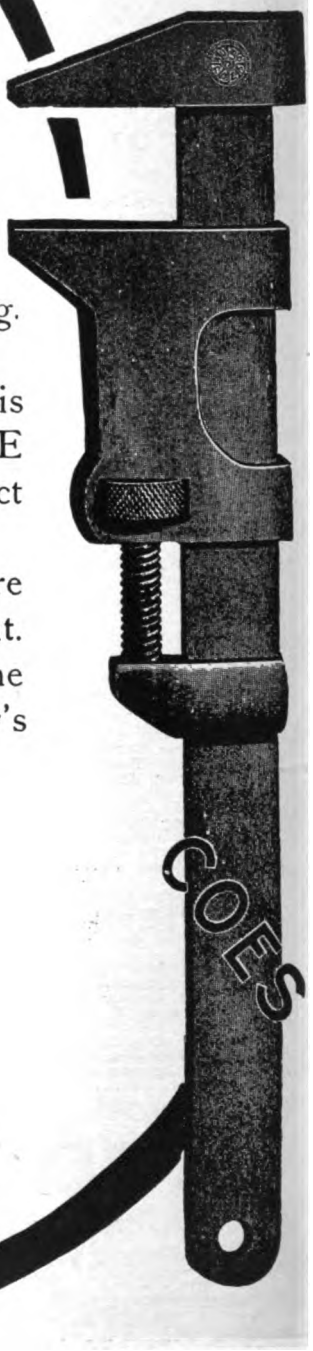
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Strength without bulk or clumsiness.
Ease of handling without slipping or bruising.
Perfect balance and right grip

Everything the motorist desires in a wrench is to be found in the "COES" AUTOMOBILE MODEL, and you will never know perfect wrench service until you pin your faith to it.

It stands to reason that the 5 per cent. more you pay for a "COES" wrench goes for 60 per cent. more quality and service—put this wrench in the tool kit and shop. You will get your money's worth.

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"Safe in the Grip of Multibestos"

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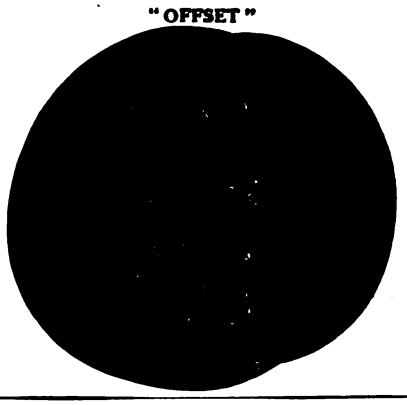
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THE 8-DAY HIGH GRADE "CHELSEA" AUTO CLOCK

"SPECIAL"



"OFFSET"



"ROUND"



"LIMOUSINE"



Primarily intended for use inside the bodies of large enclosed cars, and for such use its case can be given a variety of fine finishes. It also makes an attractive clock for use on dashboards. Only made in 2¾-inch size.

The Justly CELEBRATED 8-Day, High-Grade "CHELSEA" AUTO CLOCK (*Trade-mark*)

NOW and for YEARS the RECOGNIZED STANDARD of EFFICIENCY

Clocks built with a view to stand the jars and jolts and rough riding of Automobiles. Reputation the highest. Used by parties demanding the BEST.

☞ **ALL SIZES STATED ARE THE APPROXIMATE DIAMETERS OF THE DIALS.**

All are 8-day High-Grade. All are in DUPLEX (patent applied for) polished cast brass cases, the most thoroughly waterproof case on the market. The "SPECIAL" clocks show dial on an angle; its inner cased clock, when removed from the outer (locked) case, is excellent for use on mantels, bureaus, etc., when touring; its outer case is screwed to dashboard by hidden screws. The "SPECIAL" clocks are in large demand from dealers for owners of finest cars.

The MOTOR CLOCK has the same clock movement which for years we have supplied for the hard use on Locomotives, Steam Fire Engines, etc.; its dial is of same appearance as the Auto Clock dial, but the Auto Clock movement has a somewhat finer train.

The 3½ MOTOR "OFFSET" is likely to prove a quick, ready seller. Very attractive.

Ask for our new Auto Clock Circular and Price List, dated Oct. 1, 1911, illustrating and pricing the above and three new models, C, D and E.

PRICE LIST (Per Clock)

		"Round"	"Offset"	"Special"	"Limousine"
"CHELSEA"	2¾-in. Auto Clock.....	$26 00	$28.00	$36.00	$28.50
	3½-in. Auto Clock.....	28.00	30.00	45.00	Only made in
	3½-in. Motor Clock.....	24.00	26.00	41.00	2¾-inch size

If wanted fitted with outside (patent applied for) stem-winding and stem-setting device—the best of its kind—Add $3.00 to above Price Lists. (Such device we do not apply to the "Motor" Clocks or "Special" Auto Clocks.)

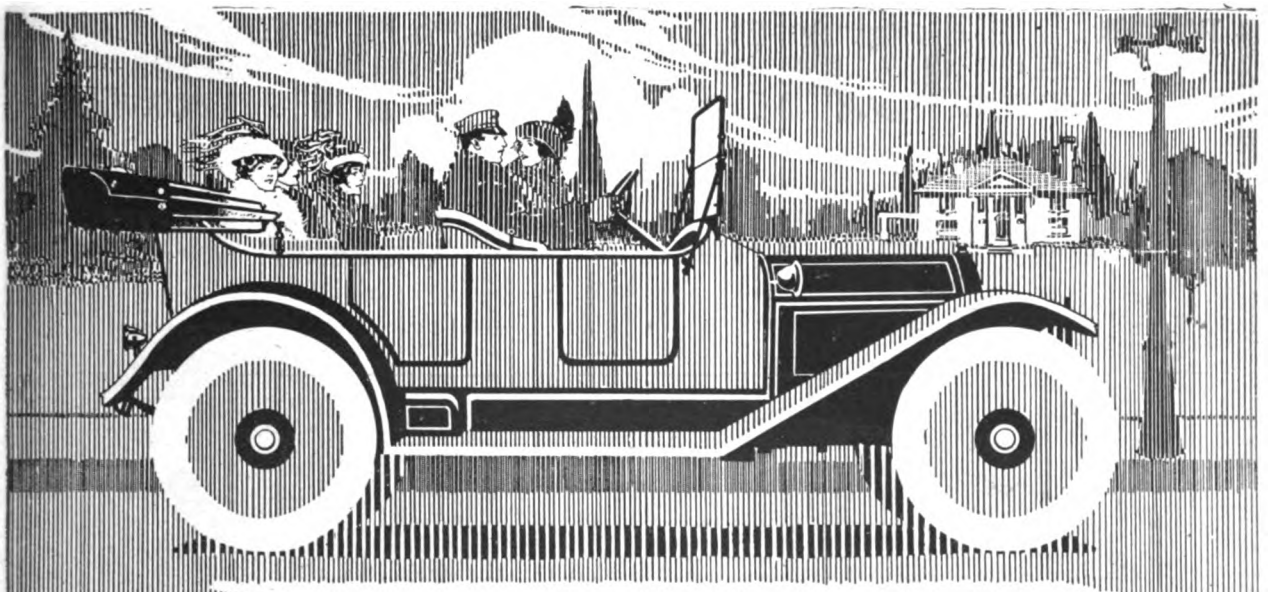
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You want the Best? Ask your DEALER for the "CHELSEA"

On Sale by Leading Jobbers and Dealers

CHELSEA CLOCK CO., 16 State St., Boston, Mass.

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The Cutting a Car of Extraordinary Value

Cutting

You don't need to be an expert judge of motor car values to recognize the superior value the Cutting offers.

When you see the car you will at once recognize tangible evidence of its extraordinary value.

You will encounter, all over the Cutting, the evidence of experience, ingenuity and of purpose.

You will see them expressed in the features that make for increased comfort; increased convenience and economy of operation; increased safety for the passengers and longer life for the car.

These specifications tell only one-half the story:

Long stroke motor—enclosed valves—self-starter—120-inch wheelbase—larger wheels and tires—deep, rich, luxurious upholstery.

The real Cutting supremacy lies in the organization back of the car—the organization that builds character and quality into every detail of engineering and construction.

—TO THE DEALER—

Dealers who want the biggest sales value in the motor car field should look up the Cutting.

You will be impressed with the unmistakable evidences of value—the things that attract the buyer to the car; that make the Cutting an easy and ready seller.

If you are interested and feel capable of selling Cutting cars do not hesitate, but get in touch with us at once.

We can offer you good territory that will assure lasting and profitable business.

Write or wire for complete information.

1913 MODELS

B-40—Five-passenger touring car $1475.00.
A-40—Two-passenger roadster $1475.00.

The same chassis is used for both models, the bodies being interchangable. Electric starter and lighting system will be installed on either model at a slight additional cost.

All models fully equipped.

Cutting Motor Car Company

311 Mechanic Street Jackson, Michigan

W. E. KELTON, 272 W. Newton Street, Boston, Mass.

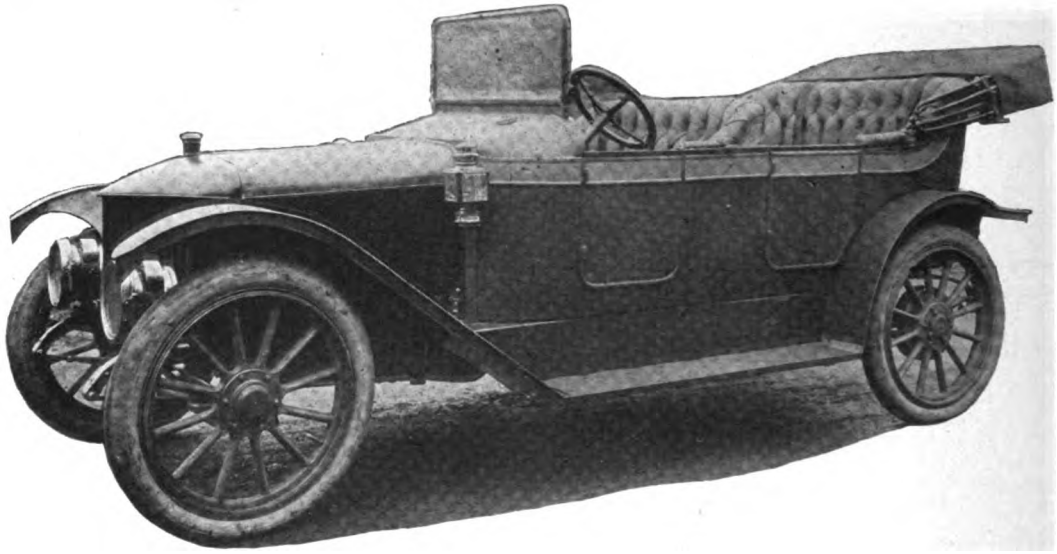
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WATER COOLED MOTOR **CAMERON** FOUR SPEEDS FORWARD

"30"

5-Passenger Touring Car (Fully Equipped) $975



A distinctive car that has power, speed, durability, comfort, easy riding, and above all is ecomomical. The work of a master mind.

The Cameron motor is the **mechanical sensation** of the season. The engine is 3 5/8 bore x 5 in. stroke and delivers 30 H. P. It gives remarkable power and efficiency because it has side valves in the head with no pockets.

Another feature used only in cars selling from $4000 upward, is the four speeds selective type of transmission. Four speeds forward with a direct drive on all speeds.

The **car** is **cranked from** the **seat.** The crank is on the dash. This is connected by a chain to a gear that meshes with a gear on the fly wheel. This gear is slid into mesh with the fly wheel by a small foot pedal for starting, and throws out automatically. It requires little effort to start the engine.

In appearance the **Cameron** has a decided foreign aspect. It is low hung with a pointed radiator.

SPECIFICATIONS

MOTOR. 4-cylinder, 3⅝-in.x5 in., water-cooled.
VALVES. Rocker arms all on one side, driven from one cam shaft.
LUBRICATION. Automatic oiling system.
IGNITION. Splitdorf magneto, dual, throttle on top of steering wheel.
GASOLINE TANK. In cowl, 22 gal. capacity.
CLUTCH. Leather-faced cone on fly wheel, self-adjusting. Clutch pedal also operates brake.
TRANSMISSION. Cameron System, direct drive on all speeds, obtained selectively. Located on rear axle, operated by hand lever, four speeds forward.
TIRES. 32x3½-inch.
AXLES. Front, nickel steel tubular; rear, full floating type, annular ball bearings.
BRAKES. 12-inch internal expanding, with 2½-inch braking face, emergency brake operated by lever, operating brake attached to clutch pedal.
SPRINGS. Front, semi-elliptic; rear, full elliptic with scroll.
WHEELBASE. 112-inch.
CONTROL. Centre.
DRIVE. Left-hand.
RADIATOR. Tubular, almost double cooling capacity.
CARBURETOR. Kingston.
COOLING. Thermo syphon.
LAMPS. Gas or electric with Prest-O-Lite tank or battery.
STARTER. Starts from seat.
EQUIPMENT. Best silk mohair top, side curtains and top boot windshield, complete tool kit and tire repair outfit, pump and jack, speedometer, head, side and tail lamps.
BODY. Two or five-passenger.
WEIGHT. Approximately 2,200 lbs.
PAINT. Black with red or gray running gear, with similar striping.
WIRE WHEELS. Optional at $20 additional.
PRICE. $975 F. O. B. Beverly.

CAMERON MFG. CO. Beverly, Mass.

Distributors for Boston, HOLLANDER MOTOR CO., 1070 Boylston St., Boston, Mass.

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The Economy of Quality

¶ If you are going to sell your car in a few days, you can use any old oil and let the other fellow pay the subsequent repair bills.
But if you expect to run your car three thousand miles further—

INVADER OIL

will save you money and give you a better car to sell—or keep.
¶ Invader Oil may cost a little more to buy—but it's by far the cheapest oil to use

INVADER OIL CO. 80 Broad St. NEW YORK

Lessees of CHAS. F. KELLOM & CO.

NEW ENGLAND BRANCH: 284 COLUMBUS AVE., BOSTON.
PHILADELPHIA WASHINGTON

I-O-C GEAR OIL

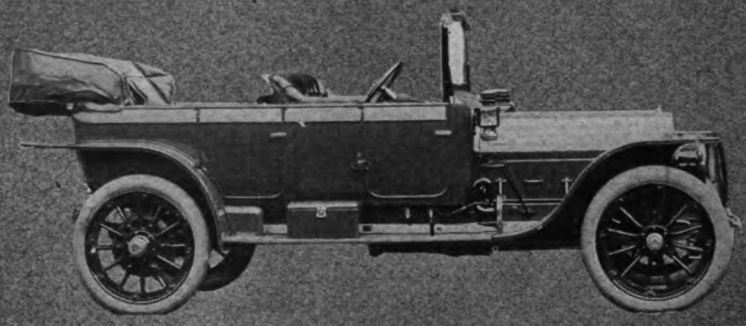
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"Puts Noisy Gears To Sleep"

It is the only oil manufactured especially and exclusively for the lubrication of automobile transmission gears.
Write for descriptive booklet and prices.

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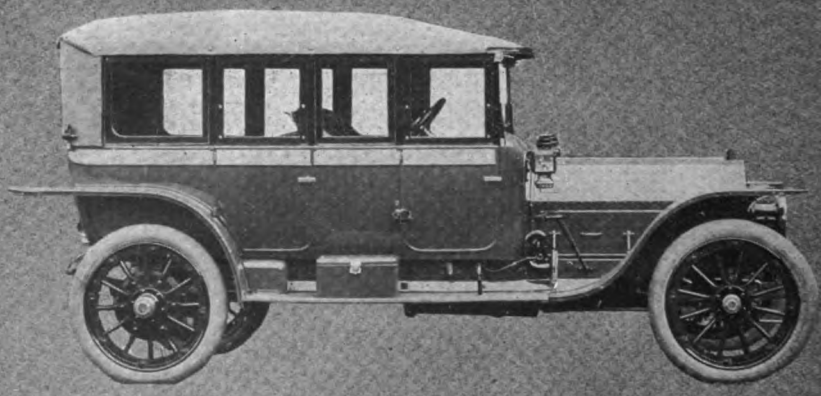
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Our new light weight convertible bodies protect you from heat, cold, rain, snow and dust.
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SPRINGFIELD METAL BODY CO.,
SPRINGFIELD-MASS.



SPRINGFIELD, MASSACHUSETTS.

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We Pay a Premium to Secure the Finest Quality of Asbestos—

When you buy RAYBESTOS, you get brake lining made of the highest grade of asbestos for which we pay a premium. Low grade asbestos has never been used in making RAYBESTOS and never will be used —that's one of the big differences between RAYBESTOS and "ordinary" brake lining.

If you want safety, wear, coefficient of friction and quality demand and insist upon the QUALITY lining—

TRADE MARK Raybestos REG. U.S. PAT. OFF.

"THE ORIGINAL AND BEST ASBESTOS BRAKE LINING"

RAYBESTOS Brake lining possesses the highest coefficient of friction—it "grips," it holds, it prevents accidents. Demand and insist upon getting RAYBESTOS. The name is stamped in every foot of lining to prevent substitution. Ask your dealer. Comes in all widths. Easily attached.



THE ROYAL EQUIPMENT COMPANY

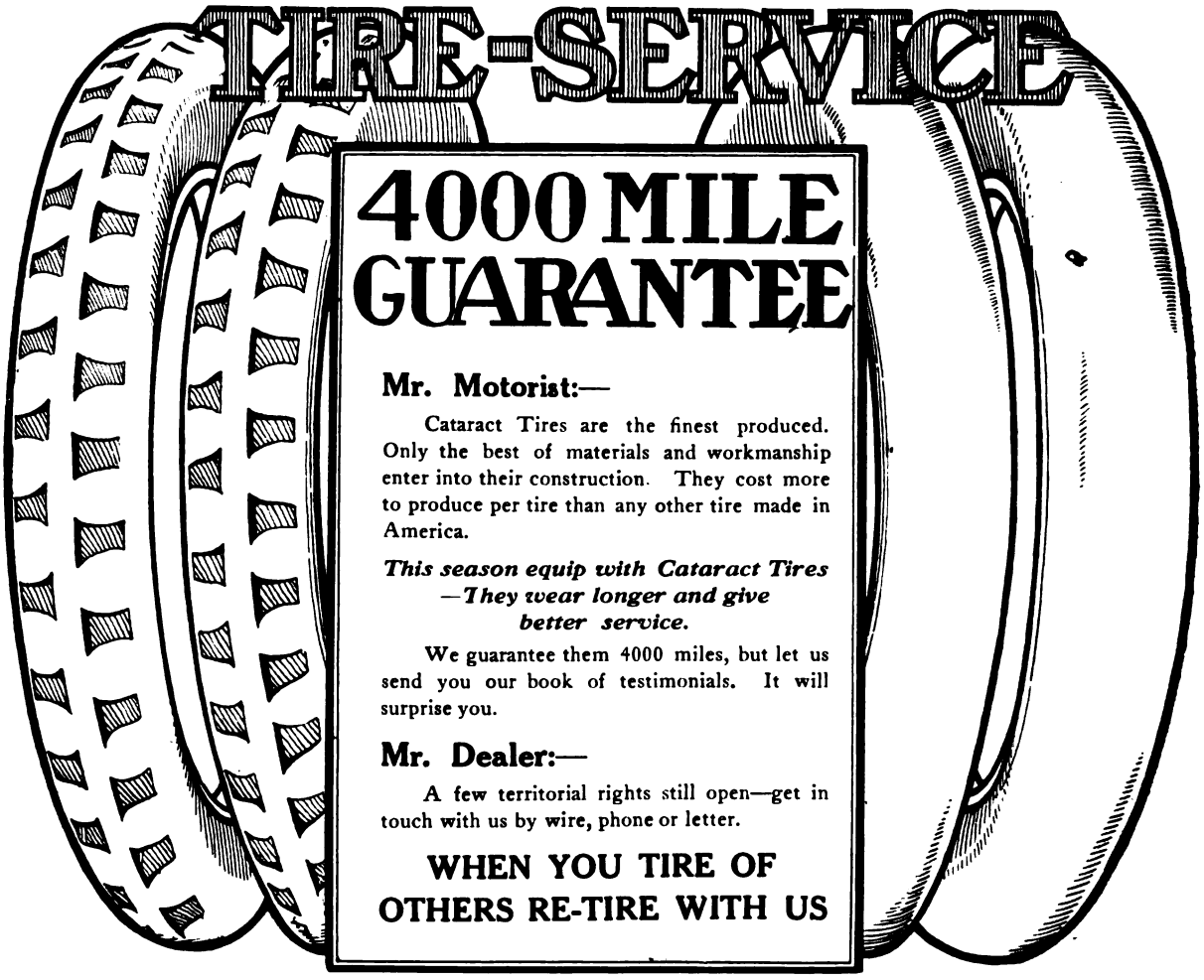
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We also make Duplex and Raymond Brakes and Gyrex, the Mixer

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CATARACT

TIRE-SERVICE



4000 MILE GUARANTEE

Mr. Motorist:—

Cataract Tires are the finest produced. Only the best of materials and workmanship enter into their construction. They cost more to produce per tire than any other tire made in America.

This season equip with Cataract Tires —They wear longer and give better service.

We guarantee them 4000 miles, but let us send you our book of testimonials. It will surprise you.

Mr. Dealer:—

A few territorial rights still open—get in touch with us by wire, phone or letter.

WHEN YOU TIRE OF OTHERS RE-TIRE WITH US

Cataract Rubber Company

WOOSTER, OHIO.

NEW ENGLAND BRANCH-66 HEREFORD ST BOSTON, MASS.

NEW YORK — PROVIDENCE — BUFFALO

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20 Miles to Gallon

Planhard Co.: Lawrence, Mass., July 13, '12.

Gentlemen:—Enclosed find check for carburetor. I feel perfectly satisfied. It does 20 miles and over on a gallon. Can recommend it to any one. G. A. SCHMIDT.

Two Years Without Adjustment

Brenham, Tex., June 29, 1912.

Gentlemen:—Do you furnish extra gasoline needle valve for the "Planhard" carburetor? If so, please let me know what the price is. I have been using your carburetor for two years on a Sheffield motor car, and it is the first repair it has ever required. R. WEBB.

Cadillac Owners

Edgewater, N. J., May 21, 1912.

The Planhard Mfg. Co.

I am very much pleased with my new Planhard Carburetor. I made a test of gasoline consumption from Edgewater to Hyde Park, N. Y., and return, and got a fraction **over nineteen miles** to the gallon. This is on my Cadillac.

Yours very truly,

JOHN H. HINNERS.

Ford Owners

Chicago, O., July 1, 1912.

Gentlemen:—Enclosed find draft to pay for "Planhard" carburetor for my model S Ford car. It is very satisfactory; in fact, I have never bought anything for the car that I paid so cheerfully for, as I have a smoother running engine with more power, and get **more mileage per gallon** of gasoline, and my engine runs much cooler.

H. W. GRANDON.

Gallon Less Per Hour

THE GRAY & PRIOR MACHINE CO. (Portland, Me. Branch)

Gentlemen:—I used one of your Planhard carburetors on the 20 H. P. model X, Hartford motor, in my semi-speed boat, "Hartford III," during the season of 1912. My boat is well equipped to make tests, as I use a **tachometer.**

I get better control with a Planhard and use practically **one gallon of gasoline less per hour** than when I used one of the most popular carburetors in use today. I have put a Planhard on my automobile as well. A. N. SMITH.

Improve Operation

SHERIDAN (Ind.) GARAGE.

Planhard Co. July 8, 1912.

Gentlemen:—Herewith find check. The carburetors are O. K., displacing two others of well known make, and improving operation of car.

H. B. JOHNSON.

Superior to Ordinary

HOWE & MEEHAN,

Wellesley, Mass.

Gentlemen: — Please find money order inclosed. Carburetor is far superior to the ordinary. Very truly yours,

W. E. MEEHAN.

3 3-4 More Miles Per Hour

When Planhard carburetors were put on the 6 cylinder 4 cycle Frisbie motor of the fast boat Delphi II, she increased 230 R. P. M. and 3¾ more miles per hour.

More Speed on Goshen Engine

Planhard Mfg. Co. Groton, Conn., Feb. 8, 1913.

Dear Sirs:—I have put a Planhard on my single cylinder 6-8 H. P. Goshen Engine. It is ahead of anything I know of. It gives 50 R. P. M. more than the ——— I took off. With the Planhard I can start cold or hot without priming, which few others can do. Yours truly, E. A. SCRIVEN.

Bath Marine Construction Co.—"The gasoline consumption at normal power was better than others, and it would develop much more power when pushed." H. D. Bacon, President.

"Fifty miles without a miss."—Geo. E. Grosvenor, Crescent, Mich.

"To use the vernacular, 'some carburetor.'"—W. R. Fleming, 3311 Broadway, N. Y.

"Has them all beaten to a frazzle."—A. G. Linden, Cleveland, Ohio.



PLANHARD Carburetors

Are Making Automobile History

New England Distributors,

Eisner-Lenk Company

1074 Boylston St., Boston.

Made for 2 and 4 cycle motors either low or high speed.

Prices: Standard Pipe Size.

¾ inch	$9.00	1 inch	$10.00
1¼ inch	11.00	1½ inch	12.00
2 inch	20.00	2½ inch	24.00

3 inch $32.00.

DEALERS: Get your Profits. Write.

Send for Free Chart

We have charts (automobile), (motor boat), which show the saving in a given time on a 10 per cent. to 25 per cent. saving with 20-cent gasoline. You can locate the spot where a Planhard will pay for itself.

Southern N. J. & Eastern Penn., Gustave Muller, Jr., Bourse Bldg., Philadelphia.

Planhard Mfg. Co., 1790 Broadway, N. Y.

Gentlemen:—Send at once your chart and book concerning Planhard Carburetor.

Name .....St.....

City .....State.....

Engine .....Carburetor....Size....in.

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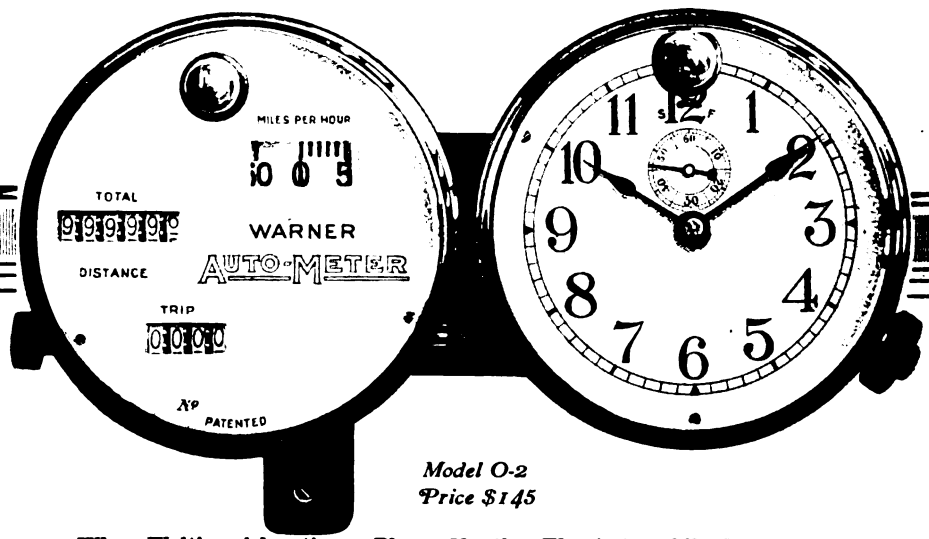
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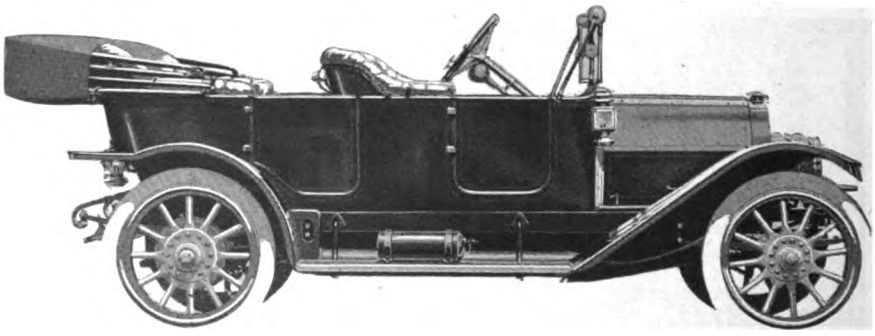
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Page

*Boston Show Produced Big Business....21
Boston's Importers' Salon....26
*Boston's Commercial Vehicle Display....27
*New and Novel Accessories....30
*Dealers Still Busy with Shows—
Bridgeport Holds Its Best Display....33
Oregon Sees New Models....33
St. Louis' Spring Display....33
Many Sales in Syracuse....34
Eastern Maine Display....34
Norfolk's Second Annual....34
Intermountain Automobile Show....35
Business in Cedar Rapids....35
Many Outside Dealers....35
Louisville Club Celebrates....36
New Records in Des Moines....36
Denver's Southwestern Display....36
Utica Sees New Designs....37
Big Results at Peoria....37
Buffalo's Truck Exhibit....37
*Mechanical Notes for Owners—
Automatic Pressure Motor Starter....38
Variable Gap Spark Plug....38
Adjusting the Steering Gear....39
*Equipping the Private Garage, Part V....40
Motoring Laws and Their Enforcement—
New York Motorists Protest....42
Let Well Enough Alone....42
Eleven Bills in California....42
Motor Trucks in Pennsylvania....43
Provisions of Kansas Bill....43
Non-Residents to Be Exempt....43
New West Virginia Law....43
*The Rudge-Whitworth Wire Wheels....44
Peugeot Drivers Named....47
Forms Chauffeur's Bureau....47
*Brown Impulse Tire Pump....47
*Correspondence with the Reader—
Noting Battery Discharge....48
Bosch Magneto....48
Current Rectifying....49
Parry Car Parts....49
Oil for Ford Cars....49
Flash and Fire Tests of Oils....49
Maker of Alpha Coil....50
Rattling Windshield....50
Backs Car up the Hill....50
Ford Creates New Record....50
Imports and Exports....50
*Two Types of Bodies for Cutting Chassis....51
Editorials....54
Protecting the Customer....55
Advantages of Large Wheels....55
Motorists Were Wasteful....56
Interesting Mileage Record....56
*Details of Curtiss Aerial Yacht....57
*Foreign Department—
Utilizes Steel Artillery Wheels....58
Increase in German Exports....59
Austrian Alpine Tour....59

Page

Americans Win Swedish Races....59
Motoring in New Zealand....60
Notes from Foreign Lands....60
*Industrial News—
New York Seeks Detroit's Place....61
Experiments with Kerosene....62
Offers Fuel Economy Trophy....62
Case Leaves Lansden Company....62
Quadrupled Former Output....63
Sponsel Rotary Valve Motor....63
To Direct Borland Sales....63
Two Lyons-Knight Cars....63
Branch Factory in Saginaw....64
May Locate in the South....64
Adds Another Building....64
Garford Heads New Concern....64
Another Car from Detroit....65
To Make Engine Parts....65
With Holly Carburetor....65
*The Repair Shop and Garage—
New Air-Friction Carburetor....66
Some Useful Cements....66
*Horsley Converted Disc Valve Motor....67
*Hitenagraph, a Device for Testing Ignition....68
Garage and Repair Shop Equipment—
Detectorphone....69
J. M. Mobilene Packing....69
Hardy Ratchet Wrench....69
Fisher Quick Acting Vise....69
Formulae and Useful Mechanical Tables....69
*O-Tak-A Tire Removers....70
*In the Realm of the Motorcyclist—
The Boston Show....71
Satisfied with the Emblem....72
Shipping Sidecars Abroad....72
To Select Convention Seat....72
With the Yale in Maine....72
Volunteer Motorcycle Patrol....73
New Registered Repair Shops....73
Bi-Car in Canadian Plant....73
Cross Country Winter Trip....74
Baker Surprises Cubans....74
Three Stolen Machines....74
Hedstrom Retires from Office....74
Recently Appointed Commissioners....74
Boyd's Winter Motorcycle....76
Legless Rider on Minneapolis....76
O-Tak-A Tire Remover....76
American Machines Race in India....77
Thor Maker to Move....77
Club Notes, Here and There....77
*The Texaco Trade Mark....78
Concerning National Shows....78
*With Invader Oil....78
Planning Wolverine Tour....79
Another Peru Factory....79
*Gaulois Tire Distribution....79
New Incorporations and Maker's Notes....80
Recent Patents....81
Coming Events....81
New Books Received....81

*Indicates article is illustrated.

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Index To Advertisers

American F. N. Company.....77
Anti-Rust Paint Co.....87
Austin Automobile Co.....89
Barrett Manufacturing Co.....84
Beach Co., T. C.....90
Borne, Scrymser Company.....13
Bosch Magneto Company.....83
Boyd, F. Shirley..... 3
Bretz Company, The J. S.....89
Broadway Central Hotel.....90
Brown Company.....92
Buckeye Manufacturing Co.....90
Cameron Mfg. Co..... 6
Cartercar Company.....92
Cataract Rubber Co.....10
Chelsea Clock Co..... 4
Coes Wrench Company..... 2
Cole Motor Car Company.....92
Croxton Motor Car Co., The.....85
Cutter, Geo. A.....87
Cutting Motor Car Co..... 5
Dean Electric Company.....91
Dixon Crucible Co., Jos.....87
Dover Stamp. & Mfg. Co.....92
Eagle Oil & Supply Co.....88
Emblem Manufacturing Co.....73
Emery Mfg. Co.....19
Empire Automobile Co.....90
Englebert Tyre Co.....20
Federation Amer. Motorcyclists..77
Firestone Tire & Rubber Co.....88
Fisk Rubber Company.....87
Gaulois Tire Co.....17
Geiszler Bros. Storage Bat. Co..88
Goodnow Mfg. Co.....90
Goodyear Tire & Rubber Co.....87
Gray Specialty Co.....92
Harris Oil Company, A. W.....84
Hawthorne Mfg. Co.....88
Haynes Automobile Co.....88
Herreshoff Motor Co.....91
Hoffecker Company, The.....82
Holtzer-Cabot Electric Co.....84
Hoyt Electrical Instrument Works 89
Ideal Motor Car Company.....85
Indian Refining Co.....Cover
Invader Oil Co..... 7
Invincible Tire Co.....83
Jackson Automobile Co.....86
Janney, Steinmetz & Co.....92
J. H. Tonneau Shield Co., The....85
J. M. Shock Absorber Co.....88
Johns-Manville Co., H. W.....87
Jones Speedometer Company.....85
Kissel Motor Car Company.....85
Knox Automobile Company.....82
K-R-I-T Motor Car Co.....88
Leavens & Co., William.....88
Lenox Motor Car Company.....87
Marburg Bros.....87
McVey Mfg. Co.....90
Mea Magneto.....87
Mercer Automobile Company.....82
Miami Cycle & Mfg. Co.....75
Michigan Motor Car Co.....91
Miller, Chas. E.....Cover
Moller Brothers Controller & Economizer Co.....86
Mosler & Co., A. R.....87
National Motor Vehicle Co.....86
New Departure Mfg. Co.....89
Nordyke & Marmon Co.....86
N. Y. & N. J. Lubricant Co.....15
O-Tak-A Tire Remover Co.....85
Owen & Co., R. M.....91
Paige-Detroit Motor Car Co.....90
Perfection Spring Co.....92
Pierce-Arrow Motor Car Co..Cover
Pilot Car Sales Co.....90
Planhard Mfg. Co.....11
Pyrene Co. of N. E.....83
Randall-Faichney Co.....82
Remy Electric Company.....89
Reo Motor Car Company.....91
R. I. V. Company..... 3
Royal Equipment Co..... 9
Sager Company, J. H.....86
Selden Motor Vehicle Co.....88
Shaler Co., C. A.....87
Speedwell Motor Car Co.....87
Splitdorf Electrical Co.....82
Springfield Metal Body Co..... 8
Standard Co., The.....91
Standard Oil Company.....88
Standard Welding Co.....90
Stewart-Warner Corp.....12
Studebaker Corporation.....92
Sumner, George, Inc.....86
Swenson, B. A.....77
Texas Company, The.....88
United States Tire Co.....87
Valvoline Oil Company.....91
Waite Auto Supply Co.....91
Warren Motor Car Company.....90
Weed Chain Tire Grip Co....Cover
Willard-Storage Battery Co..... 1
Willys-Overland Company.....14

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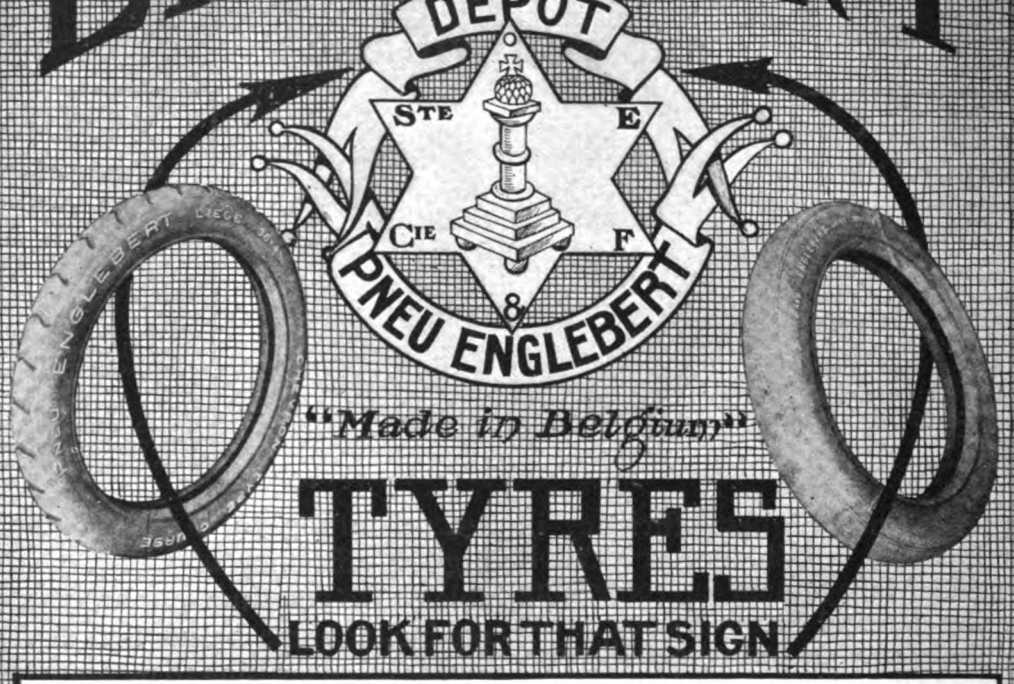
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THE AUTOMOBILE JOURNAL

VOL. XXXV, No. 4 MARCH 25, 1913 Price, $1.00 the Year

BOSTON SHOW PRODUCED BIG BUSINESS.

Everybody Made Sales, Including the Accessory Exhibitors---Largest Attendance in the History of the Industry---New England Loyally Supports Dealer's Display--Beauty of Decorative Treatment Exceeds Past Efforts.

BOSTON has given the motor car industry another splendid surprise. If the Boston automobile show still acts in the capacity of a barometer with respect to the year's business, then 1913 is to be the most prolific year in the history of the industry. The term biggest and best hardly seems sufficient to describe the results disclosed at the 11th annual pleasure car display, which came to an end in Mechanics' building March 15.



General View Across Grand Hall, Mechanics' Building, During Boston Pleasure Vehicle Display, Showing Beauty of Decorative Scheme.

The situation is one which does not admit of a ready explanation. When the national show in New York closed Jan. 18, it was freely predicted that the volume of sales in Boston would be decidedly less than in former years. This undoubtedly was based upon the results obtained in New York, since many manufacturers have expressed themselves as very much disappointed over the business transacted at that exhibition.

A month later the national show in Chicago achieved a new record in number of sales. Several makers report that the amount of business done in that city was such as to bring about a change in opinion with regard to the advisability of continuing the policy of exhibiting directly. The increased volume of sales in Chicago was

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Looking Toward the Stage in Grand Hall, Representing View Through Palace Entrance.

taken to mean that the future market for automobiles would be found in the Middle West instead of in the East.

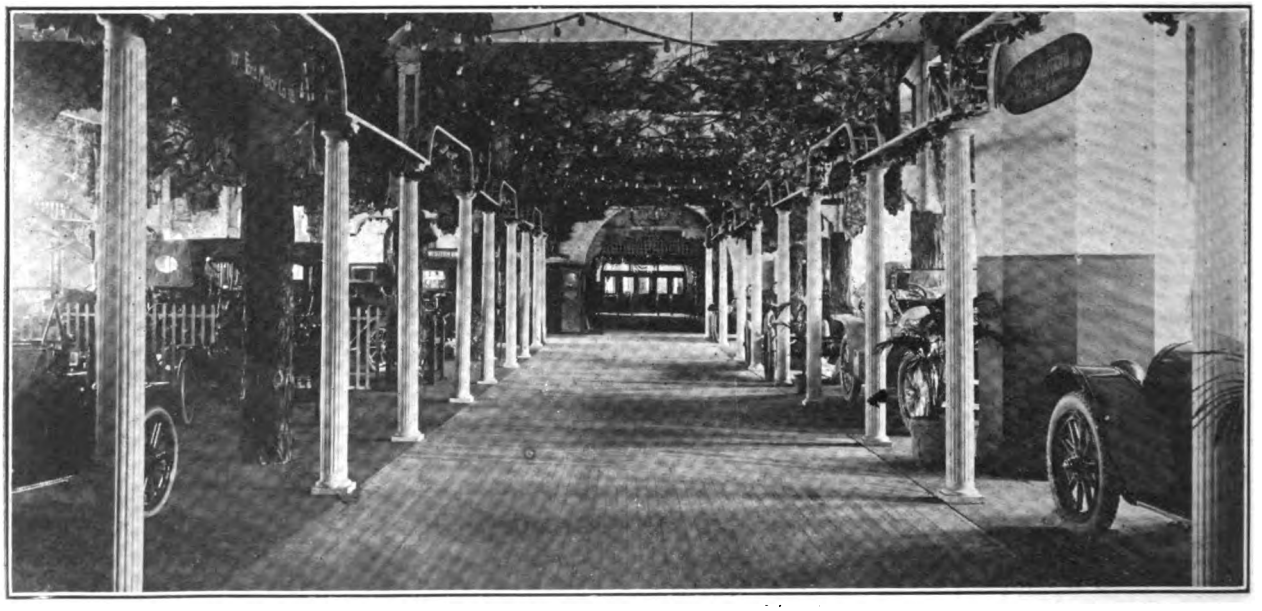
The Boston Automobile Dealers' Association, and Chester I. Campbell, its veteran show manager, maintained that these results only served to prove their contention that the proper time to hold a motor car exhibition was just previous to the opening of the actual driving season. A new phase of the situation appeared this year, in the discussion respecting the relative merits of the national and the local dealer's show. Boston and New England appear to have been anxious to demonstrate that a local dealer's show held in the spring of the year just before the opening of the driving season presents the best possible combination for results.

It is only necessary to talk with manufacturers of cars and accessories, some of whom assisted in the Boston display with a decided degree of reluctance, to realize the splendid success achieved this year. And the most surprising feature of all lies in the fact that practically every accessory exhibitor feels that he secured his full share of the business of the week. The only exceptions are those few instances where the unfortunate limitations of even such a large structure as Mechanics' building compelled the exhibitor to accept what he regarded as a somewhat undesirable location.

More than 245,000 people visited the show.

COMPARATIVE FIGURES FOR 1913 SHOWS.

	New York	Chicago	Boston
Total makes on display	90	96	107
Gasoline	85	73	93
Electric	5	13	13
Steam	..	..	1
Total cars and chassis	350	316	323
Touring cars	168	153	171
Runabouts	62	40	65
Closed cars	66	73	44
Chassis	54	50	43



Looking Down One of the Aisles in Exhibition Hall, with Marmon Display at the Left and Pope-Hartford Machines on the Right.

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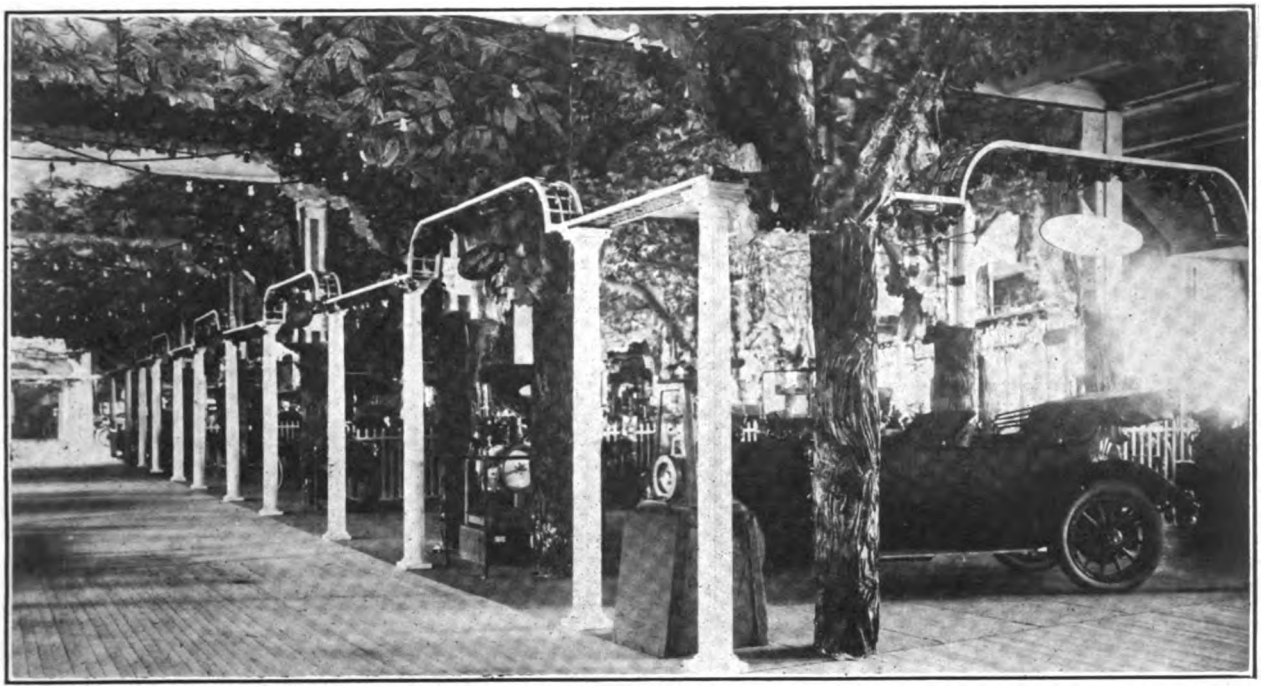
New records for attendance were established each day and evening, with the exception of Monday. Forty thousand persons entered the building the opening night, without counting the 3200 exhibitor's passes issued to those connected with the various displays. Wednesday was Society Day, and usually this has been the lightest day of the show. This year the building was crowded throughout both afternoon and evening. Even larger crowds appeared Thursday and Friday, and on the last day Huntington avenue was filled with people waiting for the doors to open at 10 in the morning.

Perhaps it was because many of them have been attending the Boston show every year until they are well known by the dealers, or it may have been a concerted effort on the part of the people of Boston and New England to assist the Boston Automobile Dealers' Association in demonstrating its point with reference to the biggest and best exhibition. Certainly, there was something about the crowds which seemed to convey an impression of mutual interest in the success of the display.

Last year, it was estimated, after a canvass of the exhibitors, that business amounting to very nearly $2,000,000 was closed during the week. A like canvass this year indicates an even larger volume of sales, and of course there were many "prospects." With respect to the accessory makers and dealers, one concern, which has a manufacturer's proposition, purely and simply, closed an order which netted $40,000. This was one of the companies which exhibited with reluctance, little thinking that business could be transacted with manufacturers at the Boston show. An entirely independent record was made in sales of accessories and fittings calculated to make a direct appeal to the owner.

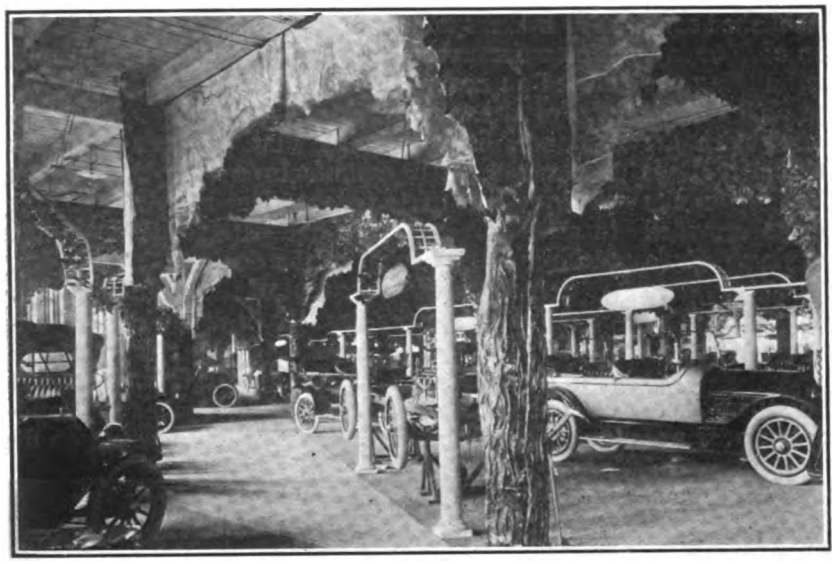
Some idea of the extent of the exhibition may be gained from the fact that there were 107 different makes of cars and 1116 separate kinds of accessories disposed about the 105,000 square feet of space on the three floors of Mechanics' building. These figures are from the contracts on file with the management and indicate the most representative showing of automobiles and fittings ever assembled under one roof. In addition there was a creditable showing of motorcycles, although not as large as it should have been considering the market afforded, and an increased number of machinery exhibits. If a suggestion may be pardoned in this connection, it would prove of value to the motoring public if it were possible to secure additional exhibits of this character another year.

As a spectacle, the display was remarkable for its beauty. Accompanying illustrations but faintly portray this view of the show. In Grand hall the conception of the Hanging Gardens of



The Old Fashioned Garden of a Century Ago, as Seen from the Entrance to Exhibition Hall, with Columbia and Maxwell Cars in the Centre.

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Still Another View of the Old Fashioned Garden, with Speedwell Display Prominent.

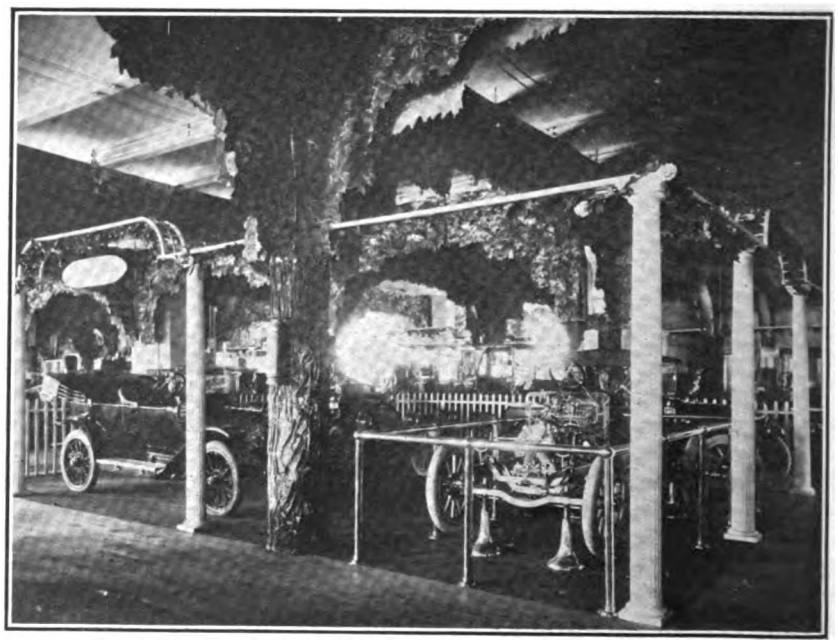
Babylon was admirably worked out. On the main floor the cars were grouped among the lofty palm trees in such manner as to cause the observer to make a mental comparison between the grandeurs of ancient Babylon with the luxurious simplicity of one of the wonders of the 20th century.

The old fashioned garden of a century ago in Exhibition hall was another splendid artistic treatment. Here the cars were arranged in an immense shaded bower, the various exhibition spaces being divided by picket fences, through the pickets of which the old fashioned hollyhocks and other flowers peeped at the visitor in a most fascinating manner. It was in this portion of the display that some of the most interesting specially designed bodies were to be seen, each with its special setting calculated to impress the beholder with the particular type of beauty.

Down stairs in the basement —that portion of Mechanics' building which always has been conceded as practically impossible of responding in a satisfactory manner to the wizardry of the artist—several cars were to be seen amid surroundings every bit as attractive as those on the main floor. Some of the specially designed bodies were to be found here as well. Of course, the machinery exhibits were to be found in the basement, and a large number of accessories besides. And here also were the motorcycles.

Upstairs, where most of the accessory displays were made, was treated with greenery and bunting wherever it was possible to use them judiciously. And it is surprising how attractively such commonplace articles as oils and tires may be arranged to assist in the decorative scheme.

In considering the display of cars, comparisons must be made with the national exhibitions in New York and Chicago. Eight makes were seen for the first time this year at a show in any way approaching this magnitude. These were the Ford, K-D, Kelsey, Moyer and Nyberg gasoline machines; the Bailey and Grinnell electrics and the Stanley steamer. At least one, the K-D, made its first public appearance. Thirteen makes were shown for the first time in Boston, these being the Chevrolet, Davis, Detroiter, Edwards-Knight, Henderson, K-D, Little, Marathon, Michigan and Moline gasoline; Borland, Grinnell and Standard electric.



One of the Individual Gardens, in Which the Overland Line Was Exhibited.

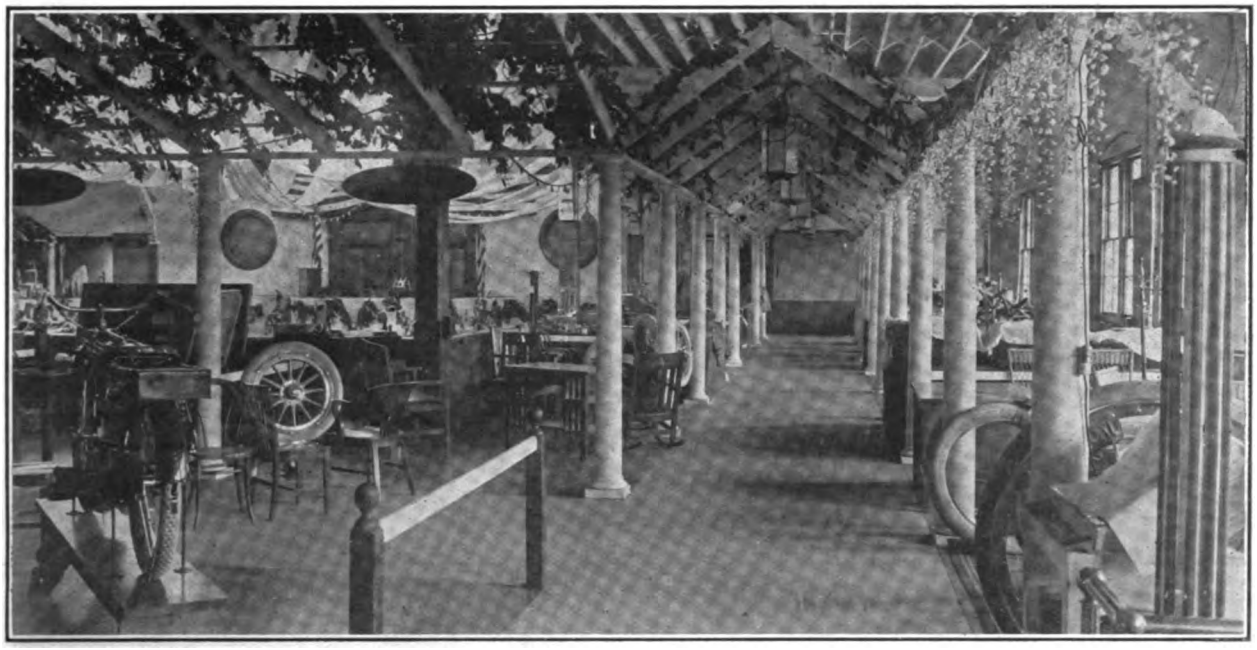
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The Ford Motor Company, Detroit, has changed its product somewhat in the method of reinforcing the rear axle system, and several refinements were noted in the body construction and arrangement of details. The six-cylinder Moyer, made by H. A. Moyer, Syracuse, N. Y., has been redesigned, although possessing many of the characteristics presented in its first appearance in Boston a year ago. The four-cylinder car also is changed by the addition of an electric lighting and starting system, at least. The Kelsey motorette had the distinction of being the only three-wheeled machine in the show, without counting the motorcycles of course, and was presented as a new roadster, with a two-cylinder, four-cycle, opposed engine and other changes in mechanical details. The Nyberg is made by the Nyberg Automobile Works, Chicago, and is now produced in four models, two with four-cylinder engines and two with six.

S. R. Bailey & Co., Amesbury, Mass., presented the Bailey electric line, including a new roadster model. As heretofore, the cars are designed to use the Edison battery exclusively. The Grinnell, made by the Grinnell Electric Car Company, Detroit, also appeared in a new model, a clear vision brougham in which all five passengers are seated so as to face forward. The Stanley, made by the Stanley Motor Carriage Company, Newton, Mass., was the sole representative of steam propulsion. The latest addition to the line is a machine utilizing a smaller engine than the others, rated at 10 horsepower.

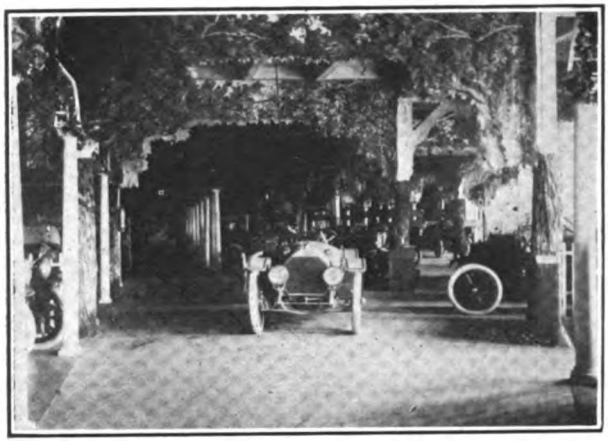
Aside from the K-D, which is entirely new and is considered in more detail elsewhere, there were several models of the better known cars which presented slight changes since the line was exhibited at New York and Chicago. In most instances these were in the nature of minor refinements, either in the design of the body or in the attachment of the fittings. It also was noticeable that several manufacturers had made provision for an electric lighting and starting system, either as standard equipment or at the option of the purchaser. At least two well known makers, the Packard and Lozier, have joined the list of those supplying machines with left hand driving position.

Perhaps the most noticeable innovation was the use of an electric gear shift on the S. G. V. While the speed changing lever is still retained and supplied with the car for use by the owner if preferred, the new model carries a series of push buttons on the wheel. The transmission affords four forward speeds and reverse, so that there are six buttons, one of these being the neutralizer. Pushing the proper button arranges suitable solenoids so that a pressure of the clutch pedal completes the circuit and the gears are meshed. This applies to each of the forward speeds and the neutral position, but the reverse is secured mechanically, through the use of a cam.



Where the Accessories Were Arranged About the Light Well in Exhibition Hall, Showing Attractive Decorative Scheme in That Section.

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Indicating Shaded Bower in Exhibition Hall, with Lenox Display in the Foreground.

The display of accessories was the most complete that has been seen at any show this year. A few well known lines which were not represented at either New York or Chicago were shown by local dealers and branches, while the list of strictly new fittings and supplies was much longer than at either of the national exhibitions.

BOSTON IMPORTERS' SALON.

Many Foreign Cars and Some American Makes Displayed in Copley-Plaza Hotel.

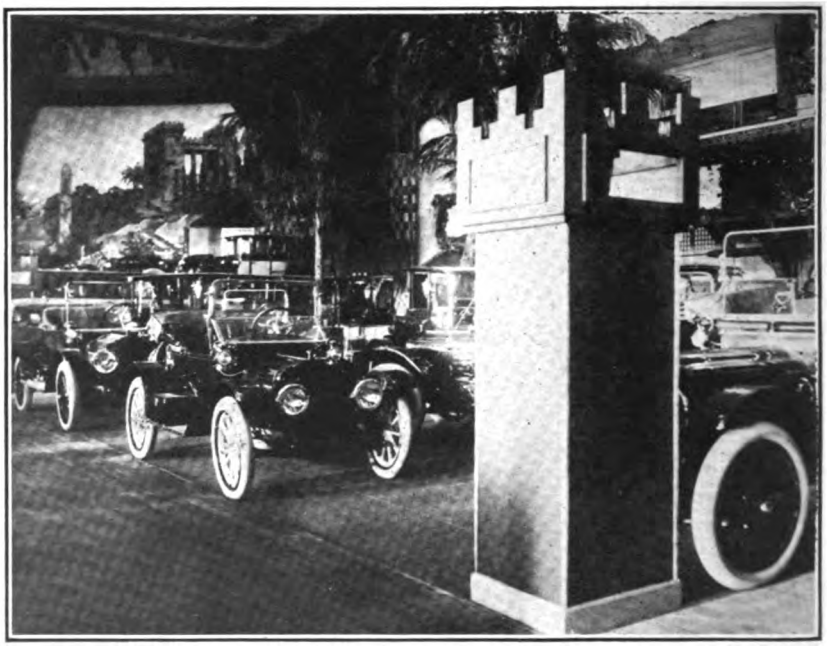
For the first time in its history Boston experienced an Importers' Automobile Salon, the dates selected being those conforming with the annual show of the Boston Automobile Dealers' Association. The event was staged in the grand ballroom of the Copley-Plaza hotel. Several foreign makes and a few American machines were displayed in such manner as to call special attention to the body equipment, although one or two of the foreign chassis were shown separately.

In many respects the salon was similar to that which was held in the Hotel Astor, New York City, just previous to the opening of the national show in Madison Square Garden and the Grand Central Palace. Practically the same cars were seen at a salon in Philadelphia during the progress of the annual dealer's show in that city.

The foreign makes displayed were: Benz, Metallurgique, Lancia, Isotta Fraschini, De Dion-Bouton, Minerva and Mercedes, representing Germany, Belgium, France and Italy. The American machines were: Two Hendersons and one each of the Keeton, Simplex and Peerless. The last named was located in the corridor, and like the others was particularly rich in its body appointments.

In one respect at least, the display of the Cataract Rubber Company at the Boston show was particularly unique. Cataract tires for both pleasure cars and trucks were seen for the first time, but the central feature was the handsome painting by William Harnden Foster, valued at $1000 and conceded by art connoisseurs to be the best reproduction of an automobile racing scene ever attempted in oil.

From New York City to Cleveland, O., by way of Philadelphia and Pittsburg, Penn., crossing seven ranges, including the dreaded Cone mountain of the Cumberland range, and covering a distance of 590 miles over winter roads in 26:23:00 actual running time, was the test recently given the new Chandler six-cylinder car by Engineer Whitbeck and Sales Manager Emise. The new machine is being manufactured at Cleveland by the Chandler Motor Car Company. It's initial announcement was made at a private display during the recent show in Chicago.

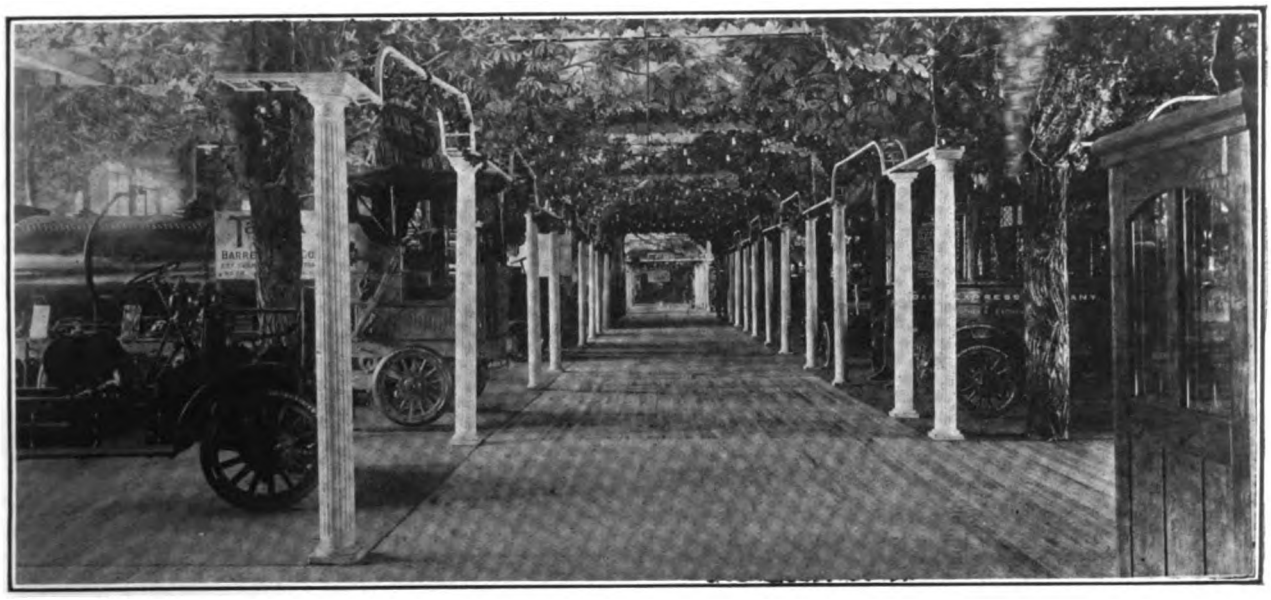


The White Corner in Grand Hall, Indicating Details in the Artistic Treatment Employed.

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BOSTON'S COMMERCIAL VEHICLE DISPLAY.

THE annual show of the Boston Commercial Motor Vehicle Association, which was opened at Mechanics' building, Huntington avenue, the evening of March 19, and which will be concluded March 26, is unquestionably the best exhibition of service vehicles ever made in Boston, and is expected to be the most productive of any display ever held in America. The show has not as many exhibits as were seen at either New York or Chicago, but it is made up of the best known machines in the industry, and it has a quality that is uniformly higher than was seen at any of the previous displays of the year. It is not an exhibition of freaks or innovations, and practically every vehicle, even those shown for the first time, conforms to engineering standards and conventional design.



View Along the Main Aisle in Exhibition Hall, Mechanics' Building, During Boston Truck Show.

If there was one thing more than another impressed upon the manufacturers and their representatives at the show, and with comparatively few exceptions the makers were represented during the early part of the exhibition, it was the unusual interest manifested and the actual transactions consummated. The attendance thus far has been such as to indicate a total more than double that of the 1912 show and it can be stated conservatively that there were very few attracted by curiosity and not by business motives.

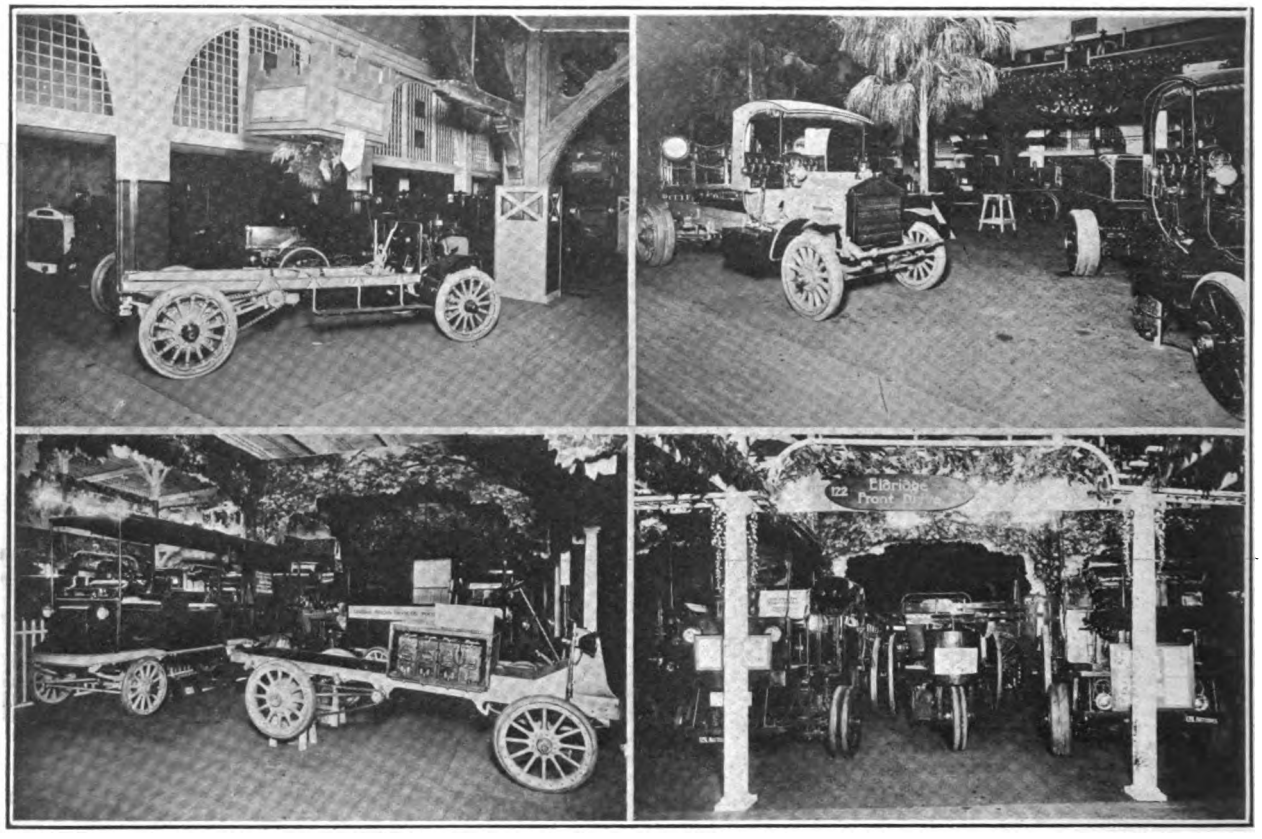
From all sections of New England came the visitors, and the number from outside of Boston and the suburbs was surprisingly large. The majority were business men who desired to learn from observation of the machines and personal examinations what information was desirable relative to equipment that might be contemplated, and the knowledge possessed by many was conclusive evidence that the subject of motor vehicle transportation was being investigated carefully and thoroughly. Those who did not know something of the machines of the type they believed might be adapted to specific service were comparatively few, and many had detail information of a number of machines that indicated careful study and analysis of each vehicle.

The show is in the splendid setting of the pleasure car exhibition that preceded it, and from this point of view might be interesting to those who attend from curiosity, but while the majority of the vehicles are those displayed elsewhere and are clean and polished, there is a decided contract between the beauties of a hanging garden or a forest and the machines that are designed, with rare exceptions, for the hardest kind of road work. The musical programmes of the orchestras and the solos of singers were entirely lost in the buzz of the motors operating the dumping bodies and the earnest conversation of the visitors.

The exhibition of tractors is not large, it being confined to the Knox-Martin machine, which has been a standard in the market for two years or more, and the Couple-Gear gasoline-electric,

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which is one of the first machines of this type built in America. One reason for this, however, is that there are but few makers in the country producing vehicles of large carrying capacity. The Knox-Martin tractors shown are two in number, with and without a body. The latter is equipped with a trailer of large capacity with stationary body with chute discharge at either side, this being designed for use in comparatively narrow streets and to comply with the exacting traffic regulations of some of the cities where the traffic is congested. The Couple-Gear tractor is fitted with a trailer built for the use of a large Boston lumber firm and is of a size that will carry 8500 to 9000 square feet of board, and so designed that the load may be dropped in two or three minutes.



A Few of the Individual Exhibits: Upper Views, Left to Right, Bessemer and Pierce-Arrow, Both in Grand Hall; Lower, G. M. C. and Eldridge and Couple-Gear in Exhibition Hall.

The machines with quick unloading bodies are of large size and intended for use by firms handling coal, gravel, sand, building material and the like, and these range from three to five tons in capacity. These are fairly numerous and among them are the Pierce-Arrow, Peerless, Packard, White, Speedwell, Locomobile, Velie and Alco trucks, all of which were shown at New York and Chicago, and of these the Pierce-Arrow, Peerless, Packard, White and Locomobile are fitted with power hoists. In addition to these at the G. M. C. stand is shown a miniature Lally body that is equipped with a manual hoist of new design. Manual hoists are also shown at the Peerless, Packard and Alco stands.

The majority of the bodies shown with the smaller vehicles are of the platform, express and enclosed types, and these are in many instances what may be regarded as standard constructions. The brewery trucks are also numerous, one that attracts much attention being on a White chassis that has a very high crate body, which may be used for both barrels and racks. This may be regarded as a combination design.

Of the new machines, shown for the first time, one of the most interesting was the two-ton, single-wheel driven Eldridge dumping body cart, built for the Metropolitan Coal Company of Boston. This is the second one of the kind constructed, the first being used by a New York concern with considerable success. The cart has a special forebody that has a single Couple-Gear wheel, which is driven by a three horsepower motor, and is carried in a massive cast steel fork, which is mounted much the same as is the for-

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ward wheel of a bicycle. This fork is operated by a large hand wheel and may be turned to any angle desired. The forebody is carried on a large collar and has a very large bearing. There are no springs and the dual solid rubber tire is regarded as sufficient to absorb practically all the road shocks. The usual Couple-Gear wheel is mounted on an axle stub on which the wheel revolves, there being a large bearing in the inside disc of the wheel, and generally the stub is so pivoted that it may turn in a yoke in the axle end. In this case the axle extends through both discs and is anchored in the fork ends, but the drive is unchanged in principle.

The single seat for the driver is mounted on full elliptic springs and is free from jar. The battery cradle is mounted directly behind the front wheel and this is carried on helical springs that protect it against road shock. The springs are placed at the corners of the cradle and the guides prevent any throw of the battery. The rear of the forebody is extended so that the platform rests on the dead axle supported by large wheels shod with steel tires, and on this platform is a pair of trunnions on which a metal body of two tons capacity is mounted, helical springs being placed under the body to maintain it rigidly when being driven light.

The Sowers machine is rated at 3000 pounds capacity, and the first chassis is exhibited. It is built by the Sowers Motor Truck Company, a Boston concern, and it is the design of Charles Basle, who was noted as driver of racing cars in this country and abroad. The machine is in no way radical, and it very generally follows standard practise, but throughout the construction is heavy and an unusually wide margin of safety is noticeable. The chassis exhibited is a seat above the motor type, and this has a 120-inch wheelbase. The body is designed to give a loading space 126 by 72 inches. The seat behind the motor type has a wheelbase of 140 inches and the same loading space.

The motor is a 25 horsepower Wisconsin, with bore of 3.75 inches and stroke of five inches, having an S. A. E. rating of 22.5 and an actual production of more than 30 horsepower. The engine is a block type with large bearings and enclosed valves, designed for heavy duty. It is lubricated by a gear driven pump that forces lubricant to all the main bearings and by splash, and it is cooled by a thermo-syphon circulation of water through a square tube radiator suspended on springs, supplemented by a fan back of the radiator. The ignition is by a Bosch high-tension magneto and the carburetor is a standard float feed type. The clutch is a leather faced cone with springs under the facing to prevent harsh engagement.

The transmission gearset is a selective sliding gear type affording three forward speeds and reverse, and the shafts and gears are nickel steel. The gears have very wide faces. The jackshaft and gearset are assembled together and are suspended at three points, the jackshaft housing being carried in very heavy hangers. The drive is by chains from the sprockets on the jackshaft to those on the rear wheels. The frame is a reinforced nickel steel channel section 4.5 inches width and four inches depth. The springs are semi-elliptic forward and platform rear construction. The rear axle is three by two inches, a nickel steel forging, and it has very large spindles. The front axle is an I section of extra weight. The wheel bearings throughout are New Departure annular double ball type. The tiebar and the drag link are very heavy and are hardened and carefully fitted. The steering gear is a worm and nut design, that may be adjusted for all wear. There are two brakes, the service set being internal expanding and the emergency set external contracting on drums 14 inches diameter and 2.5 inches face on the rear wheels. Both brakes are equalized. The gearset and emergency brake levers are at the right side, the clutch and the service brake are actuated by pedals, and the spark and throttle levers are mounted on the steering column. The wheels are 36 inches forward and 40 inches rear, shod with 3.5 and four-inch solid tires respectively. The gasoline capacity is 18 gallons and the speed at maximum is 16 miles.

The Edison electric delivery wagon, built by the Edison Electric Vehicle Company of America at Lawrence, Mass., which was shown for the first time, has several novel features. It is worm driven, a Brown transmission being used, and with this design the drive is through the master leaves of the platform spring at the rear and a radius rod that is pivoted for a horizontal movement on the rear axle housing and pivoted for a vertical movement from a heavy frame member just at the rear of the forward motor bracket. The rear spring forward ends are fixed in hangers and the rear ends are shackled. Practically the same construction is used for the forward suspension, the forward ends of the side members being fixed in the spring horns and the rear ends being shackled to the cross member, which is mounted on a frame member. The Edison battery is carried in a shallow cradle. The machine has a capacity of 1000 pounds and large loading space.

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NEW AND NOVEL ACCESSORIES THAT APPEAL TO MOTORISTS

Burn-Boston Batteries.

A battery having all the conveniences of the dry cell and possessing additional advantages in that the electrolyte is a liquid, is the Burn-Boston, made by the Burn-Boston Battery & Manufacturing Works, 19 Doane street, Boston. It differs from the conventional dry cell in that it is not affected by moisture and does not deteriorate when out of service for a considerable period. Heat or cold has no effect upon the cells, which occupy relatively the same space as dry members. These are securely sealed, may be subjected to severe service and are not impaired by vibration. The connections are unusually durable and practical. The zinc terminal comprises a special wire equipped with a terminal, while the negative member is sturdy and eliminates connecting troubles. The voltage of the batteries is standard. The most prominent quality of the Burn-Boston battery is its long life. Instances are quoted by the company in support of this contention. A special trial offer is made and a booklet will be forwarded free on request.

Apco Ford Valve Grinder.

The work of grinding in the valves is made easier and accomplished more successfully when the proper tool is employed, one that fits the head of the valve. The Auto Parts Company, Providence, R. I., maker of Apco specialties, is marketing a special grinder for model T Ford automobiles which is not only inexpensive, but is decidedly practical. One of the several qualities of the tool is that it will fit under the dash and permit of grinding the valves in the No. 4 cylinder, which is difficult of access with ordinary grinders. The Apco is constructed of gray iron, highly polished and heavily nickel plated. It is very compact.

Tremo Horn.

A horn noticeable for its light weight and compactness is the Tremo, made by the D. Henry Bonner Company, Inc., Cambridge, Mass. It is made in four sizes, these being for varying horsepower, and that shown in the accompanying illustration is designed especially for model T Ford cars. The horn proper is a hollow sphere and is integral with the coupling that is slipped over the muffler pipe. The exhaust gases are diverted into the signal by a lid which normally is held away from the coupling member by a spring. The horn is actuated by a pedal and cable in the conventional manner and a quality of the signal is, in addition to its clear, musical tone, that back pressure and consequent noise are eliminated.

Driver Lamps.

Driver lamps will appeal to those motorists who wish to utilize electric side and tail lamps in place of oil units. Although the lamps are very compact they are capable of projecting a beam of light a considerable distance and have been commended by the authorities in several states. The unit comprises a small rubber socket having a powerful lens and reflector, the entire construction being very sturdy. In addition the bulbs cannot be tampered with. The lamps are made in two styles, one for the side and the other for the tail or speedometer. The last named type is made to throw a white light on the license number, and each consumes but .2 ampere. It is stated that three lamps will give 150 continuous hours of service with an Edison battery. The equipment comes complete including three sockets, bulbs, screws, wire, one extra bulb, etc. A detachable key for a concealed switch is also included in the system. Lamps are provided for varying voltages, including three, six and eight. The Herbert S. Potter Company, 24 Commerce street, Boston, distributor for the Edison storage battery, markets the lamps.

Arnold Electric Vaporiser.

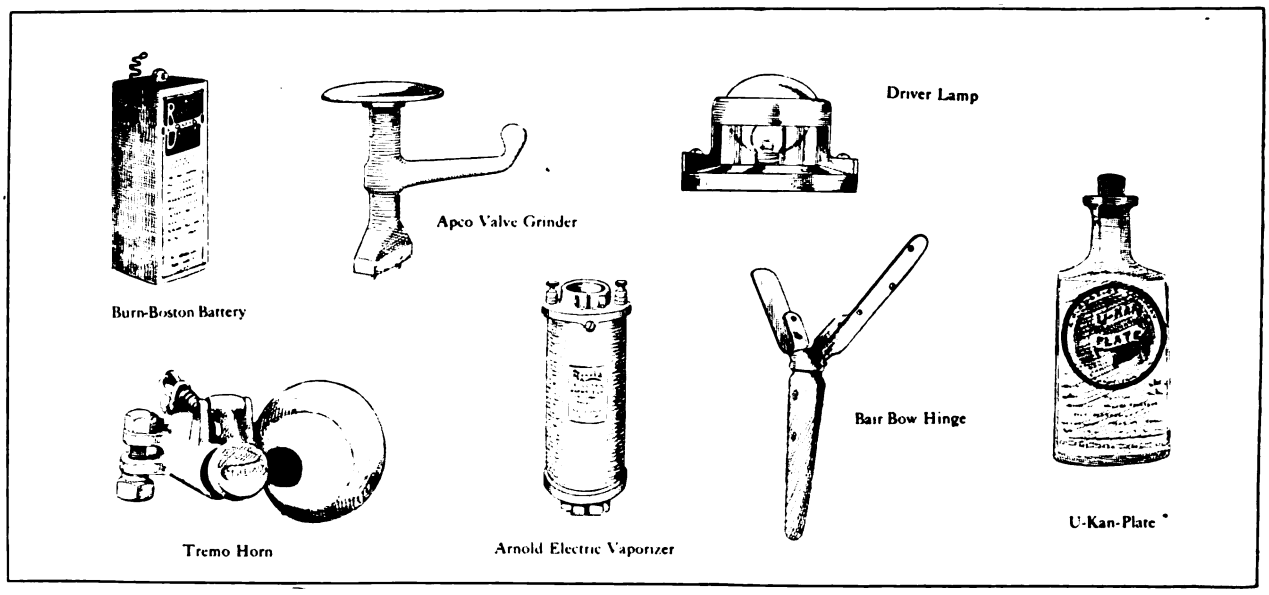
The Arnold electric vaporizer, manufactured by the Arnold Electric Company, 93 Massachusetts avenue, Boston, is designed to make easy the starting of the motor when cold and the principle involved is that of heating the air passing to the carburetor. The device is very compact and is placed over the hot air tube, being secured by clamps constructed integral therewith. Current is supplied from the conventional battery to two terminals and when the switch is closed it takes but a few seconds to heat the electric vaporizer which is supplied with heat until the motor is sufficiently warm. The Arnold vaporizer is easily attached and consumes but little current.

Bair Bow Hinge.

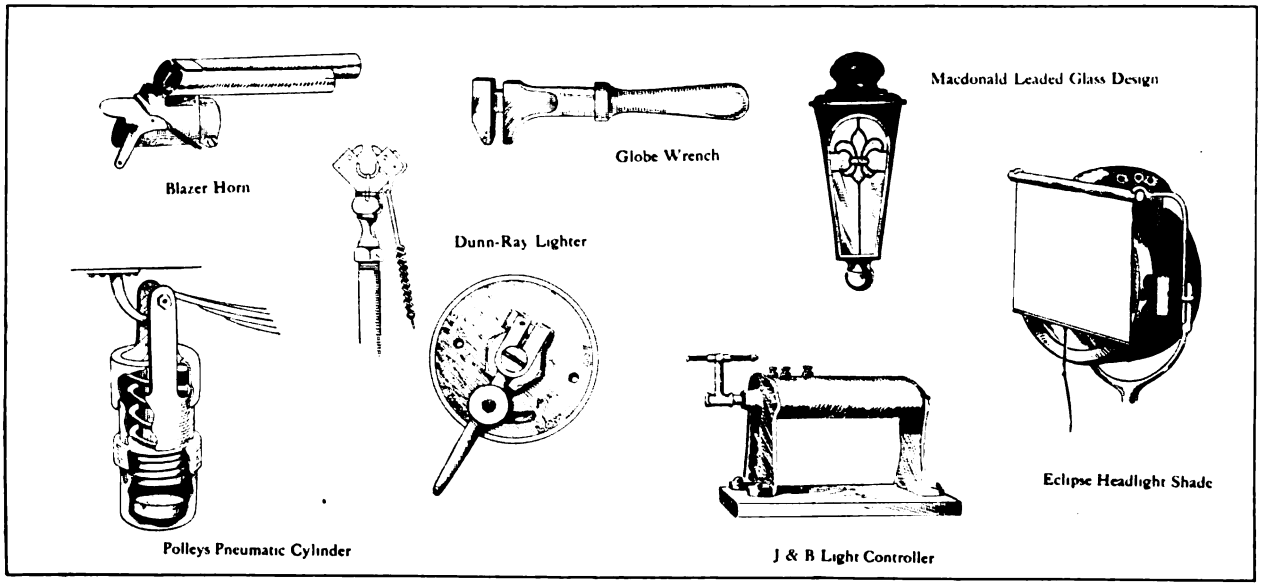
The Bair bow hinge is the product of the Auto Specialties Manufacturing Company, Chicago, and when driven into the four middle bow sockets of a four-bow top convert it into a six-bow member. Its function is to prevent sagging as the cloth is better supported and greater clearance is provided when the top is dropped. By means of set screws the height of each bow hinge may be regulated to obtain the desired shape. The Bair hinge is very compact, being but two inches when folded.

U-Kan-Plate.

The advantages of nickel or silver plated trimmings on the motor car are numerous. Not only do the lamps, etc., always present a good appearance, but it is a simple matter to keep the parts clean with a minimum outlay of labor. The A. R. Justice Company, Philadelphia, is marketing U-Kan-Plate, a liquid preparation, which when applied according to directions, silver plates parts the base of which is brass, copper, German silver or bronze. It is held not to contain mercury or acid, but pure silver, which is deposited by chemical action. It is applied easily with a cloth and requires but a short time



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to thoroughly plate the article. Durable qualities are claimed for the preparation, which may be removed if desired by using any brass polish. U-Kan-Plate comes in varying size containers and is inexpensive.

Eclipse Headlight Shade.

The Eclipse headlight shade, as the name implies, is designed to instantly dim the lamps, eliminating the glaring effect which blinds pedestrians and other users of the public highways. The product of the Eclipse Headlight Shade Company of Syracuse, N. Y., complies with the laws of those cities which prohibit the use of headlights, and is a convenience in that in passing through cities the lights may be dimmed without leaving the seat. This is accomplished by a water proof shade held in a container mounted on the lamp brackets and operated by a pedal. When not in service there is nothing to detract from the appearance of the lamp. The shades are easily fitted, requiring no other tools than a screw driver and a wrench.

Blazer Horn.

The Blazer horn is marketed by the American Motor Equipment Company, 27 Haverhill street, Boston, and is designed for model T Ford automobiles. It is held to possess a soft, agreeable, yet penetrating tone, and is operated by the exhaust of the motor. It is attached over the outlet pipe of the muffler, extends toward the front of the chassis and it is claimed that it cannot clog. The exhaust gases are shunted to the signal by actuating a lid member which may be so operated as to produce a varying volume of sound. When not in service the horn does not in any way deflect the gases. It is easily fitted, requiring no special tools, and is operated by the usual pedal and cable. It is moderately priced.

Globe Wrench.

The Globe wrench, manufactured by the Globe Wrench Company, Ipswich, Mass., is termed a one-hand wrench in that it may be operated when held in one hand; that is, the jaws may be adjusted to fit the nut or bolt by rotating the handle. The mechanism is contained within the handle. The limit of adjustment is very fine and lost motion is eliminated by the principle involved. It is stated by the maker that after the adjustment is secured the wrench will break before it loosens its grip. The jaws are constructed of open hearth drop forged steel and a quality emphasized with the tool is that slipping is prevented.

Polleys Pneumatic Cylinders.

Polleys pneumatic cylinders are a patented principle of absorbing vibration by air, coil springs and rubber enclosed within a cylinder. They are shock absorbers and are adjustable to all types of motor vehicles and to both front and rear springs. The weight of the car is balanced on a coil spring and a valve in the piston head opens and closes automatically as the piston moves up and down in the cylinder, compressing the air, and conforming in pressure to the roughness of the road. The rubber cushion is utilized to care for the overload, and does not allow the coil spring to open or close beyond its elastic limit.

MacDonald Leaded Glass Designs.

Donald N. MacDonald, 400 Northampton street, Boston, attaches by a special process leaded glass designs to the motor car lamps and a variety of distinguishing marks are possible and in various colors. Monograms, crests, emblems, initials or devices are applied and it is held that the brilliancy of the lights is not affected. Standard or special designs are installed.

Dunn-Ray Lighter.

The Dunn-Ray lighter presents interesting features in that the flame at the acetylene burners may be controlled, in addition to being lighted or extinguished from the seat. This is made possible by a special dash controller, which is neat and compact and well constructed. By moving the lever to the right the blaze may be lowered to the minimum, a convenience when leaving the car for any length of time. The normal light is as easily secured by moving the lever to the left. The latter has a spring controlled pin which registers with recesses on the dial, making for efficiency of the system. The burners are made by the company and the acetylene is ignited by heating a platinum wire by current from a battery, but little being required. The flow of the gas is regulated and the tail light is included in the system, which can be installed easily as there is no complicated wiring. It is manufactured by the Dunn-Ray Company, 29 Central street, Boston.

J & B Light Controller.

The J & B light controller is designed to govern the current generated by the magneto on model T Ford cars when the electricity is utilized for lighting purposes. With this type of magneto the voltage developed is proportional to the speed of the motor and at high speeds the filaments are subjected to overload unless of proper size. On the other hand when the car is operating slowly, efficiency is not secured from bulbs designed to withstand high voltages. The J & B device is wired in parallel and one lamp may be utilized because each has an independent feed wire. It is installed directly forward of the carburetor, is adjustable, and is operated by a lever connected to the throttle lever of the vaporizer. As the carburetor is opened or closed the movement is imparted to the arm regulating the controller. In this manner the proper current is maintained at all motor speeds. The J & B controller is installed by drilling three .1875-inch holes in the metal shield between the motor base and frame. It is produced by the J & B Manufacturing Company, Pittsfield, Mass.

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Stanwood Brush Insert.

More or less dirt accumulates in the car and as a result the clothing becomes soiled, to say nothing of the work involved in brushing the mats, etc. The Hayes Manufacturing Company, Detroit, is marketing the Stanwood brush insert, which is composed of specially prepared fibre brushes placed in series in pressed steel supporting devices. The insert is set into the running board so that the surfaces of the brushes are only slightly above its plane, providing a foot scraper of neat and finished appearance. The equipment comprises in addition to the brushes a T shaped frame, also a supporting L shaped member of steel, two steel clamping bars, nuts and spring washers. A template is given with each outfit, making it a simple matter to secure the proper sized opening for the insert, which may be placed in the running board as desired, depending upon the type of car, etc. Although the brushes are positioned securely, suitable spaces are provided to permit of displacing the dirt by washing and without removing the insert from the running board. The Stanwood brush insert is finished in brass or aluminum and is moderately priced.

Fowler Priming Cup.

The Fowler priming cup, made by the Fowler Lamp & Manufacturing Company, Chicago, comprises a small container designed for mounting on the dash inside the hood and is utilized for priming the intake manifold. The fluid is led to the intake pipe by tubing and control of the gasoline, etc., is by a plunger lever or rod on the dash. The rod actuates a needle valve, allowing a predetermined amount of priming fluid to pass to the intake pipe. The device is self-closing and the priming cup is substantially made.

S. & M. Puncture Proof Tire.

A tire presenting an interesting feature in that the tread is a separate part is the S. & M. puncture proof shoe made by the S. & M. Manufacturing Company, Akron, O. It is pneumatic and employs the same size inner tubes as tires of the conventional type, but differs in that the side walls are in two parts and each is provided with two beads. The lower members retain the parts to the regular rim and the upper are employed for securing the tread. The latter is a metal clincher band having a rubber cushion tread cured to the metal. It is claimed that economy is effected in that the casing is saved from bruises and deterioration, etc.

Neverout License Bracket.

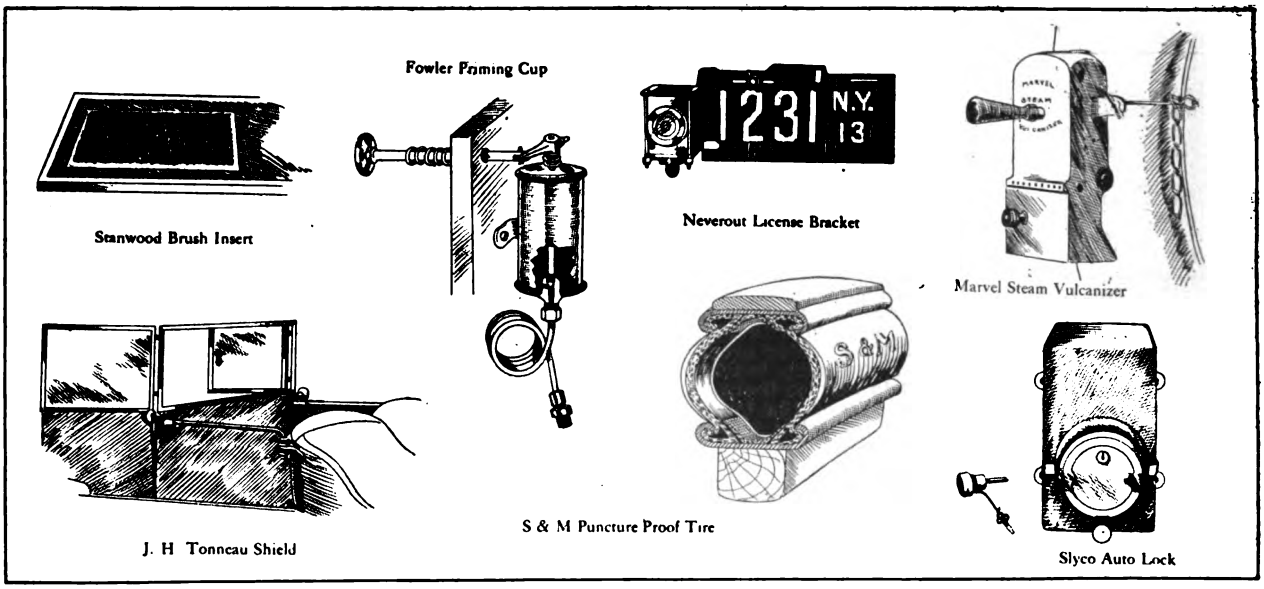
The Rose Manufacturing Company, Philadelphia, is marketing a new design of license bracket which is a combination unit in that it includes an electric tail light. The license holder is of the adjustable type and the number plate is held securely and without opportunity for vibrating or rattling. The tail light is substantially constructed, the frame being of reinforced metal. The design is not only neat and attractive, but is very compact.

Marvel Steam Vulcanizer.

The Marvel steam vulcanizer is produced by the Marvel Manufacturing Company, Cleveland, O., and the steam utilized for curing the rubber and cement is generated by the heat of an alcohol lamp which is integral with the device. It is held by the maker that the vulcanizer is entirely automatic in its action and that it will not burn or injure a tube or casing for which it is adapted. When used for repairing tubes it is clamped to the tube by means of threaded bolt members carrying wing nuts. When utilized on casings a chain is employed and it is not necessary to remove the tire from the rim. The vulcanizer comes complete with supplies.

J. H. Tonneau Shield.

The utilization of a windshield on the dash does not afford protection to the occupants of the tonneau who are exposed to the wind, dust and rain. A shield that presents interesting as well as practical features is the J. H. tonneau, manufactured by the J. H. Tonneau Shield Co., 225 West 49th street, New York City. It is designed for attachment by special fittings to the rear of the front seats and in addition to affording complete protection to the occupants of the rear seat is collapsible. It may be folded up back of the front seat, is adjustable to any desired position and has an extra advantage in that it may be employed as a table or a desk, making for convenience in touring. The main frame is fitted with .25-inch plate glass and side members with .0625-inch high grade celluloid. The side frames are adjustable by means of locking hinges and are provided with a special storm catch easy to operate. Another feature of the shield is the utilization of a water proof cloth curtain secured to the lower portion and reaching to the floor. This protects the passengers from rain and the construction is desirable in that it is not necessary to raise the top during showers. The frames are of mahogany, highly polished, brass and oxidized steel and the two side windows fold in when their use is not desired. The J. H. tonneau shield is adaptable to any type of car, is easily adjusted to any desired position and affords the protection of a top without the disadvantages of the latter.



Slyco Auto Lock.

Smalley Daniels, manufacturer's agent, Detroit, is marketing the Slyco auto lock, which may be attached easily to the usual spark coil and without changing its casing. It comprises a polished steel casing, heavily nickel plated, and is attached over the usual ignition switch by means of a screw driver. The cover is hinged and the device is open when the car is being operated, but locks automatically when closed. The key is attached to the plug, preventing its loss. As the retaining screws are inside the casing it will be noted that the lock cannot be tampered with.

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DEALERS STILL BUSY WITH SHOWS.

Every Section Is Represented, from Maine to Oregon on the North and from Virginia to Utah and Colorado on the South---Bridgeport Holds Its Best Display.

BRIDGEPORT, Conn., is another of those cities, the proximity of which to the big national show in New York City was expected to effect in no large measure the success of the annual display of the local dealers' association. As was the case with Newark, Brooklyn and other cities near New York, the result of the annual Bridgeport exhibition in the Park City rink, March 3-8, was such as to indicate that the national display does not seriously interfere with sales. In every respect this year's show established a new record —in number of exhibitors, attendance and business transacted.

The event was under the management of Benjamin B. Steiber, who was successful in converting the interior of the building into a handsome setting for the cars and accessories, through the liberal use of pink and white, and green and white bunting. The list of exhibitors included practically all the dealers in Bridgeport and some from nearby cities and towns. Those who made display were:

Pleasure Cars—Lyford Bros., Oldsmobile, Oakland; Consolidated Motor Company, Abbott-Detroit; Bull's Head Garage, Franklin, Buick; Moon Sales Agency, Moon; Carl H. Page Company, Chalmers; Harry M. Ford, R-C-H; Elm Auto Company, Pope-Hartford, Mitchell, Studebaker, National, Waverley electric; Bulkley Auto Station, Paige, Lozier; George W. Weusterfeldt, Pierce-Arrow; Starbuck & Mattice, Ford; Peck & Lines, K-R-I-T, Paterson; Detroit Cadillac Company, Cadillac; Knowles & Tomlinson, Henderson.

Commercial Vehicles—Consolidated Motor Company, Selden; Elm Auto Company, White; Bulkley Auto Station, Gramm; W. M. Morris, G. M. C.; Peck & Lines, Knox Martin tractor; O. H. Banks, Little Giant, Mack, Saurer.

Motorcycles—C. W. Ellison, Pope; Waldorf Motor & Machine Company, Harley-Davidson.

Accessories—Metropolitan Auto & Garage Carriage Company, Post & Lester, J. L. Carpenter.

OREGON SEES NEW MODELS.

Majority of Dealers Meet with Success in Fourth Annual Portland Display.

Although a few of the dealers in Portland, Ore., were convinced that there was insufficient interest in a show to warrant holding the fourth annual event in the Land Show building, March 17-22, a majority easily won the day, and the people of Oregon responded in such numbers as to leave no room for doubt as to the success of the venture. It was argued that several sales were waiting for some such display in order to be closed, and this proved to be true. A large number of prospects also resulted.

The show was held under the direction of the following committee: Capt. W. H. Gray, Northwest Auto Company; Robert T. Atkinson, J. W. Leavitt Company; E. E. Gerlinger, Gerlinger Auto Company, and John M. Rieg. The actual management fell upon the shoulders of Mr. Rieg. Special sections were devoted to the exhibition of motorcycles and accessories and among the cars displayed were:

Pleasure Vehicles—American, Henderson, Stutz, Stoddard-Dayton, Reo, Overland, Pathfinder, Stearns-Knight, Hudson, McFarlan, Herreshoff, Rambler, Velie, Michigan, Haynes, Ford, Case, Mitchell, R-C-H, KisselKar, Beaver, Lozier.

Commercial Vehicles—Stearns, Velie, Reo, Menominee, Federal, Little Giant, Standard, KisselKar, Lippard-Stewart, Ford, Overland.

ST. LOUIS' SPRING DISPLAY.

Indoor Show Arranged as Supplement to Outdoor Exhibition Held Last Fall.

Although a large number of the dealers in St. Louis, Mo., took part in the outdoor show at Forest Park Highlands last fall, several others were represented at the eighth annual display in the Coliseum under the management of Frank Bishop. The interior of the building presented a spring scene, a liberal use of smilax, mountain laurel and other flowers providing the necessary transformation. The list of exhibitors follows:

Pleasure Cars—T. J. Moss Motor Car Company, Staver, Borland electric; Meyer-Busch Motor Car Company, Speedwell; Beustadt Auto & Supply Company, Marion; Lindell Auto Sales Agency, Cutting; Detroit Electric Car Company, Detroit electric; M. & T. Motor Car Company, M. T.; Geo. C. Brinkman Motor Car Company, National; De Luxe Automobile Company, Warren, Argo electric; Todd Auto & Rental Company, Marathon; Cochrane Motor Sales Company, Cartercar; Imperial Motor Company, Imperial; Wiemeyer Motor Company, Ames; Paine Automobile Company, Haynes, Crow Elk-Hart; American Welding & Auto Repair Company, Midland; Coller-Reitz Motor Car Company, McFarlan; Pullman Motor Car Company, Pullman.

Commercial Vehicles—Meyer-Busch Motor Car Company, Brown; Geo. C. Brinkman Motor Car Company, Smith-Milwaukee, Lippard-Stewart; Cochrane Motor Sales Company, Gramm, Modern; Electromobile Company, Electromobile; Palmer-Meyer Motor Car Company, Palmer.

Motorcycles—C. W. Waughop, Henderson; Olive Cycle & Motor Company, Flying Merkel, Harley-Davidson; Hurck Motor & Cycle Company, Indian; Knight Mercantile Company, Excelsior.

Accessories—Holzman Auto Supply Company, general line; Concrete Construction Company, garages; Jiffy

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Starters Company, motor starters; American Welding & Auto Repair Company, welding; Koochook Rubber Company, tires; U. S. Electrical Tool Company, tools; C. D. Robinson, rims; American Specialty Company, polish; Carbo Sol Company, carbon remover; Auto Starter Sales Company, motor starters; Ingersoll-Rand Company, air compressors; Weiss-Bosley Company, manufacturer's agent.

MANY SALES IN SYRACUSE.

Success Attained by Automobile Dealers' Association Exceeds All Expectations.

While the Syracuse Automobile Dealers' Association expected that this year's fifth annual show in the local armory at Syracuse, N. Y., would prove the best ever held, the members were not prepared to expect the large attendance or the increased business which resulted. Over 5000 people were present on the opening night and this ratio was maintained until the close of the show. Several sales were recorded the first evening, and the number was increased steadily throughout the week.



Henry T. Gardner, Manager, Syracuse Automobile Show.

A large share of the credit must be given to Henry T. Gardner, who had charge of the details. The decorations proved a revelation. Outside the building, over the doorway, a large automobile was outlined in electric lights, and the effect was that of a moving car when the bulbs were turned on at night. The interior was transformed into an Italian garden, over which was suspended a canopy of gold and magenta bunting. A partial list of the cars exhibited follows:

Pleasure Cars—American, Cole, Stevens-Duryea, Alco, Ford, Moyer, Franklin, Case, Oakland, Reo, National, Auburn, Pathfinder, Overland, Cadillac, Detroiter, Buick, Hudson, Haynes, Firestone-Columbus, Studebaker, Cartercar, Knox, Chalmers, Garford, Rauch & Lang electric, Metz, Rambler, Packard, K-R-I-T, Winton, Pierce-Arrow, Locomobile, Regal, Lozier, Velie, Pope-Hartford, White, Baker electric, Standard electric, Moline, Michigan, Abbott-Detroit.

Commercial Cars—Federal, International, White, Mais, Knox, Garford, Palmer-Moore, Menominee, Chase, Packard, Sanford, Alco, Pierce-Arrow, Pope-Hartford.

Motorcycles—Eagle, Excelsior, Dayton, Harley-Davidson, Henderson, Indian, Thor.

EASTERN MAINE DISPLAY.

Many Towns in That District Contribute Toward the Success of Bangor Show.

The success of the Eastern Maine automobile show in the Auditorium at Bangor, Me., was aided largely by the railroads centring in that city, all of which offered special rates during the progress of the exhibition. Delegations numbering as many as 180 in some instances were present from Belfast, Bucksport, Ellsworth, Bar Harbor, Cherryfield, Waukeag, Hancock, Columbia, Newport, Waterville, Houlton, Fort Fairfield, Eastport, Old Town, Orono and other cities and towns from all sections of eastern Maine.

Sales were recorded during the opening hours and these were by no means confined to cars. One concern reported the sale of over $5000 worth of Walpole tires during the week. The list of exhibitors included the following:

F. A. Nickerson, Pierce-Arrow, National, Chalmers, Severance & Craig, Metz, Maxwell; Maine Motor Car Company, Peerless; Bath Garage Company, Cutting; Harmon Automobile Company, Hudson; S. L. Crosby, Oakland; Miles B. Mank, Knox, Cole; Charles B. Treat, Mitchell; E. A. Marsters, International truck.

NORFOLK'S SECOND ANNUAL.

Virginia People Inspect New Models and Talk Over Good Roads Problems.

The second annual show of the Norfolk Automobile Dealers' Association was held in the local armory, Norfolk, Va., March 17-22. The success of last year's display was repeated, both in the matter of attendance and in the number of sales consummated. In addition, the Tidewater Automobile Association found abundant opportunity to interest the people of Virginia in the subject of good roads.

The show opened with a monster street parade, in which many of the owners in Norfolk and surrounding territory took part. On account of the date, St. Patrick's Day, green was the prevailing color, and this was carried out to good effect in the decorative scheme within the hall. Those who made display included:

C. L. Young, Allen Motor Company, Arthur Depue, Virginia Auto & Garage Company, P. L. Harrison, Chalmers Motor Car Company, Bell Motor Company, Michigan Motor Branch of Virginia, Tidewater Automobile & Garage Company, Coburn Motor Car Company, Case Automobile Agency, International Harvester Company, Frank X

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Parker, Mitchell Automobile Agency, W. Daughtridge, Reliance Electric Company, Ball & Co.

The following makes of cars were represented:

Pierce-Arrow, Cole, Kline-Kar, Buick, Locomobile, Haynes, Lozier, Rambler, American, National, Marion, Overland, Ford, Chalmers, Michigan, Baker electric, Waverley electric, Studebaker, Mitchell, K-R-I-T, Marathon, Case, Packard, International truck, Indian motorcycles.

INTERMOUNTAIN AUTOMOBILE SHOW.

Display in Salt Lake City Booms Good Roads and Sells Cars in Five States.

Three years ago the automobile dealers in Salt Lake City, Utah, held their first show. Last year there was a small representation of cars in a similar exhibition. The third display was held in the Auditorium, March 3-8, and was of decided importance to the industry in every way. The committee in charge, consisting of L. J. Gilmer, J. R. Hall and N. H. Bertram, sought and obtained the assistance of the dealers in Idaho, Wyoming, Nevada and western Colorado, as well as those in Utah outside of Salt Lake City. The event was termed an Intermountain automobile show and was under the direct management of W. D. Rishel.

In addition to the large number of cars on display, for which it was evident from the opening of the show there was to be a satisfactory list of purchasers and prospects, the local council of the Midland Trail Association took advantage of the opportunity afforded to advance the interests of good roads. The interior of the building was handsomely decorated, and in every respect the week was one which will long be remembered by the motorists and prospective motorists in that district. The list of exhibitors follows:

Pleasure Cars—Utah Motor Car Company, Packard, Campbell Auto Company, Premier, Michigan, Overland; Wright Motor Car Company, Pathfinder; J. I. Case Threshing Machine Company, Case; Velie Motor Vehicle Company of Utah, Velie; Speedwell Agency Company, Speedwell; Studebaker Bros. Company of Utah, Studebaker; White Automobile Company, White; A. O. Whitmore, Baker electric; Sherman Auto Company, Cadillac; Alkire Smith Auto Company, Ford; Salt Lake Auto Company, Franklin, Detroit electric; Monarch Motor Company, Stearns-Knight; Cartercar Utah Company, Cartercar; Cheesman Auto Company, Locomobile, Chalmers, Paige; Randall-Dodd Auto Car Company, Buick, National; Tom Botterill Auto Company, Pierce-Arrow, Hudson.

Commercial Vehicles—Utah Motor Car Company, Packard; Velie Motor Vehicle Company of Utah, Velie; Speedwell Agency Company, Speedwell, Wagenthal; White Automobile Company, White; Salt Lake Auto Company, Alco, International; Cheesman Auto Company, Standard, Federal, Menominee.

Motorcycles—Lon Claflin, Indian; Bicycle Supply Company, Excelsior; Western Arms & Sporting Goods Company, Pope; J. Louis Anderson, Harley-Davidson, Thor.

Accessories—Tom Botterill Auto Company, Bertram Motor Supply Company, Austin Tire & Rubber Company, Utah Oil & Refining Company, Monarch Motor Company, Salt Lake Hardware Company, Continental Oil Company.

BUSINESS IN CEDAR RAPIDS.

Dealers in Iowa City Enjoy Good Week During Fourth Annual Exhibition.

The fourth annual show of the Cedar Rapids Automobile Dealers' Association was held in the Auditorium, Cedar Rapids, Ia., March 10-15. The success of previous exhibitions had been such that every inch of available space was taken long before the display opened. Another large attendance was experienced this year and the business transacted was in proportion to expectations. The list of exhibitors included the following:

Automobiles—H. I. Bunting, Oakland; W. F. Schrieber, Detroiter; Beck & Sons, trucks; Cedar Rapids Auto & Supply Company, Chalmers, Lozier, Michigan, White, Reo; J. A. Wicke, Moline; Barton Motor Car Company, Cole, Hudson, Velie, Baker electric; Courtney Motor Car Company, Ford, Studebaker, Rambler; Iowa Auto & Tire Company, Cadillac; C. E. Fawcett, Garford; Windsor Hotel Garage, Paige; J. E. Elgin, Enger, Empire, Metz, Pilot; S. G. Gay Company, trucks; Matheson Sales Company, Matheson; Capital City Carriage Company, Richmond; S. M. McQuestion, Davis; Foy Supply Company, Overland.

Motorcycles—E. H. Hall, Harley-Davidson; Rob Smulekoff, Excelsior, Henderson, Black Hawk; G. A. Sayers, Indian.

Accessories—W. H. Burrows, general line; Cedar Rapids Oil Company, lubricants; D. P. McClure, general line; Tokheim Manufacturing Company, pumps; Western Auto Supply Company, supplies; Vac Liquid Equipment Company, pumps; Iowa Light & Power Company, electrical supplies; Universal Portland Cement Company, road building materials.

MANY OUTSIDE DEALERS.

Majority of Those Represented at Waterville, Me., Came from Other Cities.

Waterville, Me., enjoyed its first automobile show in the Empire rink March 4-7. Of the 15 exhibitors eight were from other cities in Maine and Boston. The walls were covered with green bunting, the national colors being used with good effect to relieve this single tone, while the exhibition spaces were marked off by lattice work entwined with Virginia smilax. The attendance throughout the week was decidedly satisfactory and considerable business was reported. The exhibitors were:

W. J. Skehan, Augusta, Buick, Chalmers, Stevens-Duryea; Wade & Dunton Motor Car Company, Lewiston, Cadillac; Waterville Motor Company, Waterville, Studebaker, Reo; Guy Lawrence, Gardiner, Lozier; Steward & Marston, Waterville, International truck; Portland Company, Portland, Knox, Cole; Joseph Sawyer, Fairfield, Oakland; Darling Auto Company, Auburn, Reo truck; Wallace Spencer, Waterville, Mitchell; Morrison Auto Company, Waterville, Ford, Michigan; E. L. Gove Company, Waterville, Overland; H. N. Beach, Waterville, Yale motorcycle; E. S. Baker, Waterville, Indian motorcycle; Herbert & Towle, Lewiston, tires; Wayne Oil Tank & Pump Company, Boston, storage systems.

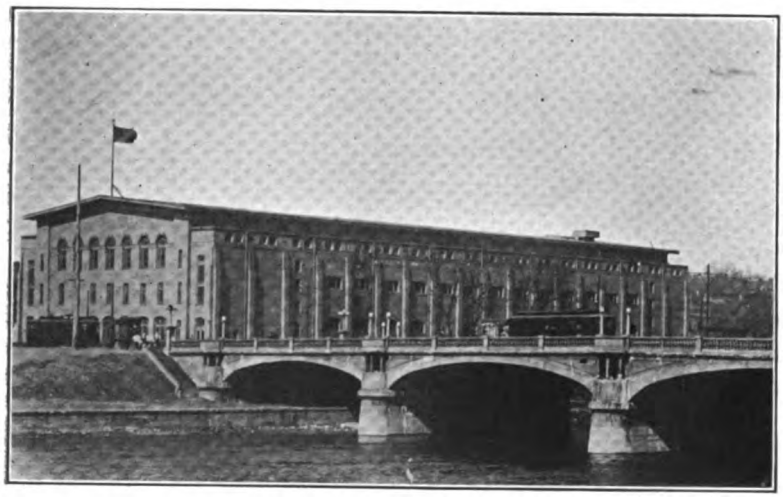
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LOUISVILLE CLUB CELEBRATES.

Tenth Anniversary Followed Closely by Sixth Annual Show—The Best Yet Held.

Feb. 27 the Louisville Automobile Club, Louisville, Ky., held a banquet to commemorate the 10th anniversary of its organization. March 5 its sixth annual show was opened in the armory for one week. Both events were the best attended since the formation of the club, and the latter was marked by the largest number of retail sales yet received by the Louisville dealers at a local show. Now the officials of the club are planning a triple celebration for April 10, at which plans will be laid for the 1913 season and the 1914 display.

The interior of the building was completely transformed, the exhibition spaces being marked with artificial stone walls, surmounted by iron pickets. Surrounding the walls and fences were sprays of green oak, and green and white bunting was used to good effect on the sidewalls and ceiling. Thousands of electric lights helped to carry out the entire scheme. The list of exhibitors follows:



Coliseum at Des Moines, Ia., Where Recent Automobile Show Was Held.

Leyman Motor Car Company, Prince Wells, Kentucky Motor Car Company, Glossbrenner Commercial Car Company, Clark Motor Car Company, Kentucky Auto Company, Hite D. Bowman, Reimers Motor Car Company, J. L. Case Company, Thomas Garage, A. E. Reid, Rommel Motor Car Company, Louisville Lozier Company, Kentucky Wagon Works, Standard Auto Company, Southern Motors Company, Yager Motor Car Company, Inter-State Motor Sales Company, Hiter-Logan American Sales Company, Transit Motor Car Company, J. J. Caffrey.

Among the cars displayed were the following:

Cadillac, McFarlan, Rambler, Waverley electric, Locomobile, Ohio electric, Little, Chevrolet, Chicago electric, Ford, Inter-State, Detroiter, Case, Lozier, Paige, American, Winton, R-C-H, Buick, Stearns-Knight, Peerless, Hupmobile, Rauch & Lang electric, Columbus electric, Overland, Chalmers, Urban electric truck.

NEW RECORDS IN DES MOINES.

Fourth Annual Display Finds Local Dealers Prepared for Big Business Results.

The fourth annual show of the Des Moines Automobile Dealers' Association in the Coliseum, Des Moines, Ia., March 3-10, was the largest in number of exhibitors, in attendance and in amount of business transacted that has yet been held by that organization. The visitors were by no means confined to Des Moines, the people of Iowa apparently feeling that the event was of state wide importance.

The decorative scheme was intended to convey the impression of a Dutch village. An abundance of foilage, vine covered walls, pretty streets, hanging baskets of flowers and electric lights combined to produce an outdoor effect that was decidedly pleasing. In each of the four corners of the hall was installed a Dutch windmill, the big wheels of which revolved continuously. A large blue canopy studded with electric lights, representing stars, still further accentuated the scene.

Some 60 different makes of cars were displayed, and as each dealer showed from one to four models, the grand total was close to 200 machines. In addition there was a decidedly representative exhibit of accessories, parts, fittings and supplies.

DENVER'S SOUTHWESTERN DISPLAY.

Chamber of Commerce Aids Local Dealers in Making Twelfth Annual Show a Success.

The 12th annual Denver automobile show was held in the Municipal Auditorium, Denver, Col., March 4-8, under the management of G. A. Wahlgren. The local dealers took advantage of this opportunity to display the new models for the inspection of a large number of people residing in the Southwest. In addiiton, the Denver Chamber of Commerce, through its "Build Colorado First" committee, brought the benefits of good roads to the attention of the visitors in a thoroughly practical manner.

Previous to the opening of the show a good

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roads banquet was held at the Albany hotel, Gov. Ammons being the guest of honor. Many prominent people were present, not only from Colorado, but from other states in the Southwest. The enthusiasm thus created served to establish the value of motoring, and proved of invaluable assistance to the dealers in closing sales during the show. The list of exhibitors included the following:

Pleasure Cars—Mathewson Auto Company, Lozier, Reo, Ohio electric; Overland Auto Company, Overland, Apperson, KisselKar; Stanley Motor Carriage Company, Stanley steam; Western Motor Car Company, Abbott-Detroit, Paige; Wilson Motor Company, Mitchell; J. I. Case Threshing Machine Company, Case; J. L. Armstrong, Baker electric; William Thornley Auto Company, Little; Havens Motor Car Company, Dorris; Inter-State Motor Car Company, Inter-State; Estarado Auto Company, Hupmobile; Hall Auto Company, Stutz, Marion; Michigan Motor Car Company, Michigan, Oldsmobile, Waverley electric; Fritchle Automobile Company, Fritchle electric; Colorado Cartercar Company, Cartercar; Mercury Manufacturing Company, Ford; R-C-H Corporation, R-C-H; M. & M. Auto Company, Pathfinder; Wallace Motor Car Company, Locomobile; White Company, White.

Commercial Vehicles—Capitol Truck Company, Capitol; Inter-State Motor Car Company, Wichita; Continental Motor Truck Company, Continental; Mercury Manufacturing Company, Mercury; Overland Auto Company, KisselKar; Wilson Motor Company, Selden; Auto Tractor Company, Zimmerman tractor; Shaffer Auto Supply Company, Blair.

Motorcycles—Mead Auto Cycle Company, Excelsior; W. W. Whiting, Harley-Davidson; Hendee Manufacturing Company, Indian.

Accessories—K. & W. Reliner Company, Better-Than-Air Tire Filler Company, Shaffer Auto Company, Easy Cleaner Company, Hendrie & Bolthoff, Auto Equipment Company, Metal Welding Company, Cook's Dry Battery Company, Fry & McGill Motor Supply Company, Clason Map Company, Mine & Smelter Supply Company, Denver Auto Goods Company, Boss Rubber Company.

UTICA SEES NEW DESIGNS.

Local Dealers Assisted by Syracuse Agents in Presenting Successful Display.

Immediately following the close of the show in Syracuse, N. Y., some of the exhibitors at that display moved on to Utica, N. Y., for the exhibition of the Utica Automobile Dealers' Association. The event was held in the local armory, March 10-15.

Gold and white were chosen for the foundation of the decorative scheme, and this combination was decidedly prominent in the overhead treatment. Ornamental pedestals, surmounted by cut flowers marked the exhibition spaces. The attendance throughout the week was decidedly satisfactory and much business resulted. The list of exhibitors follows:

Automobiles—Genesee Garage Company, Overland; Crim-Bronner Company, Studebaker, Cole, Stewart truck; Buick Motor Sales Company, Buick; Terry Garage Company, Schacht; John M. Weaver, Stutz, National; Metz Motor Sales Company, Metz; Robert Payne, Velie; Haynes Company, Haynes; Franklin Motor Car Company, Franklin; Chas. H. Childs Company, Jackson, Coleman truck; H. A. Moyer, Moyer; George Hammer, Imperial; Victor Vernon, American; J. I. Case Threshing Machine Company, Case; International Harvester Company, International truck.

Miscellaneous—Bowen Bros., motorcycles; Oneida Garage Company, oils; Hover Company, vacuum cleaners; Indian Refining Company, lubricants; Standard Oil Company, oils; Cadby Company, cameras; M. E. Hooks, electrical devices.

BIG RESULTS AT PEORIA.

Annual Display in Illinois City the Most Successful Yet Held by Dealers.

With every inch of floor space taken weeks in advance of the opening night the dealers in Peoria, Ill., held the most successful show of its career in the Coliseum, March 12-15. The event was under the management of Albert H. Whigham, who worked out a decorative scheme that set off the various exhibits in the most advantageous manner. Reports from the dealers indicate that in attendance and number of sales all previous records were exceeded. The list of exhibitors follows:

Cars—Peoria Auto Company, Franklin, Regal; Bartholomew Company, Glide; C. W. Robinson, Cole, Waverley electric; Warren Motor Sales Company, Warren; Reliance Auto Company, Hupmobile; Cadillac Auto Company, Cadillac; L. J. Robinson, Buick; Machemer & Pinkerton, Chalmers, Ford; Avery Company, Avery truck; F. H. Avery, Detroit electric; W. H. Colean, Broc electric; Kircher & Wood, Ohio; J. I. Case Company, Case; Rambler Auto Sales Company, Rambler; Westcott Garage, Metz, Westcott; Cummings & Rutherford, Overland; L. R. Caldwell, Michigan; M. M. Baker, Packard; E. G. Isch, Inter-State; Collins & Archdale, Moon; C. L. Turner, Velie; B. F. Adams & Co., Studebaker; Clark & Cashin, Hudson, Peerless.

Miscellaneous—Peoria School of Motoring, Fitch Auto Supply Company, Graham-Seltzer Company, Bartell-Sweeney Company, National Refining Company, Indian Refining Company.

BUFFALO'S TRUCK EXHIBIT.

Local Dealers Hold Special Event for Business Men of That City and Vicinity.

While the annual pleasure car show of the Buffalo Automobile Dealers' Association was held in Buffalo, N. Y., last December, the agents for commercial vehicles decided to wait until March 11-15 before bringing the merits of the mechanical transports to the attention of the local business men.

The event was a decided success. Full opportunity was given for demonstration and the educational value of the display hardly can be overestimated. The hall was treated in red and white, although no special endeavor was made to present an elaborate decorative scheme.

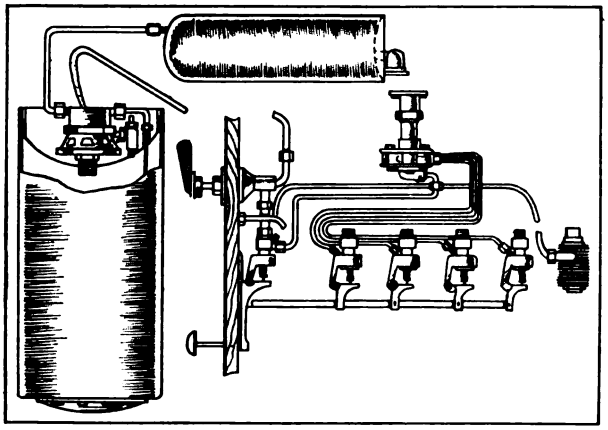
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MECHANICAL NOTES FOR OWNERS.

Features of H & M Motor Starter Utilizing Carbon Dioxide---Reducing Lost Motion in Steering Gear and Linkage---Spark Plug Having Adjustable Gap.

A motor starter operating on the pressure principle, in which the crankshaft of the internal combustion engine is rotated through application of carbon dioxide to the piston, is the H & M automatic pressure starter, produced by the Ham-Meix Manufacturing Company, Indianapolis, Ind. The carbon dioxide is chemically produced, being controlled and maintained by the use of a liquid tank, generating or storage container and an automatic diaphragm valve. It is held by the maker that carbon dioxide is non-explosive, will not injure metals or rubber and that it may be employed for inflating tires.

The larger tank is carried at the rear of the machine, is tested to withstand a pressure of 500 pounds and is equipped with a diaphragm valve



H & M Automatic Pressure Motor Starter Employing Carbon Dioxide Chemically Produced.

so constructed that it may be adjusted to control any pressure from five pounds to the maximum. The liquid tank is smaller and is equipped with a filler cap for replenishing the charge when necessary, but it is stated that one filling will suffice for 60 days. Extra recharges are put up in convenient packages and are not expensive.

A pipe is led from the storage tank to a dash shut-off valve having a detachable key for locking purposes, thence to a diaphragm valve. The gas flows through another tube to a distributor which may be a four or six-cylinder unit, and which is driven at camshaft speed. The discs and ports of the device are so arranged that pressure is admitted in the proper firing order of the motor.

After leaving the distributor the gas passes to a diaphragm motor valve on top of each cylinder, thence to the combustion chamber, forcing the piston downward. The construction is such that compression is relieved, enabling the motor to be spun easily with a very low pressure. The motor valves are operated by a push button on the dash actuating which also permits of the passage of gas from the storage tank to the distributor.

The system is applicable to any type of gasoline car and is made in several sizes to meet requirements of installation. All valves are adjusted and assembled before leaving the factory and are held to be non-leakable.

VARIABLE GAP SPARK PLUG.

It is a well known fact that the width of the gap, or space between the points of a spark plug, is an important factor in ignition. Makers of plugs advise a predetermined gap, that utilized with a magneto being less than when the source of current is a battery. There are times, however, with the latter system, when the spark will be weak through run-down batteries, and starting is made difficult. The usual remedy is to decrease the gap, an operation involving the removal of the plugs and subsequent readjustment of the points.

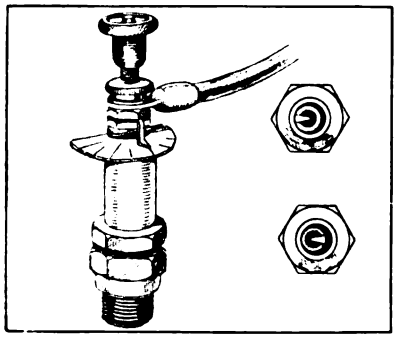
An adjustable spark plug has been brought out by an English concern which presents interesting features in that the width of the gap may be varied when desired and with the motor operating. The device is presented in an accompanying illustration and it will be noted that the gap from the central electrode to the body or shell is adjustable by means of a milled edge cap of non-conducting material, attached to the outer end of the electrode.

The latter is made slightly eccentric in relation to the body of the plug, so that when it is rotated the gap is varied. The extreme positions are illustrated in the sketch, the upper denoting the minimum and the lower the maximum. The gap, however, is exaggerated in the drawing to depict the positions. Stops are provided to prevent moving of the electrode other than when desired, by a projecting tongue of insulated material, a form of steatite. Accuracy in adjustment

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is made possible by a calibrated scale and a pointer.

Among the advantages of the device is that it would be possible to start upon the magneto, when the latter developes a weak spark, by decreasing the gap, and to remove soot or deposits by changing the gap much in the same manner as the spark gap method employed in this country.



Adjustable Spark Plug.

ADJUSTING THE STEERING GEAR.

As the steering gear and linkage is subjected to considerable service, wear follows and the components of the system require attention. Few motorists realize the amount of work this mechanism performs, because steering a machine becomes purely automatic with the driver, as is indicated by the involuntary movement of the operator when the car starts to skid. Each time the wheel is moved, even slightly, several parts are brought into action and in travelling 50 miles, for example, the movements may number thousands. If one were to make note of the times the wheel was moved the result would be surprising.

Inasmuch as the steering mechanism is called upon in this manner, the material and construction are as nearly perfect as possible, but it is evident that in time certain components will wear even if properly lubricated. More lost motion, however, is due to neglect rather than to wear, and the manufacturers are conducting an educational campaign by incorporating in their instruction books, complete directions as to the care of the components of the steering gear.

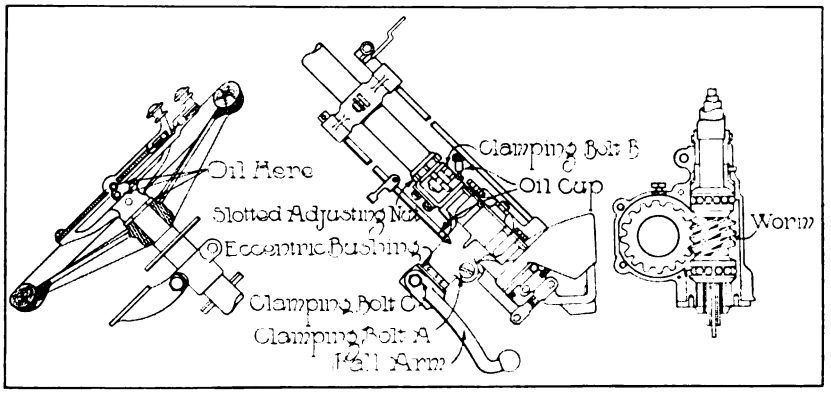
An instance is noted in the book issued by the Willys-Overland Company, Toledo, O., maker of the Overland cars. Sectional views of the wheel, column, worm and gear are included and these have been redrawn and lettered to make clear the parts requiring attention, as well as those components which are utilized in making adjustments.

Play or lost motion is noted easily by rotating the wheel when the car is standing still. There should be a little play, very little, it being necessary for operation. If an excess exists it may be removed by adjustment. First jack up the front wheels so that the gear may be tested during the work. It will be noted that there are two clamping bolts marked A and B. These are loosened, after which the slotted adjusting nut is turned to the right until the play is reduced. This may be ascertained by trying the wheel.

Next rotate the wheel until further movement is impossible and adjust the worm gear by turning the eccentric bushing C. Make this adjustment with the wheel turned to the extreme right and left, as a majority of the wear occurs in the centre since the car travels mostly in approximately a straight line.

If adjustment fails to correct the lost motion it will be necessary to remove the ball arm which may be accomplished by displacing the clamping bolt C. Next turn the steering wheel one and a half times, which will present a new surface, there being four, as will be noted in the drawing. Make the adjustment as previously outlined and after replacing the arm member make sure that all parts are locked. The compartment containing the worm and gear should be packed with fresh grease and lubricant introduced through the oil cups.

In attempting to reduce lost motion, play in the linkage should not be mistaken for wear of the worm and gear. The linkage is tested easily by jacking up the wheels and moving them. In performing this work care must be taken not to confound play in wheel bearings and spindles with lost motion in the linkage.



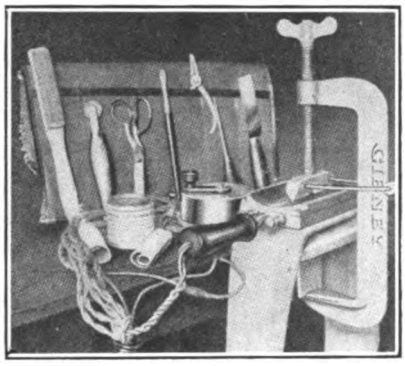
Showing Components of Steering Mechanism Requiring Attention and Means Incorporated for Eliminating Lost Motion.

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EQUIPPING THE PRIVATE GARAGE.

Part V.

In the last installment was included a list of supplies needed in the overhaul of the car and although nearly 30 articles were named a large number of these may be dispensed with if the owner is to attend only to minor repairs. With the exception of the soldering iron, oil and grease gun, the cost of the listed supplies would not exceed $2 at the most and by purchasing a few at a time the garage could be stocked easily.



Gibney Eleck-Trick Vulcanizer.

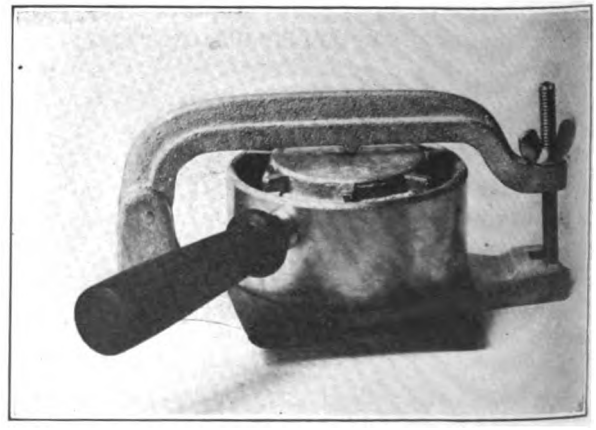
Dixon's graphite comes in various sized packages and is not expensive. It will serve for a number of useful purposes and is indispensable in the overhaul of the chassis. The use of material will be considered in the overhaul, which will be included in this series. Cotter pins, lock washers, taper pins, hexagonal nuts and cap screws are always needed and come in assorted sizes. A good quality of shellac should be purchased and stored in a bottle having a wide mouth to which should be fitted a tight stopper. The shellac should not be left exposed to the air as it dries quickly. A small tube of Prussian blue is inexpensive and will be useful when bearings are to be scraped in.

Valve Grinding Compound.

Regarding an abrasive for grinding in valves, there are several excellent preparations on the market, but a substitute can be secured in the finest grade of carborundum which when mixed with oil makes a fine valve grinding compound. A bundle of waste is not absolutely necessary. It is preferable to old rags, but the latter will serve. In selecting the hand soap care should be exercised not to purchase any material that will roughen the skin. Copper, brass and iron wire can be picked up for a few cents. In purchasing gasket material the owner will find a wide variety from which to choose, including asbestos, fibre, mobiline, combinations of these and special materials. These will be dealt with in the overhaul of the power plant.

The most inexpensive form of cleaner is a can filled with gasoline and a brush. More or less fuel, however, is wasted and as many places are difficult to reach with the brush the writer favors a motor washer. These may be made or purchased. In an accompanying illustration is depicted the Turner device, made by the Turner Brass Works, Sycamore, Ill., a washer actuated by pressure. It is made in three sizes, holding one quart, two and five gallons respectively. The tanks are constructed of drawn steel, have a pressure gauge, a suitable length of flexible hose and an adjustable nozzle. The last named may be so set that a finely divided or intense needle stream can be secured. Kerosene is utilized and being subjected to considerable pressure the fluid removes easily all dirt and grease from parts not accessible to the brush. An advantage of the washer is that the tank may be pumped full of dry air and employed for cleaning upholstery, etc.

One may be made by taking a stout one-gallon can, cutting a small hole in the top and soldering in a complete tire valve. Next fit and solder a petcock to the container and slip over this a suitable length of rubber hose, taking care to wire the tube to the petcock. A nozzle may be made of a small, round piece of brass, boring a needle like opening. This should be made very small, and after being inserted in the tube the latter should be wound snugly with wire to prevent leaks. The filler cap should be fitted with a rubber washer

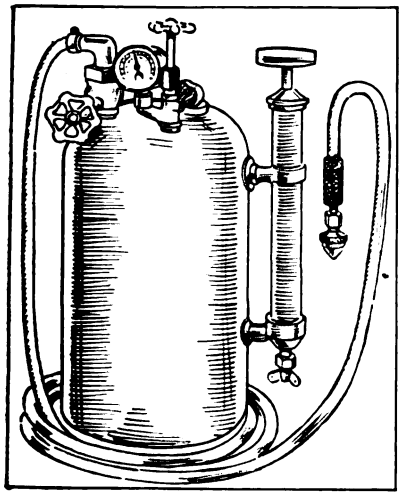


The Shaler Vul-Kit, a Moderately Priced Automatic Vulcanizer Employing Gasoline.

and after the can has been filled about half full of kerosene, screwed down snugly. Pressure is secured by attaching a pump to the valve and a few

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strokes will develop sufficient compression. When pumping the petcock must be kept closed, being opened only when the washer is in service. A little experimentation with the nozzle will determine the most efficient opening.



Turner Motor Washer.

The purchase of a valve grinding tool is optional with the motorist. The work can be accomplished with an ordinary screw driver or by using a bit-stock. The service of a tool designed especially for the work will prevent the novice making errors and in an accompanying illustration is presented the Ashcroft combination valve grinder marketed by Stevens & Co., New York City.

When the efficiency of the portable type of vulcanizer, coupled with its moderate price, is considered, it is not surprising to note the large number of motorists who complete their own tire and inner tube repairs. In equipping the garage provision should be made for one of these members for repairing inner tubes and with the practical, automatic devices now marketed anyone can complete the work successfully. Punctures are experienced by all automobilists and they must be attended to.

Shaler Vulcanizer.

One of the latest vulcanizers is the Vul-Kit, made by the C. A. Shaler Company, Waupun, Wis., manufacturer of all types, including those operated by steam and electricity, and adapted both for the garage and private owner. That depicted in an accompanying illustration is not only very inexpensive, but embodies those principles essential for successful work, including that of maintaining the temperature at a predetermined point for a considerable length of time.

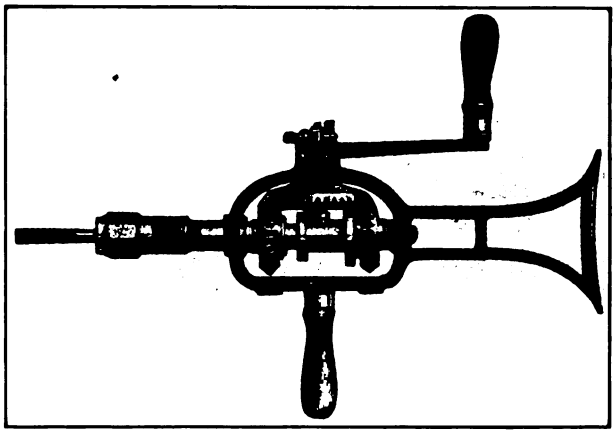
This is secured by the utilization of a gasoline generator which converts the fuel into gas, distributing the flame over the bottom of the vulcanizer, and producing and maintaining the desired temperature. It is provided with a universal clamping arrangement, insuring equal pressure and ease in handling. The tubes are placed on an inlaid asbestos pad, retaining the heat and preventing pinching. The handle is a non-conductor of heat and there is no danger of the operator being burned. It is easily operated, requiring but the filling of the combustion chamber with gasoline and the lighting of the fluid, the balance of the work being performed automatically. The Shaler Vul-Kit is nickel plated, very compact and is accompanied by a supply of repair material and complete instructions.

An electric type of vulcanizer is illustrated by the Gibney, it being operated by direct or alternating current and at 110 or 220 volts. As will be seen in the accompanying illustration the device is fitted with a rheostat, which is employed to decrease or increase the voltage entering the vulcanizer and thereby to raise or lower the heat.

The design may be employed for repairing cuts in casings and without removing the tire, and comes complete with ample length of cord, necessary tools, supplies, etc. It is manufactured by James L. Gibney & Bro., Philadelphia. The Waite Auto Supply Company, Providence, R. I., is agent.

(To Be Continued.)

President Harvey Granger of the Savannah Automobile Club, Savannah, Ga., has announced that N. H. Van Socklen of Chicago, president of the Chicago Motor Club and of the Chicago Automobile Trade Association, will be connected with the Savannah Automobile Club in an official capacity when the Thanksgiving Day races are run next November. He has had wide experience in racing matters and he will do much to make the official supervision of the Grand Prize and Vanderbilt Cup races a success.



Ashcroft Combination Valve Grinder Which May Be Utilized as a Ratchet Tool, Etc.

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MOTORING LAWS AND THEIR ENFORCEMENT.

Organized Motorists in New York Protest Against Proposed Legislation---Connecticut Satisfied with Present Statute---News in Other States.

ENFORCE existing laws, was the basis of Charles Thaddeus Terry's reply to the attempt to amend the motoring laws of New York State at the recent hearing before the legislative committee. Mr. Terry, who is chairman of the legislative board of the American Automobile Association, also was acting as special counsel for the Automobile Dealers' Association and the Motor Truck Club, both of New York City, and the state automobile association. His objections were voiced particularly against the proposition to increase the registration fees on both pleasure cars and trucks; to give the secretary of state authority to revoke the license of any motorist, and to limit the weight of vehicles using the highways of the state.

With respect to the second proposition named, Mr. Terry holds that the secretary of state already has sufficient power under sub-division L of section 289 of the act of 1910, which reads as follows: "Before such a license is granted the applicant shall pass such examination as to his qualifications as the secretary of state shall require, and no license shall be issued until the secretary of state or his authorized agent is satisfied that the applicant is a proper person to receive it." As to the proposed increase in taxation of commercial vehicles, Mr. Terry says:

The proposition to increase the fees of commercial cars has nothing to support it. (1) It is against the general policy of the state not to tax an instrument of commerce. (2) It is taxation of a manufacturing industry. (3) The fees proposed would be higher than those required in any other state in the United States. (4) The fees imposed would increase the burden of taxation to a point where it would be intolerable.

This suggestion for the increase of fees came from the governor's committee of inquiry. It was based upon the assumption that commercial cars were exempt from taxation. This is not the fact. In fact the present motor vehicle law specifically excepts commercial cars from the exemption from taxation. So that if this bill became a law on a 10-ton truck a tax of $75 would have to be paid for a registration fee and in addition a personal property tax of about $150. This would make a tax of $225 a year. This would not be taxation, but confiscation.

LET WELL ENOUGH ALONE.

Connecticut Motorists Decidedly Object to Changes in Present Automobile Law.

The Connecticut Automobile Association is receiving the loyal support of practically all the local clubs in the state in its organized objection to 21 proposed amendments to the existing motoring statute. The motorists of the Nutmeg State see no reason for changing the present very liberal law, except in the matter of providing for universal lighting.

Particular objection is made to those amendments which seek to create a maximum speed limit. Two years ago, after long effort, the legislature was induced to insert a "reasonable and proper" provision, and experience is held to indicate that wherever the law has been enforced properly the results have been the best yet obtained. At the recent hearing several instances were cited in which it was maintained no attempt had been made to enforce the existing law, and the organized motorists claimed that every effort should be made to secure results before creating a situation which undoubtedly would revive the "trap" methods.

ELEVEN BILLS IN CALIFORNIA.

Motorists Urged to Examine Carefully Changes in Motoring Laws Now Pending.

While the organized motorists of California have been assisting the secretary of state in the preparation of a new motoring law, it would appear that others have been busy along the same line. No less than 11 amendments have been presented for action. The main provisions are set forth below:

Kehoe-Bennett Bill—Repealing present law and placing the licensing of automobiles and motorcycles in the hands of the highway commission, and establishing the following fees: Under 20 horsepower, $5; 25-30, $10, 30-40, $15; 40-50, $20; 50-60, $25; over 60, $35.

Avey Bill—Providing a penalty for refusing to give name and address in case of accident.

Schmitt Bill—Providing for the following fees: Under 25 horsepower, $5; 25-35, $10; 35-50, $15; over 50, $20; commercial vehicles, $5; motorcycles, $2.

Canepa Bill—Giving secretary of state authority to refuse to issue a license, and to appoint three persons to examine applicants for chauffeur's licenses.

Flint Bill—Prohibiting the possession or use of a car without permission from the owner, as well as the offering or accepting of a bonus or discount for the purchase of supplies, etc.

Stuckenbruck Bill—Regulating the speed of motor vehicles in regard to traffic and use of the highway.

Strobridge Bill—Making it a misdemeanor for a person who is crippled by the loss of one or both hands or who is deaf, dumb or blind, to operate a car.

Johnson Bill—Making it a misdemeanor for anyone to drive any conveyance in a reckless manner, or in a manner that is dangerous to others.

Shartel Bill—Providing for the protection of persons

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and animals from reckless driving of motor vehicles on public highways.

Beban Bill—Providing for a license fee of $5 a year, and the examination of applicants for chauffeur's licenses.

Kehoe Bill—Requiring all vehicles to display a light or lights between sundown and sunrise, except on any street where street lights are maintained at a distance of 500 feet apart or less.

MOTOR TRUCKS IN PENNSYLVANIA.

Would Base Registration Fee on Weight of Vehicle and Load—Other Changes.

Senator Buckman of Pennsylvania has worked out a new list of registration fees for motor trucks. He also would require chauffeurs to file a bond of $1000 before receiving a license to drive. Operating a car while intoxicated or without the owner's consent is made subject to heavy fine and imprisonment. The provision for commercial vehicle registration reads as follows:

The fee for solid tired vehicles (motor trucks) shall be regulated by combined weight of vehicle and load, as follows: Less than 4000 pounds, $10; from 4000 to 5000 pounds, $15; from 5000 to 10,000 pounds, $20; from 10,000 to 15,000 pounds, $25; from 15,000 to 20,000 pounds, $30.

PROVISIONS OF KANSAS BILL.

Another Attempt to Regulate Use of Motor Vehicles in That Commonwealth.

Senator Wilson has introduced in the Kansas legislature a bill which he hopes to see enacted into law. Several objections have been filed by motorists and others. The chief features of the bill are presented below:

The registration fee of $2 a year for motorcycles and $5 a year for all other motor vehicles must be paid to the county treasurer, after which the receipt therefor shall accompany the application for registration to the secretary of state. Persons under 16 years of age and those who are intoxicated are not permitted to operate a car. Speed shall at all times be reasonable and proper, with maximum of six miles an hour at street crossings and eight miles an hour at dangerous points outside of cities and towns.

Non-residents are exempt from registration for 30 days, and the usual provisions for lights, brakes, signalling devices, etc., are included. Lamps must be lighted from one hour after sunset to one hour before sunrise, and must be visible 200 feet.

NON-RESIDENTS TO BE EXEMPT.

North Carolina Joins the Ranks of Those States Which Have Limited Reciprocity.

Heretofore non-resident motorists have been required to register their cars in North Carolina, unless they happened to be passing through the state without stopping longer than necessary. The bill now pending would amend this section so that cars registered in their home states shall be exempt from this provision for 15 days. The legislature has reconsidered its action requiring all cars to be equipped with speedometers. Other provisions of the proposed law of interest to non-residents are:

No person under 16 years of age shall be permitted to operate a motor vehicle on any public highway. Some cities have passed ordinances requiring all operators to be at least 18 years of age, and the act is so qualified that these ordinances are not to conflict.

The stipulated maximum rate of speed outside of incorporated towns has been reduced from 25 to 20 miles an hour. In cities and towns that rate is fixed at 15 miles for residential sections and 10 for business sections.

NEW WEST VIRGINIA LAW.

Bill Prepared by Ohio Valley Automobile Club Meets Approval of Legislature.

The legislature of West Virginia has enacted into law the bill prepared by the Ohio Valley Automobile Club. It does not appear to change the previous provisions for registration, or the non-resident privilege, and the important differences may be set forth as follows:

Applicant to drive a car as a chauffeur or paid operator must make affidavit that he is over 18 years of age, and must send a photograph taken within 30 days of the application to the state auditor. The fee is $2, for which a badge is issued.

The maximum rate of speed, which if maintained for more than a quarter of a mile shall be deemed "driving at a rate of speed which is not careful and prudent," is raised from 20 to 25 miles an hour.

Persons operating cars while intoxicated shall be subject to a fine of from $100 to $300, and the license shall be suspended for six months.

In case of accident causing injury or damages to the person or property of another, the operator is required to give his name and address.

COURTS TO REVOKE LICENSES.

Power Vested in Police Judges Under Amendment Before Minnesota Legislature.

Several amendments to the motoring law in Minnesota, which has been in force for the past two years, have been agreed upon by the house committee on general taxes, and it is expected that they will be enacted during the present session. Three of the most important provisions are:

Fixing registration fee at $5 a car, which is expected to give a revenue of between $150,000 and $200,000 a year. This will be diverted to the state highways commission.

Vesting in police court judges the power of revocation of car licenses, and diverting of all police court fines for violation of the motoring law to the highways commission.

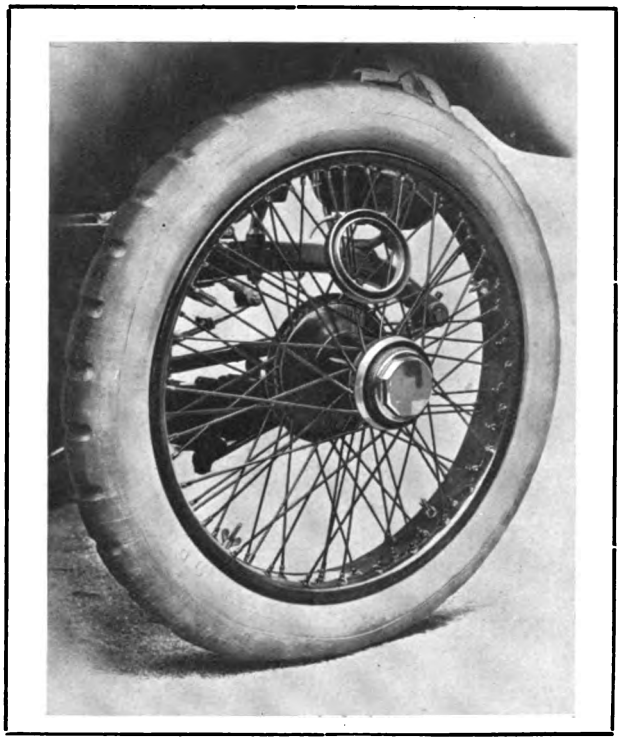
Creating a new state commission of three members to take the place of the present examining board.

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THE RUDGE-WHITWORTH WIRE WHEELS.

IN A previous discussion dealing with the subject of wire wheels it was pointed out that the development of this type has been more pronounced abroad than in this country. This should not be taken to mean that American made wire wheels are not the result of quite as much study and experimentation as those which are produced abroad. However, until very recently, practically within the past year, little attempt has been made in this country to market a substitute of this character for the American hickory wheel.

Perhaps the best known foreign wire wheel



Rudge-Whitworth Detachable Wheel, with Locking Ring Removed.

is the Rudge-Whitworth, made by Rudge-Whitworth, Ltd., Coventry, England. This wheel is now made in this country, under license from the British concern, by the Standard Roller Bearing Company, Philadelphia, for which the George W. Houk Company, 5001 Lancaster avenue, Philadelphia, is selling agent. Although it is by no means the pioneer American product in this line, using the term with reference to modern wire wheels, a description of it will prove of interest as indicating the progress that has been made abroad.

The Rudge-Whitworth firm has been making wire wheels for a number of years, almost since the inception of the automobile industry, but it may be said that the detachable form did not make its appearance until some five years ago. This has been refined and perfected until the present product is regarded by the maker as being all that could be desired for automobile road suspension. The wheels produced by the Standard Roller Bearing Company are made under the direction of engineers who studied every detail of their manufacture in the Coventry shops. The exact formulae for the steels that enter into their construction have been adopted, and duplicates of the special testing machinery employed in England are used, so that every wheel that leaves the Standard Roller Bearing Company's factory is guaranteed to be interchangeable and equal in every respect to the Rudge-Whitworth Coventry product.

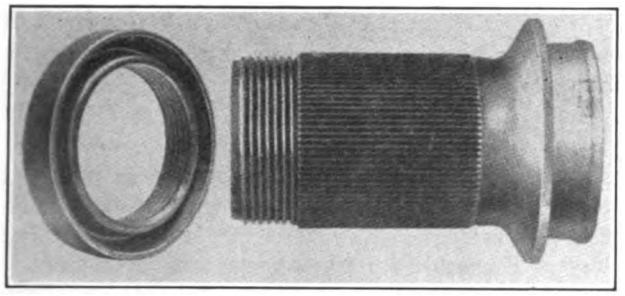
The Rudge-Whitworth wheel really comprises three parts—the outer stamped steel shell, to which the steel wire spokes are attached; the inner hub and the locking nut. The inner hub and the locking nut constitute the main points of difference between this and other constructions, although the material of which the shell and spokes is composed conforms to special formulae and is treated with a patented rust preventing compound. The Rudge-Whitworth wheels made in this country are fitted with the Houk quick detachable rim, which is held to be an additional feature of merit.

It is maintained by the British maker that the triple-spoke formation utilized in these wheels entirely overcomes the possibility of spokes becoming loosened. In addition, it is claimed that this construction produces a wheel that is scientifically braced from every point. Seventy spokes in tension throw the wheel into compression, making it perfectly circular. Engineers claim that this form permits the plane of the tread to be carried toward the centre line of the car almost at will, and that the triple-spoke wheel is a stronger construction, weight for weight, and is the acknowledged superior.

The arrangement of the spokes is brought out at A, in an accompanying sketch showing a sectional view of the hub, shell, spokes and rim. It only needs to be added that the spokes are attached to the shell and rim in much the same manner as with the bicycle wheel, and their replacement, in event of their becoming bent or broken, is quite as simple.

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The inner hub, or as it is sometimes termed, the fixed hub, is fitted to the axle and its size varies with the axle and the bearings of the car



Locking Ring and Inner Hub of Rudge-Whitworth Wire Wheel.

for which it is made. Along this inner hub barrel long serrations are cut, and at the outer end there is a screw thread of substantial dimensions On the inner surface of the shell are a number of grooves extending lengthwise of the hub, which engage with the serrations on the inner hub. It is through these parts fitting into each other that the drive is transmitted from the axle to the wheel, and care is taken in machining so that the shell can be slipped on the hub in any position with reference to its circumference. It is emphasized that these serrations take all of the driving and braking strains, which are not thrown upon the locking device at all. It also will be noted that the hub takes the form of a taper or wedge.

The wheel is locked upon the inner hub by screwing on the locking nut or ring, which engages with the threads on the end of the hub and with the taper face on the outer circumference of the shell. Only the tapered or V shaped portion of the ring engages with the taper or wedge shaped portion of the shell, so that screwing up the locking nut necessarily is a self-centring operation.

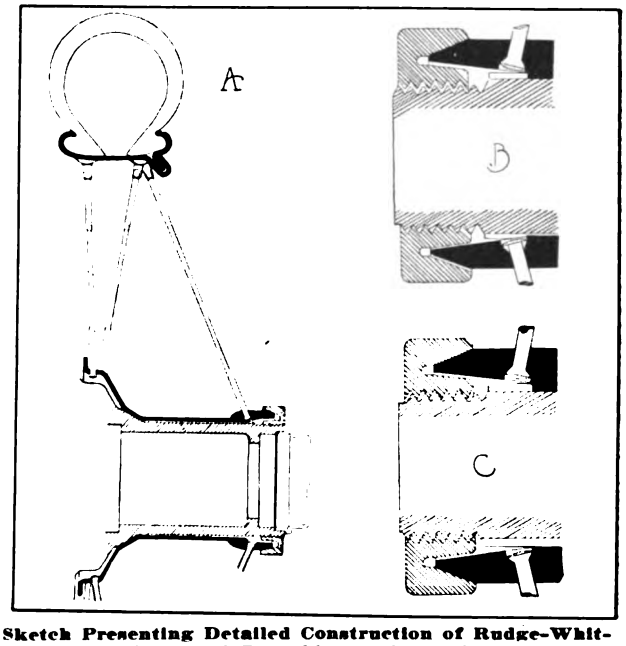
There is a slight clearance between the inner hub and the shell, and the teeth, though a good fit, are not tight, so that the removal or replacement of the wheel itself is accomplished easily. On the other hand, the wedge action of the locking nut is such that it not only locks the wheel immovably, but centres it on the inner hub.

Another feature is the provision for self-locking. While the maker supplies the regulation spanner, which is necessary for loosening the locking nut for removal, it is maintained that it is feasible to tighten this nut as far as possible with the fingers, when the rolling action and weight of the car will complete the process. It is held that this self-tightening has nothing to do with the driving torque or braking, but is merely a question of eccentricity and weight, the effect of the weight being to resolve eccentricity into concentricity, when the action of self-locking ceases.

The accompanying sketch brings out this feature. B shows the locking nut screwed on loosely, and it will be noted that it bears upon the top and outer taper of the shell, but not on the bottom, the locking of the ring onto the hub is entirely upon the outer surface of the latter. That is to say, the locking ring does not bear upon the shell at all on the inner side of the V groove. The self-locking action takes place between the ring and the shell where they touch at the top, and is produced wholly by the rolling action and weight.

As the ring locks up, it begins to bear all around instead of at the top only, so that as soon as contact is continuous the whole way around the locking action ceases, as the two surfaces are no longer eccentric to each other. C in the sketch shows the relative positions of the inner hub, shell and ring when the last named has tightened itself. All parts are now concentric. The locking nut has grasped the taper of the shell all around its circumference and centred it. The drawings are with the details considerably exaggerated, the better to explain the proposition.

Experiments under actual driving conditions have shown that when the wheel has been re-



Sketch Presenting Detailed Construction of Rudge-Whitworth Wheel, and Detaching and Locking Means.

moved and replaced and the locking ring screwed on loosely by hand, it was fully tightened within less than a mile of travel, so that it could not

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be undone without using the spanner. One question has arisen—since the wheel locks itself, will it not be possible for it to unlock in a similar manner? In answering this, it is pointed out that this could only take place, if at all, when the car was driven backward, and since it takes something less than a mile of travel to tighten it one revolution of the thread at the outer end of the inner hub, there is little danger from this source. Moreover, it is claimed that once the ring is fully locked it cannot become unlocked except by using the spanner. This spanner is provided with a short projection which fits into one of three small holes in the outer periphery of the locking nut, so that the position of the wheel is at all times such that the tool may be used with ease.

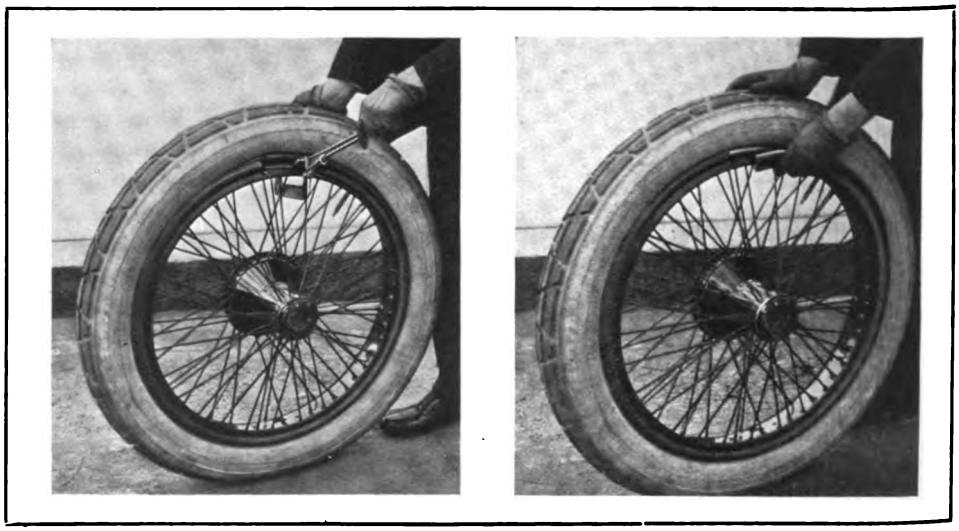


Houk Locking Ring Completely Removed from Wheel.

The Houk quick detachable rim, with which the American Rudge-Whitworth wire wheels are fitted, is decidedly simple in operation, there being no bolts or nuts used in locking the ring. The detachable feature consists merely of a locking ring which is fitted over the edge of the rim, automatically springing into position, and being held there firmly by its own spring. It is maintained that it does not depend in any manner upon the inflation of the tire to be held in place, and in addition it is claimed to be impervious to water. It is light in weight, and by reason of its double section on the outer edge of the rim it is held to be next to impossible to injure it by coming into contact with road obstructions.

The cross section of the wheel at A presents the construction of this rim as well. Other illustrations indicate its simplicity in operation. One end of the tool fits against the wheel rim on the opposite side and forms a bearing against which it is possible to pry the locking ring out of its groove. One or two such movements along the edge of the rim is sufficient to loosen enough of the ring to enable it to be grasped by the hand, when the entire ring may be withdrawn. The replacement is equally simple. One end of the ring is fitted and the remainder sprung into place.

The advantages claimed for wire wheels were fully set forth in a preceding article, and these are held to apply to the Rudge-Whitworth. Inasmuch as these wheels have seen extended service abroad, it is maintained that they prove the maker's contention in every respect. Particular emphasis is laid upon their strength, and that they will withstand severe stresses is held to be evidenced by the result of an accident to a car while running at 75 miles an hour. Although the tires were wrenched off, it is pointed out that the wheels were undamaged beyond a bent rim and spokes, which were soon realigned.



Removing Houk Quick Detachable Rim from Rudge-Whitworth Wheel: At Left, Loosening the Locking Ring by Use of Special Tools; at Right, Springing It Free From the Rim After Connection Has Been Broken.

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PEUGEOT DRIVERS NAMED.

Goux and Zucarrelli Will Handle French Machines in Memorial Day Event.

Definite word has been received from the Peugeot Company of Paris, France, that two of its fastest cars, with Jules Goux and Zucarrelli as drivers, will be entered in the third annual 500-mile international sweepstakes race at Indianapolis, Ind., May 30. This rumor has been current for some time and its official confirmation by the Peugeot company adds unusual interest to the coming contest, it being assured that the event will be truly international in character and will prove to be the greatest automobile race ever staged on an American track, if not in the world.

The Peugeot cars have left the factory and are being tested under the supervision of the engineers who designed them. According to present arrangements, Goux and Zucarrelli will arrive in America about May 12, and will proceed immediately to Indianapolis, where they will have a chance to become thoroughly acquainted with the speedway before the day of the race. Albert Guyot, who is to pilot the famous English Sunbeam car, will arrive about the same time and will also train at the speedway.

Owing to the fact that all of these drivers are scheduled to drive in the French Grand Prix, July 12, it will be necessary for them to return to France immediately after the Indianapolis race. Boillot, another Peugot driver, who had hoped to come to America with his team mates, will be compelled to remain in France preparing cars for the Grand Prix.

FORMS CHAUFFEUR'S BUREAU.

New Haven Club Will Supply Members with Information Concerning Drivers.

The governing board of the Automobile Club of New Haven, Conn., has established a chauffeur's bureau, through which members will be supplied with information concerning men who are seeking employment. It is pointed out that the object is to enable chauffeurs to secure good positions, as well as owners to obtain satisfactory service.

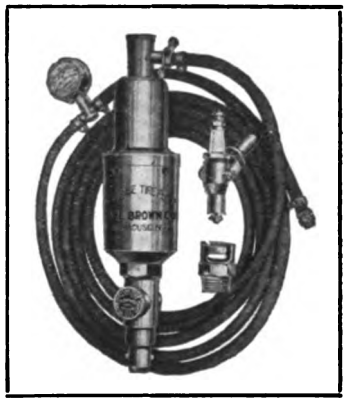
Information as to the chauffeur's age, nationality, habits, etc., is filed by his employer, and provision is made for revising this from time to time as occasion requires. Members who desire employees are permitted to call upon the secretary for this information without expense.

BROWN IMPULSE TIRE PUMP.

Utilizes the Power of the Motor, Eliminating Arduous Manual Labor.

Operating a hand pump in inflating tires is a task that is not relished by the motorist, especially on a hot day. Pumping troubles are dispensed with by utilizing the power of the motor and in the accompanying illustration is shown the Brown Impulse tire pump, a device that may be quickly attached and the shoe inflated without any other attention than watching the pressure gauge.

The pump operates on the compound principle, conveying only cool, pure air to the tire. The taking in of gases from the cylinder is prevented by a special breather valve having a tension of three ounces. The maker states that the ordinary motor has about five feet of vacuum, and the atmospheric pressure of 15 pounds to the square inch immediately overcomes this vacuum and the pure air replaces the gasoline vapor. There is less resistance in the valve than is encountered in the intake manifold of the motor.



Brown Impulse Tire Pump.

The equipment comprises the pump, the Brown quick detachable spark plug, 12 feet of high grade hose, a guaranteed gauge and a self-opening valve connection, all packed in a substantial wooden box. The plug is of the bayonet type and a quarter turn removes the core containing the electrodes, permitting the insertion of the pump proper, which is securely locked by a similar movement of the hand. The hose and connection are then attached and the motor operated at a slow rate of speed while the tire is being inflated. The pressure gauge is conveniently located and any number of shoes may be pumped up without stopping the engine.

The spark plug is constructed on principles indorsed by ignition experts, is adaptable both for battery and magneto, and the firing points are adjustable. The pump is constructed of high grade material, with valves of polished brass, and the finish in two coats of gray enamel. It is manufactured by Brown Company, Syracuse, N. Y.

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CORRESPONDENCE WITH THE READER.

Noting Battery Discharge.

(1500)—To ascertain the condition of dry cells we use an ammeter. For testing storage battery cells a voltmeter is employed. We are told that the ammeter cannot be used for measuring the storage battery, yet we can use the voltmeter on dry cells. And I note that some lighting systems on cars using dynamos have ammeters on the dash. This point is not very clear to me and I should like to have an explanation. If the ammeter can be employed in lighting systems why cannot it be used with the straight storage battery system?

REASON.

Malden, Mass., March 10.

The use of an ammeter for testing dry cells by short circuiting it across its terminals for an instant, has proved sufficiently satisfactory for a continuation of the method. Because it is done it is difficult for the layman to understand why the same instrument is not applicable to the storage battery.

Some idea of the difference may be gained by

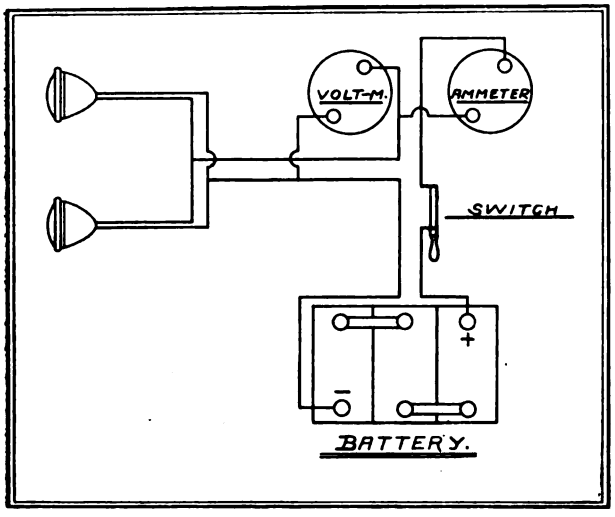


Fig. 1—Illustrating Use of Voltmeter and Ammeter in Straight Storage Battery System of Lighting.

remembering that the internal resistance of dry cells is comparatively high and the chemical action comparatively slow, while the chemical action of the storage battery is very rapid and internal resistance very low when its elements are connected, and that rapid chemical action is productive of heat. It should be borne in mind that in charging a storage battery a difference in potential between the plates (positive and negative), is created, and that if the plates were joined together the difference of potential would instantly become equalized. It is this process of equalizing that gives off the current making the battery useful. Thus it will be seen that it is desirable that the cells be discharged slowly.

An ammeter is of such low resistance that to all intents and purposes connecting it across the terminals of a storage battery would bring about practically the same conditions as connecting the plates directly. For this reason a voltmeter is employed because it has high resistance and requires practically no current to operate it.

Regarding the ammeters utilized in connection with dynamo lighting systems on automobiles, it will be noted that the maximum reading of the scale is from 15 to 20 and that provision is made for denoting the charge and discharge rates. These instruments indicate the amount of current being drawn from the cells, not their capacity.

Regarding the question as to whether an ammeter can be employed with the straight storage battery system, the diagram presented at Fig. 1 will show the method of incorporating both instruments in the circuits. In this installation the voltmeter would indicate the strength of the current and the ammeter the amount being drawn for heating the filaments of the lamps, which would be small in comparison with that capable of being supplied by the battery.

Bosch Magneto.

(1501)—I have a 1912 ——— car which employs a true high-tension Bosch magneto. While out riding the other day the motor stopped suddenly and refused to start after repeated trials at the starting crank. Finally I was obliged to be towed back home. Not being familiar with magnetos I called in a repairman from a neighboring repair shop, who examined the instrument and informed me that the points did not separate, that the fibre block on the breaker arm had worn down. He said that the breaker box was full of fibre dust when he removed the cover. A new part was secured and fitted and the magneto is as good as ever. His explanation of the parts was so meagre I would like to be posted as to what to do if it ever occurs again.

SUBSCRIBER.

Providence, R. I., March 10.

The best plan would be to prevent the entrance of grit or foreign elements to the breaker box. The fact that the fibre block wore so badly was doubtless due to some form of abrasive working into the breaker box, which acted as would a piece of emery cloth or sandpaper upon the fibre. The latter is a very important component in that it causes the movable arm to which it is secured, and which carries a platinum contact point, to separate the points, breaking the primary circuit. Its principle is the same as the conventional timer employed in the battery and induction coil system of ignition.

The break is caused by the fibre block coming in contact with cams, depressing the arm member and thereby breaking the contact between the platinum points. The abrasive in the breaker box

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reduced the thickness of the fibre block to such an extent that while it may have touched the cams it was not sufficient to separate the points, therefore the primary circuit was grounded practically in the same manner as when the switch lever was thrown to stop the operation of the motor.

It is evident that the magneto is mounted in such manner that it is exposed to dust and dirt or else the cover to the breaker box was not secured properly. It is advisable to clean out this member from time to time, employing a soft, dry brush. Lubricants should not be used as the fibre would become swelled and create trouble. If the instrument is exposed to dirt, etc., it would be advisable to purchase a leather cover. They are not expensive and will keep out foreign elements as well as moisture.

Trouble of the kind referred to is not common. If desired, an extra arm with fibre block may be secured and carried in the car. It is a simple matter to remove the old member and fit the new, requiring but the displacement of a locking nut and long screw. If the breaker box be given attention and the magneto protected from dirt, a repetition of the trouble will be avoided.

Current Rectifying.

(1502)—I understand that you printed an article on charging lighting batteries by an automatic rectifier. Can you give me information concerning the same and who is the maker of the device? F. A. B.
Jackson, Mich., March 11.

The article appeared in the Oct. 25th issue of The Automobile Journal and the instrument was an Edison alternating current rectifier which is presented at Fig. 2. It is made in two sizes, one providing a charging capacity of eight amperes and the other 16, and with the unit shown a regulating rheostat is provided. Complete information will be forwarded free of charge by the maker, Thomas A. Edison, Inc., Orange, N. J.

Parry Car Parts.

(1503)—Where can I secure parts to a Parry automobile? H. W.
Waltham, Mass., March 15.

The parts referred to may be secured from the Motor Car Manufacturing Company, Indianapolis, Ind.

Oil for Ford Cars.

(1504)—What is the best and cheapest oil for Ford cars? Where could I buy a second-hand White gasoline machine? What concerns make inner tube linings and leather trunks? T. H. M.
Holbrook, Mass., March 13.

The best oil is the cheapest with any automobile. The refiners have conducted a series of exhaustive tests to ascertain which grade is best adapted to each type of motor and the information will be furnished free upon application. In the Classified Buyers' Guide are given the names and addresses of makers, also those manufacturing reliners and trunks. Regarding the White car, the Boston branch of the White company should be able to supply information.

Flash and Fire Tests of Oils.

(1505)—What is meant by flash and fire tests of cylinder oils? What has viscosity got to do with it? I note mention made of the high flash and viscosity of lubricants advertised by different concerns. I take it for granted that any high grade oil is good oil, but why the technical terms? MOTORIST.
Mechanicsburg, Penn., March 18.

The terms referred to are employed in testing lubricating oils. They are five in number—specific gravity, flash, fire, cold and viscosity. The specific gravity was the first standard established for determining the quality of lubricating oils, but it is not now regarded as a conclusive test of quality. However, as the specific gravity of a particular petroleum oil increases the viscosity also increases.

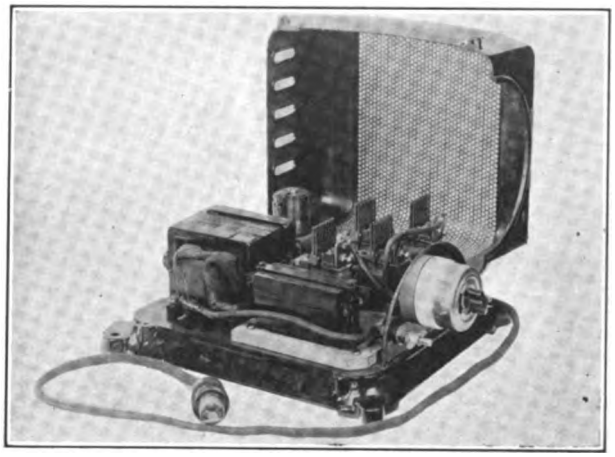


Fig. 2—Edison Alternating Current Rectifier, Adapted for Charging Storage Batteries.

The object of the flash test of a lubricant is to determine the point at which the vapor will ignite, but not burn, while the fire test indicates the burning point. This prevents danger from fire through the use of an oil that will evolve inflammable vapors. The cold test of an oil is the temperature at which it will congeal. It should be well below that at which it is used, otherwise the coefficient of friction would be correspondingly increased.

Viscosity, or fluidity, is the body of an oil, which is usually expressed in seconds of time in which a given quantity of lubricant will flow through a certain orifice at the temperature

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stated, comparison sometimes being made with water or sperm oil or rape seed oil.

Maker of Alpha Coil.

(1506)—I have an Alpha coil and desire to secure a new contact screw. Can you give the name of maker and address? W. P. H.

Cassville, Wis., March 8.

The writer does not recall the coil mentioned. Perhaps some reader may know the maker and forward the address to this office. If the platinum point is destroyed it could be replaced with new material by any jeweller, or a screw may be made to fit the part if a new one cannot be purchased.

Rattling Windshield.

(1507)—I am troubled by the windshield on my car rattling. Have been over it very thoroughly and tightened up all parts. The noise seems to come from shield itself, where it rests in the frame. Any suggestions as how to cure the noise will be appreciated. WINDSHIELD.

Dayton, O., March 13.

It is probable that the channel rubber employed to absorb the vibration has become hardened and lost its usefulness. If this material is utilized replace with new.

Backs Car Up the Hill.

(1508)—The stunt of a driver of a commercial truck the other day struck me as particularly interesting and while it may not be a new one it may be of value to some of your readers who find themselves in a similar predicament. The operator started up a hill with the machine loaded, but after part way up the motor stopped. After trying the usual tests he discovered that the height of the carburetor was more than that of the fuel in the tank. Releasing the brakes the driver allowed the car to coast down, after which he started the engine, turned the truck around and went up the hill on the reverse. This brought the gasoline tank considerably higher than the carburetor. SUBSCRIBER.

Boston, Mass., March 20.

FORD CREATES NEW RECORD.

Spokane Motorists Claim Three Cross Country Marks in Washington State.

Three intercity speed records are now held by Spokane motorists, the last established being by F. A. Williams, who drove a Ford car, made by the Ford Motor Company, Detroit, from Seattle to Spokane, Wash., a distance of 339 miles by railroad, in 23:15:00, crossing the Cascade mountains en route.

The first automobile Washington run advertised as a speed contest, and in which judges were appointed, was held in August, 1909, when Murray made his record run from Coeur d'Alene to Spokane in a Buick machine, made by the Buick Motor Company, Flint, Mich., covering 32.6 miles in 35:37. The second run was made in April, 1910, between Spokane and Walla Walla, when H. M. Eastman covered the round trip, registering 326 miles, in 12:59:00 in a Cadillac touring car, made by the Cadillac Motor Car Company, Detroit.

IMPORTS AND EXPORTS.

Government's Annual Report for 1912 Shows Splendid Increase in the Latter.

The annual report of the bureau of foreign and domestic commerce of the United States government relative to the imports and exports of automobiles during the past year, for the 12 months ending Dec. 31, 1912, indicates an increase in the exports of practically 50 per cent., while the imports for the same period showed a slight decrease. The following tables show the comparison for the two years:

December Imports.

	1911		1912	
Country	No.	Value	No.	Value
France	47	$108,687	43	$100,589
Germany	13	28,086	7	19,523
Italy	13	21,648	10	18,909
United Kingdom	23	50,823	15	51,523
Other countries	7	17,823	12	37,108
Totals	103	$227,067	87	$227,652

December Exports.

	1911		1912	
Country	No.	Value	No.	Value
France	35	$24,043	30	$29,123
Germany	9	5,905	12	18,516
Italy	5	5,202	21	16,335
United Kingdom	858	638,742	269	215,753
Other Europe	90	67,718	110	116,532
Canada	432	415,246	557	604,560
Mexico	35	57,725	41	86,937
West Indies and Bermuda	37	39,847	54	60,660
South America	207	225,263	342	374,183
British Oceania	435	346,046	273	239,961
Asia and other Oceania	71	76,493	181	176,011
Other countries	33	31,200	123	122,241
Totals	2247	$1,933,430	2013	$2,060,812

Annual Imports.

	1911		1912	
Country	No.	Value	No.	Value
France	341	$770,643	469	$1,123,584
Germany	160	350,239	63	152,860
Italy	131	203,733	109	174,412
United Kingdom	173	403,506	137	347,776
Other countries	167	370,360	90	200,955
Totals	972	$2,098,481	868	$1,999,587

Annual Exports.

	1911		1912	
Country	No.	Value	No.	Value
France	420	$449,757	698	$531,163
Germany	115	124,615	450	366,914
Italy	176	199,986	288	257,050
United Kingdom	4,031	3,380,266	4,640	3,518,671
Other Europe	795	718,360	1,549	1,295,379
Canada	4,988	5,552,931	7,421	8,859,694
Mexico	297	490,041	274	459,023
West Indies and Bermuda	300	343,281	370	391,890
South America	1,116	1,356,445	2,201	2,539,166
British Oceania	2,476	2,217,762	3,385	3,091,966
Asia and other Oceania	813	795,576	1,650	1,640,369
Other countries	280	295,341	794	752,704
Totals	15,807	$15,924,361	23,720	$23,703,989

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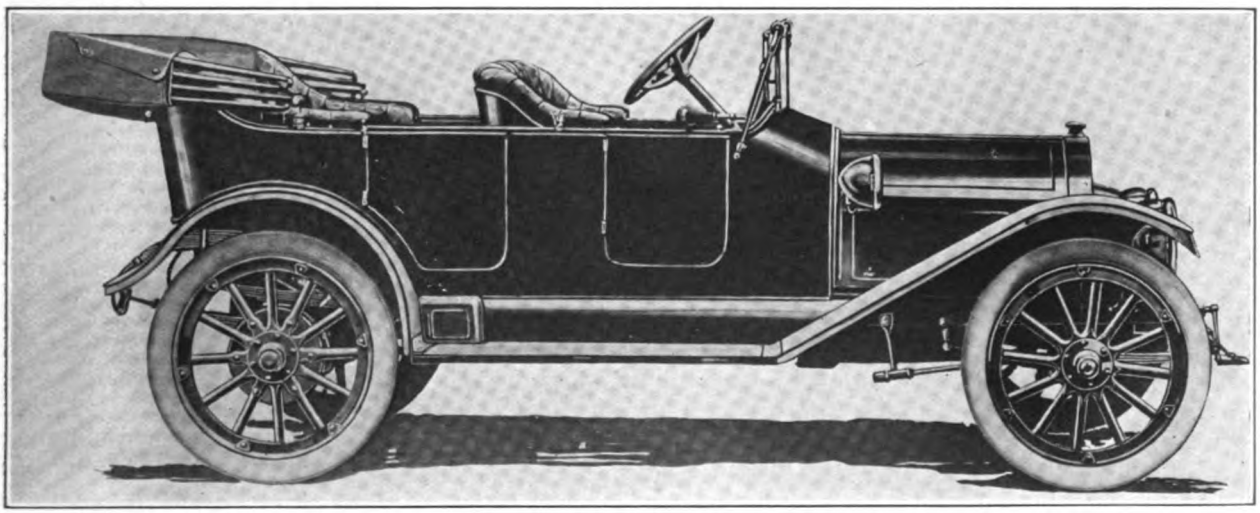
TWO BODY TYPES FOR CUTTING CHASSIS.

BELIEVING that the production of two models instead of six as formerly, will permit of improving the quality as well as increasing the output, the Cutting Motor Car Company, Jackson, Mich., is producing one chassis to which is fitted two types of bodies, these including a two-passenger roadster and a five-passenger touring car, and both are very attractive in design. While the changes are largely in the nature of refinements the company adheres to those principles of construction indorsed by sound engineering practise. The most important improvement is the adoption of the unit power plant suspended at three points. Last season the transmission was located amidships.

The new power plant is very compact and is noticeable for its simplicity and accessibility of components. It is a four-cylinder, water-cooled unit of the L head type, and cast en bloc with the water jackets integral. The cylinders are finished with open tops, closed by a bronze plate member which serves as the exhaust water manifold. This construction permits of easy cleaning of the water jackets. The bore is four inches and stroke five, and although the horsepower rating by the S. A. E. formula is 25, the Cutting power plant develops considerably in excess of this in brake tests, having a piston displacement of 251.3 cubic inches.

The ground pistons are fitted with four rings of the eccentric type and four oil grooves insure proper lubrication. The connecting rods are 12 inches long, of drop forged high grade steel, and the small ends are secured to hollow tool steel wristpins, which are retained in the piston bosses by lock screws. The crank and camshaft are of a 40 per cent. carbon steel, the former rotating in three bearings of Parsons white bronze and these are 2.75, four and 2.75 inches, respectively. The crankshaft is 1.75 inches in diameter. Three bearings are employed for retaining the camshaft and the bearing material is bronze, as are the big ends of the connecting rods.

The crankcase is of aluminum, divided at the centre. The valves are located on the left hand side of motor, have nickel steel heads and carbon steel stems electrically welded. The port diameter is liberal, 2.625 inches, and the valve mechanism is enclosed by easily removed plates.



Cutting Five-Passenger Touring Car Having Attractive Lines and Being Fully Equipped.

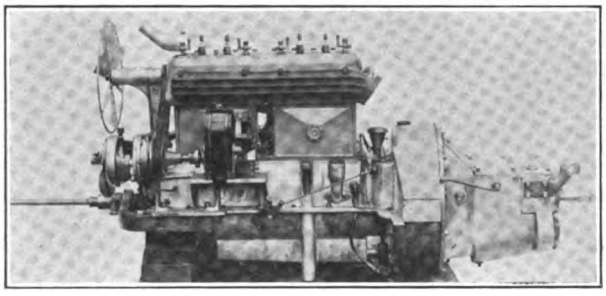
The carbon steel tappets have bronze guides and are adjustable by a screw and locknut. Spiral timing gears, enclosed in a bronze case, make for noiseless operation.

The carburetor is a Schebler fitted with a hot air attachment and the feed is by gravity. The fuel capacity of the roadster is 25 gallons, that of the touring car being 15. Ignition is by the late model Remy magneto and dual ignition is provided by an 80 ampere-hour capacity storage battery. The magneto is located on the left hand side of the motor and is positively driven through shaft and coupling. The pulley driving the adjustable fan is fitted to this shaft and the entire construction is sturdy and accessible.

The lubrication system is of the circulating type, a gear pump located on the outside of the

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lower crankcase being driven by spiral gears from the camshaft. The lubricant is forced to a main duct cast integral with the crankcase, thence



The Unit Type of Power Plant Is Employed—Note the Compactness and Liberal Sized Inspection Plates.

distributed by other ducts cast in the web, to the main bearings. From this point it is forced through the hollow crankshaft to the connecting rod bearings. The circulation of the oil through the crank arms and connecting rod bearings is in the direction of centrifugal force and a sufficient amount of lubricant is thrown to thoroughly lubricate the pistons and camshaft, which are provided with pockets. A fine wire gauze is brazed to the opening of the pump, preventing the entrance of foreign elements. The oil gauge is located on the exhaust side of the motor, extends to the level of the crankcase, and the height of the lubricant is indicated by a float and ball. Marks are provided on the glass gauge to denote high and low. By maintaining the proper level smoking is eliminated. The company states that the system is so efficient that one gallon of lubricant will operate the motor 800 miles.

Circulation of cooling fluid is by a centrifugal shaft driven pump and the intake and outlet water manifolds are ample in size. The radiator is of the square tube type and cooling is further aided by a pressed steel, one-piece fan.

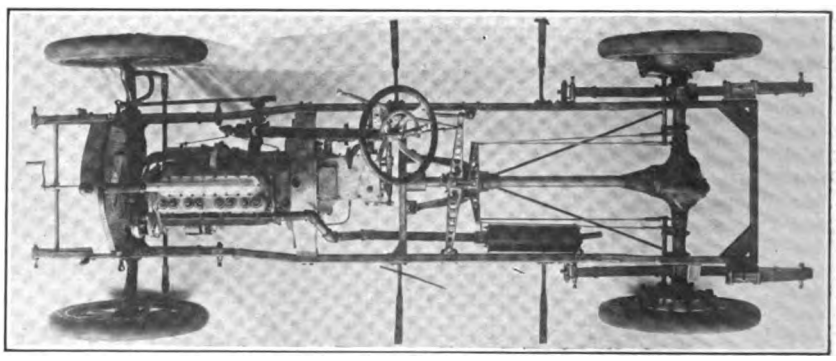
The three point suspension is utilized, the power plant being supported at the front by a steel casting extending from both sides of the crankcase to the centre of the front cross bar. There is a large bearing permitting the motor to swivel, compensating for torsional stresses to the frame. The two rear supporting arms on the motor extend to the frame.

The clutch is a multiple disc comprising 15 plates operating in a bath of lubricant. It is very accessible for adjustment and easy engaging qualities are emphasized with the design. The transmission is of the selective type, providing the conventional three speeds forward and a reverse, with direct drive on the third. The gears are carefully cut and finished from 35 point carbon steel and their size and width make for durability. Large sized annular ball bearings are employed throughout. Liberal inspection plates permit of examination and the replenishment of the supply of lubricant.

Power is transmitted to the rear wheels by a shaft of ample size and high grade material, and a well designed universal joint is fitted at the rear of the transmission casing. The propeller shaft and universal joint are anchored to the middle cross member, and the latter is removable, being bolted. The shaft yoke is carried on two brackets anchored to the cross member, and has two large steel bushings, cotter keyed to the bracket. The employment of bronze bushings in the yoke makes for easy replacement in the event of wear and at a minimum of cost. Annular ball bearings are utilized.

The rear axle is of the semi-floating type with differential and shaft housing of malleable cast iron. The axle shafts are of carbon steel, 1.375 inches in diameter, and rotate on roller bearings. The differential gears are of nickel steel, ample in size, and roller bearings are employed. The inspection plate is liberal in size and very accessible.

The frame is of pressed steel, .1875 inch thick, is provided with the usual kickup at the rear and is inswept at front, making for a short turning radius. The springs are semi-elliptic in front, 40 inches long and two wide. Nine leaf three-quarter elliptic, 40 inches long and two wide, are fitted to the rear. All bolts are provided with grease cups and the springs are well shackled.

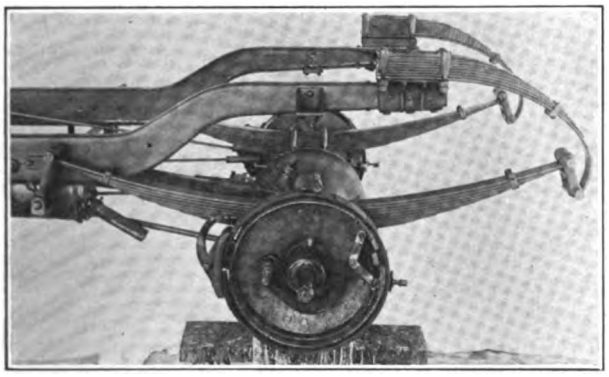


Top View of Cutting Chassis, Showing Unit Power Plant, Compactness of Design and Accessibility of Components.

The front axle is of the I beam section type,

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drop forged, and has the conventional drop in the centre. The spindles are provided with the ball and cone type of bearings and the tiebar is



The Brakes Are Ample in Size and Separate Equalizers Are Employed with Each Set.

tubing, located in the rear of the axle. The yokes are drop forged, and their size provides an ample margin of safety.

Two sets of brakes are provided and the drum has a diameter of 14 inches and face of two, making for efficient braking capacity. The service members are of the external contracting type with emergency internal and actuated by lever. Both are faced with Raybestos. The bar evener equalizing system is employed, both brakes having separate and distinct equalizers, a construction assuring efficiency.

Artillery wheels of second growth hickory are employed and ball bearings are utilized. The rims are of the quick detachable demountable design and 36 by four-inch tires are fitted both front and rear. One extra rim is standard equipment. The wheelbase is 120 inches and tread standard, 56.

The steering gear is of the worm and gear type and a noticeable feature is the ample size of its components and linkage. The column is set at a comfortable angle and is surmounted by an aluminum spider to which is secured the 18-inch black walnut notched wheel. Provision is made for proper lubrication by the fitting of grease cups in accessible positions.

The spark and gas levers are mounted on the wheel. The driver is located at the right with gear shifting and emergency brake levers inside of the body. The clutch pedal is placed at the left with service brake pedal at right, and the usual accelerator is located in the footboard in a convenient position.

Both the roadster and touring bodies are of the fore door type and the designs are noticeable for their straight lines and attractive appearance. The bodies are of pressed steel and a feature of their construction is the fitting of the doors, which are flush and have locking mechanism within. The fenders harmonize with the lines of the bodies and with the utilization of well fitted splash aprons there is no reason why the passengers should not be fully protected from mud or water.

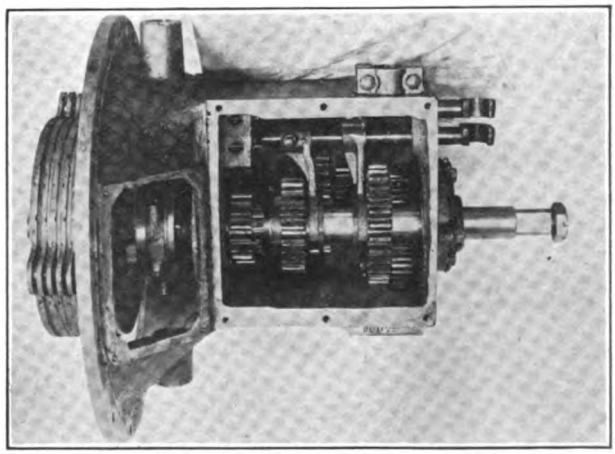
The upholstery is a high grade black leather and the cushions are deep and fitted with comfortable springs. There is ample room in the tonneau as well as in front and the designer has made every provision for comfort on long trips.

The roadster is striking in appearance and the usual deck fuel tank is fitted at the rear of the seats. A large sized trunk is also carried at the rear. The models are well painted, royal blue being used, a rich, neat color. The company calls particular attention to the finish, which is not only high grade, but very enduring.

The cars are fully equipped and include a high grade mohair top with dust boot, clear vision windshield, horn, pump, jack, tools, etc. The holders are fitted at the rear and the touring car is provided with a robe rail. The roadster is equipped with foot rail.

The headlights are acetylene and are lighted from the dash. The equipment includes a Prest-O-Lite tank. The motor starter is of the acetylene type, a Hanna, but a combined electric lighting and starting unit is installed at a slight additional cost, provision being made for the installation of the system.

The Cutting models are designed to meet the



Multiple Disc Clutch and Transmission of Cutting Chassis —Note the Ample Sized Gears.

requirements of motorists desiring a serviceable car having plenty of power and capable of being maintained at a minimum cost.

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STILL AMERICA'S BEST SHOW.

Whatever question there may have been in the minds of those interested in the automobile industry as to the continued importance of the Boston show must have been dispelled as a result of a visit to Mechanics' building during the progress of the recent 11th annual exhibition of pleasure cars. In every way it was biggest and best, fully bearing out all previous predictions. Never has there been a prettier setting for the show. The number of makes on display exceeded all others held this year. More special bodies were to be seen. The list of accessories was most complete. And best of all, the amount of business transacted even exceeded expectations.

It cannot be denied that the value of the automobile display is measured by the business developed. This does not necessarily apply alone to sales, although it is exceedingly gratifying to note that in this respect this year's Boston show was quite as prolific as ever. There is the additional source of future business to be found in the prospects revealed, and the enthusiasm created also has its weight. There can be little doubt that in these other factors the recent exhibition suffered no diminution in importance.

Insofar as the commercial vehicle section is concerned, the results are even more far reaching. It is expected that there will be a noticeable difference in the appeal made by the two types of cars. Motor trucks and delivery wagons are considered strictly on a business basis, as they should be, and the value of the show is quite as much along the lines of an educational campaign as in the closing of sales. There is abundant evidence, however, that the Boston commercial vehicle display was quite as successful in the latter respect, as well.

In view of the rapid development of the automobile industry and its growing importance in the industrial life of the nation, it is not surprising that other cities envy the position held by Detroit. New York City appears to be very much in earnest in its effort to secure a substantial share of the manufacturing in this line. The committee in charge of the movement does not seem to have overlooked any of the arguments in its favor, among which that of the market afforded is by no means the least important.

The fuel problem promises to be uppermost in the minds of manufacturers and owners during the next few months. The discovery of the new fuel, motor spirit, does not seem to offer the complete solution that is expected. Those who read carefully between the lines cannot help but gain the impression that the practical kerosene carburetor is shortly to make its appearance, and on some of the best known cars.

Although there has been decided effort to secure amendments to the so-called reciprocity law of New Jersey, which in a greater or lesser degree would cause a return of the discrimination against non-resident motorists, it is now stated that there is little likelihood that any changes will be made this year. Former experience appears to have convinced a majority of the people in New Jersey that such methods do not pay.

A gain of practically 50 per cent. in the value of automobile exports for the year, with an aggregate of $23,703,989, indicates the importance of this industry in international circles. There is small wonder that the foreign manufacturers are seeking to learn how it is accomplished.

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PROTECTING THE CUSTOMER.

President Joy Explains How the Public Suffers from Price Cutting Methods.

Automobile salesmanship has undergone a decided change within the past few years. Methods which were in vogue in the earlier days of the industry are no longer tolerated. Henry B. Joy, president of the Packard Motor Car Company, Detroit, sets forth the value of the established retail price fixed and maintained by the manufacturer, as follows:

An established retail price fixed and published by a responsible manufacturer is for the consumer's protection. The control of the retail price by the manufacturer, when the fixed and published retail price is actually, honestly and inviolably maintained by the manufacturer and by his representatives, the retail dealers, is the only honest, square way to insure fair dealing between the manufacturer and his patrons. Such a method and such only is square, honest business.

When, however, such a retail price is only "ostensibly established" by a manufacturer, but is fixed "high" for the purpose of having something to "throw off," to negotiate with or "trade" with, it is crooked business. The manufacturer who does it is crooked and the retailer or dealer also is crooked. The trusting or unskilled buyer is "fleeced."

The Department of Justice is, by pending litigation under the Sherman act, seeking to prevent the control of the resale price to the consumer after the sale of the product to the dealer by the manufacturer has been consummated. This is wrong in principle and wrong in fact. It tends to force and actually will compel "unfair competition," resulting in one price to one consumer and another price to another.

We have demanded that the railroads should establish, publish and maintain equal freight rates to all. Why are we so fussy about railroad rates? Yet we institute legal proceedings to prevent the Kellogg Toasted Corn Flake Company from treating all the consumers of its product alike. The government would be in better business if it sought to compel equal treatment to all.

If the Department of Justice sought to compel a manufacturer to maintain established list prices by interpreting the Sherman act to mean that cut prices below the manufacturers' fixed and published prices was conspiracy in restraint of trade, which it actually is, great good would be accomplished in promoting honesty in business.

We jailed and fined railroad officials for cutting prices on freight! Why is not the same principle applicable to products of manufacturers in relation to the consumers of their goods? We have a right to demand equal and fair treatment to all. Competition will still exist in its broadest and best sense and in the most beneficial form to all concerned.

If a manufacturer establishes and publishes a consumers' price he should be compelled to maintain it, and if a sale at less than list price can be proven to have been made by his dealers or agents, then all sales for a period of say 30 days prior to the "cut price sale" should be adjusted to that basis.

In such a condition it is plain that published prices would be maintained. The confiding purchaser would not be cheated as is now largely the practise. Purchases could be made with one-tenth the expenditure of time, talent and energy in "shopping" and negotiating, and all consumers would be treated alike and each get a square deal.

It is obvious also that established published prices would be fixed at their proper and legitimate point. A published price would mean the real actual value of the article at which it must sell on its merits in competition with other like products. Competition would be transformed from "sharp and unscrupulous business methods" to the basis of "quality, merit and service."

Ed. Note—The Automobile Journal welcomes correspondence from manufacturers, dealers and owners on subjects of pertinent interest to the industry. Letters should be as brief as possible consistent with the importance of the subject. In publishing these communications The Automobile Journal assumes no responsibility for the opinions expressed.

ADVANTAGES OF LARGE WHEELS.

Some of the Reasons Why Tire and Car Manufacturers Urge Their Adoption.

While the average motorist may be more or less well informed concerning the advantages of large diameter wheels, it is probable that he has given little thought to the reasons therefor. V. A. Longaker, general manager of the American Motors Company, Indianapolis, Ind., has taken up the subject in an interesting manner. He says:

The advantages of large diameter wheels are self-evident. Strange as it may seem, the only question ever raised is the one as to tire cost. The advantages of large diameter tires are so fully appreciated by the tire manufacturers that they are encouraging the use of large diameter tires by making a concession in the price. By referring to a price list of any of the large tire manufacturers it will be found that the price of a 41 by 4.5-inch casing is less than the price of a 36 by five. This hardly seems reasonable to the casual observer. The 41 by 4.5-inch casing must contain a greater amount of rubber and canvas, and certainly it takes a greater length of time to build the body of the tire, owing to the larger diameter. The fact that the difference in the list price is in favor of 41-inch tires can only be explained in that the tire manufacturer is endeavoring to encourage the use of large diameter tires, no doubt reasoning with his own mind that the large wheel is the only solution of the tire problem.

The perfecting of the pneumatic tire has not progressed with the rapid development of the automobile. In fact, the pneumatic tire is the weak point in the construction of the car. Anything which the car manufacturer can do to help overcome the one weak point which has had the greatest retarding effect and the one thing which has been the source of the greatest expense in the maintenance of a car, certainly deserves the attention of the progressive designer.

The theoretical reason why the 41-inch tire has a much longer life than tires of a smaller diameter is that the angle formed by that portion of the circumference of the tire where it makes contact with the road is smaller. As a result, an obstruction in the road of a given height being passed over by the larger wheel, does not cause the wheel to rise so abruptly. In other words, the greater this angle, the more quickly the wheel is called upon to rise. The blow of the contact of this obstruction is consequently greater. Owing to the increased radius of the arc at that portion of the tire which is in contact with the ground, a great many small depressions in the road can be bridged. If the wheel were to drop into these depressions the fall would result in practically the same kind of a blow being applied to the tire as if it were passing over an obstruction which stands above the surface of the road. The greater number of these small, but nevertheless telling, blows that can be overcome will not only prolong the life of the tires, but will also result in the entire mechanism of the car being greatly protected.

Vibration in itself can in a way be compared to a great many blows of greater or less magnitude being applied with greater or less rapidity. The blow of a hammer, for instance, no matter how small it may be, if kept up sufficiently long, will destroy the best piece of armor plate. Vibration is the greatest enemy the motor car of today has to contend with. The large wheels not only lengthen the life of the tires, but prolong the life of the rest of the car as well. In early automobile construction this important factor of vibration was not as fully

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appreciated as it is at the present time. The early builder found that certain parts of his car were failing. In his early calculations the part may have been designed with the factor of safety in view; however, the all-important question of vibration was overlooked. This problem of vibration has created the demand for the alloyed steels which enter into the construction of the automobile of today to such an extent.

Another reason why the large diameter tire will give a greater mileage is that the length of the chord which is formed by the surface of the road depressing the periphery of the tire is much greater; for instance, a 36-inch tire having a five-inch section, properly inflated, (89 pounds) will have a contact surface in the form of an ellipse approximately 1.75 inches in width by 7.5 inches in length. The area of contact of the 41-inch tire, properly inflated and carrying the same load, is approximately 8.125 by 1.9375 inches. The area of the first contact surface is 10.3 square inches and the second 12.3 square inches, or a gain of 20 per cent.

The increased length of the contact with the road not only has its advantage in the surface wear of the tire, but also plays an important part in the ability of the tire to withstand the enormous strains which are applied in the driving and the retarding of the car to that portion of the tire which is in contact with the ground. The reason for this is that there is a greater percentage of the periphery of the tire which is carrying the load, and owing to the load being applied over a greater portion of the tire, the strain is more equally distributed.

MOTORISTS WERE WASTEFUL.

Vice President Studebaker Thinks Price of Fuel Made Everybody Careless.

That the price of motor fuel rests to a great extent with each individual motorist, and that the industry in general is under a deep obligation to the big oil companies, is the opinion of Clement Studebaker, Jr., first vice president of the Studebaker Corporation, Detroit. He writes as follows:

I have recently noted several articles, quoting automobile manufacturers and others as deprecating the recent increases in the price of gasoline. Some have even professed to see, in the advance, a menace to automobile popularity and industry. As a matter of fact the difference amounts to but a fraction of a cent for each mile a car and should not, in a season's running of 5000 miles, exceed a total of $25. On the other hand, it is high time that motordom should consider the debt it owes the big oil companies, without whose magnificent organization motoring would never have achieved its present popularity.

Before the internal combustion motor, gasoline was virtually a by-product, on sale at central stations for perhaps 10 cents a gallon. The cost of delivery fell on the buyer and often amounted to more than this figure. The oil companies were glad to sell the gasoline at almost any price, for this enabled them to manufacture at a profit, greater quantities of oils, greases and lubricants. While this condition prevailed the buyers of the staples paid a large share of the motorist's fuel bill.

But gasoline motor cars multiplied and eventually the demand for fuel equalled that for the other products. A year or so ago the old balance was reversed. Now the demand for gasoline greatly exceeds that for the staple oils and greases. And in place of the old method of distribution, the oil companies have established a system which covers the entire country, bringing to the very door of each garage a refined product which has often travelled thousands of miles. When one considers the cost of drilling, pumping, transportation, refining and delivering, he must admit that there is no manufactured product sold as cheaply as gasoline. Even at its present price it costs the consumer less than an equal quantity of most brands of spring water.

When the demand for gasoline came to exceed that for the other crude oil products the manufacturers faced a dilemma. They could not produce gasoline and throw away the other products; such a process would have made the fuel prohibitive in cost. To advance the price of gasoline and to lower the price of the other products was the only available means of regaining the balance. So now we pay more for gasoline and less for oils and greases.

As a matter of fact we have all wasted gasoline; it has been so cheap. A little economy will hurt none of us. Automobile manufacturers have built wasteful cars—cars with motors much larger than necessity demanded; cars that lacked efficiency. But the manufacturer is seeing the light. The recent shows emphasized a new tendency—a tendency toward motors that yield more in miles a gallon. But these cars will fail to save gasoline unless their owners do their part.

Just as a wasteful car raises the cost of gasoline, so every motorist who fails to make his car efficient, makes fuel cost more. Owners of automobiles owe it to each other to start a united effort, keeping track of gallon-miles, watching carburetion, learning the art of controlling a car more by the clutch and less by the brakes. A campaign along this line will save enough gasoline to more than balance the recent increase in cost.

Our office files contain hundreds of letters from tourists whose cars have averaged from 15 to 25 miles a gallon on ordinary country roads, and a car should yield at least 10 miles a gallon in city traffic where there are many more starts and stops. If motorists generally would regard these averages as standard and would strive to exceed them, the condition would be immediately relieved.

The cost of gasoline will advance no further than the necessities of the oil companies' production require. These necessities are, to a large degree, in the hands of motorists themselves.

INTERESTING MILEAGE RECORD.

Pierce-Arrow Covers 22,867 Miles in Europe Without Repair Expense.

A record of 22,867 miles as shown by the speedometer on the car has been reported by Edward Harding, who has returned from Europe after driving the Pierce-Arrow machine owned by Miss M. P. Walker of Boston and made by the Pierce-Arrow Motor Car Company, Buffalo, N. Y., in all sections of the Continent. A new 1913 touring car is waiting shipment to Gibraltar, where the party will start on another tour of several thousand miles, this time through Africa.

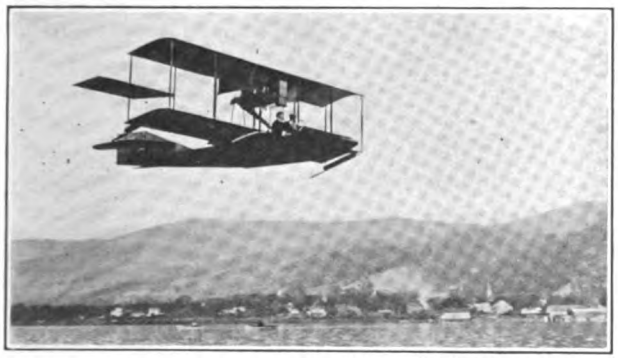
Mr. Harding reports that in all the 22,867 miles travelled by the 1911 Pierce-Arrow, not a single cent was expended for anything save gasoline, oil and tires. Incidentally, on the entire trip only 18 casings were used, due mainly to the magnificent roads encountered.

Stop, Look and Listen—M. H. Douglass, a locomotive engineer at North Platte, Neb., has prepared a bill for introduction in the present legislature compelling the operator of a motor vehicle to bring the machine to a dead stop before crossing any railroad track or tracks. He states that railroad men all over the country are behind the movement.

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DETAILS OF CURTISS AERIAL YACHT.

AFTER five years the regents of the Smithsonian Institute, Washington, D. C., have made the first award of Langley memorial medals to Glenn H. Curtiss and Gustave Eiffel. These



Curtiss Aerial Yacht in Flight Over Lake Keuka.

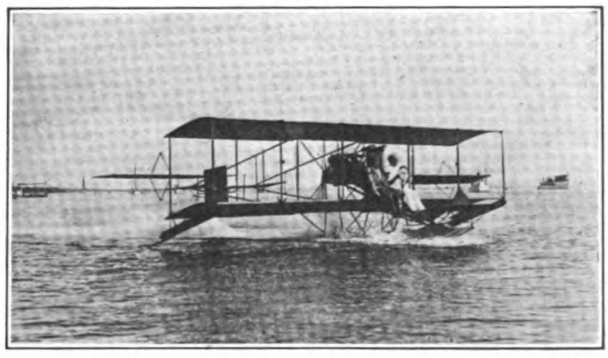
medals were provided for in 1908 as a memorial to the late Prof. Samuel Pierpont Langley, a pioneer experimenter in the field of aviation, and at that time the regents decided that they should be awarded only for "specially meritorious investigations in connection with the science of aerodromics and its application to aviation." These two first medals are to be presented May 6, at the annual meeting of the Aero Club of Washington, this date having been selected as Langley Day. The award to Curtiss is made for development of the hydraeroplane, out of which was evolved the flying motor boat or aerial yacht; that to Eiffel, for his recent laboratory work and researches relating to the resistance of the air in connection with aviation.

The Curtiss hydraeroplane, which is regarded as the first successful machine of this type, already has been described in full in these columns. The aerial yacht bears a close resemblance to its predecessor in many respects, but is held to be a decided improvement, particularly with reference to the matter of safety. Accompanying illustrations show the machine in flight and on the surface of the water, the photographs having been taken at Lake Keuka, near Hammondsport, N. Y., where the Curtiss plant is located.

The main difference between the hydraeroplane and the aerial yacht, though it may be stated that both are hydraeroplanes in the strict use of the term, lies in the length of the float and the arrangement of the plane surfaces with reference thereto. That is to say, that with the former construction a short float is utilized underneath the main plane formation, and the empenage is free. With the latter the boat body virtually takes the place of the ordinary fuselage.

This boat body practically is an elongated float, the construction being of spruce over a spruce framework with separate water tight compartments. It measures 26 feet in length and 2.5 feet in width at its widest portion, just a little further back than the rear spar. The main plane formation is the regular Curtiss biplane type with a spread of 28 feet three inches. This with its 75 horsepower eight-cylinder Curtiss motor is superimposed upon the float or boat body, directly behind the cockpit, in which the pilot and passengers and controls are located. The engine is mounted rather high, considerably above the axis of the cellule, and drives a left hand propeller eight feet in diameter and six inches pitch.

The empennage does not differ materially from that utilized with the standard Curtiss biplane or the Curtiss hydraeroplane, except that it is mounted over the extreme rear of the boat body. The machine may be flown either with or without a forward elevator, but when one is used the rear elevator works inversely with that at the front, by steel cables which pass through a portion of the boat and in a direct line. The prow of the boat is pointed to offer the least resistance possible when in the water, and the occupants are protected from spray by a collapsible water proof hood. The boat itself is so strongly built that it may be beached with safety, even through a high surf, and is capable of being handled much the same as a fisherman would handle his dory. It may be housed afloat or anchored to a buoy like a motor yacht. Several of these machines have



Curtiss Flying Boat on the Surface of the Water.

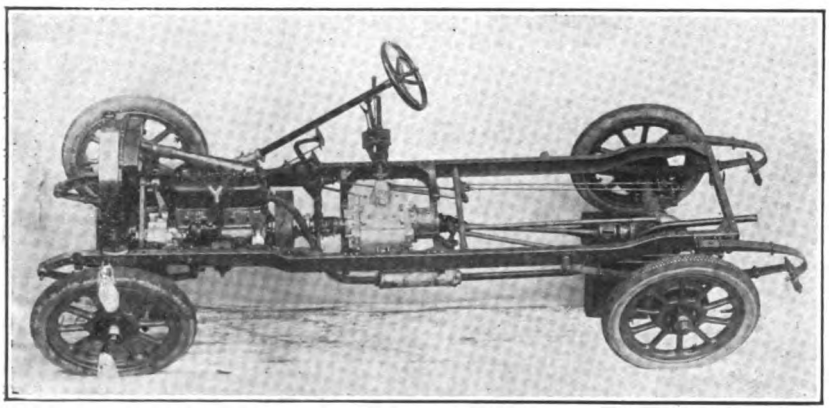
been sold in this country and abroad, Louis Paulhan, the pioneer French aviator, having taken the European agency in connection with that for Curtiss hydraeroplanes.

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UTILIZES STEEL ARTILLERY WHEELS.

Features of Latest Model of the Singer Produced in Great Britain—American Cars Win in Swedish Ice Carnival Races—Other News Notes from Abroad.

BECAUSE of the very satisfactory manner in which the Singer car has performed in hill climbing contests and events on the Brooklands track, the latest model produced by the Singer Motor Company, Ltd., Coventry, England, cannot fail to be of interest to American motorists, albeit the general construction does not depart greatly from standard practise in this country. It may be added that the machine driven by C. L. E. Geach to create new standard class records (corresponding to stock car records in this country) was rated at 15.9 horsepower, while the new car is rated at 14. It was a 20 horsepower Singer which won the Royal Automobile Club's standard car race in July, 1912, and other events were won with a specially constructed machine, a front



Three-Quarter Top View of 14 Horsepower Singer Chassis, Showing New Block Motor and Other Components.

view of which is presented herewith.

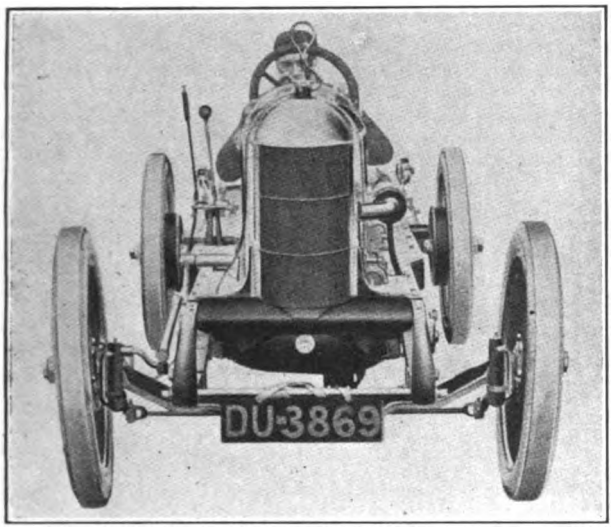
The new model is fitted with a block motor, having bore of 3.07 inches and stroke of 4.92. British engineers contend that it is a particularly neat design. The carburetor is so attached that but a short pipe is required to convey the mixture to the cylinders, the inlet manifold being a part of the integral casting, of course. The exhaust leads are cast inside the water jacket, the outlet being from one union at the rear end. The crankshaft is of particularly large diameter and runs on three exceptionally long white metal bearings. The axis of the Bosch high-tension magneto is parallel to that of the crankshaft, on the exhaust side of the motor. The valves are slightly inclined to reduce the size of the combustion chamber, and with the adjustable tappets having fibre inserts are entirely enclosed by means of easily detachable aluminum covers.

The clutch is of the leather faced cone type, fitted with a series of flat springs secured beneath the back of the clutch leather, providing for smooth engagement. Disengagement is effected by means of two ball bearings, which are stationary and out of action under normal running conditions, and the thrust of the spring is entirely self-contained when the clutch is engaged. The transmission is of the selective type and is suspended at three points in a cradle specially formed by dropping and connecting the cross frame members. Four forward speeds and reverse are provided, with direct drive on the fourth. Perhaps the most interesting feature of all is that of the wheel equipment. These are detachable steel artillery members, and the maker claims they possess double the strength of an ordinary wood artillery wheel of the same weight. No comparison appears to be made with wire wheels, which Americans have come to believe were most generally fitted by British manufacturers. The method of detachment is similar to that in use with wood wheels by a few American makers, although it is stated that it is a special design with this concern. One extra wheel, minus the tire, is furnished.

In view of the wide use of electric lighting systems in this country, it is somewhat surprising to find but few makers fitting this as regular equipment abroad. Undoubtedly the main reason lies in the fact that chassis are sold separately, the body and all other equipment being regarded in an entirely different light than with American producers. The Singer company supplies an electric lighting equipment with this model, but only with the enclosed body types.

In addition to the 14 horsepower model the Singer includes chassis fitted with engines rated at 15, 20 and 25 horsepower, which have not been changed materially for the coming season. The

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Front View of Special Singer Racing Model.

steel wheels have been adopted as standard equipment for all.

INCREASE IN GERMAN EXPORTS.

Report of 1912 Shows a Slight Gain in Value of Cars Shipped Abroad.

The report of the Association of German Automobile Manufacturers for 1912 shows that the export of automobiles from that country made a gain in value of $5,600,000, compared with an increase of $3,500,000 in 1911. About 6800 pleasure cars were exported in 1912, as against 5136 in 1911, 3399 in 1910, 1838 in 1909, 1151 in 1908 and 958 in 1907. Motor trucks exported in these years numbered 640, 345, 225, 156, 141 and 249, respectively.

Motor vehicle imports increased about $595,000 last year as against $300,000 in 1911. This gain was chiefly in pleasure cars, which numbered 1650 as compared with 1244 for the previous year. While this indicates a considerable sale in Germany by foreign manufacturers, the imports were not as large in number of cars as in 1907, when 1812 were brought in.

The report shows that there was one motor vehicle for each 927 persons in Germany at the close of the year. The total production in the country was valued at approximately $86,000,000.

AUSTRIAN ALPINE TOUR.

Itinerary for the 1913 Test Under Auspices of Imperial Automobile Club.

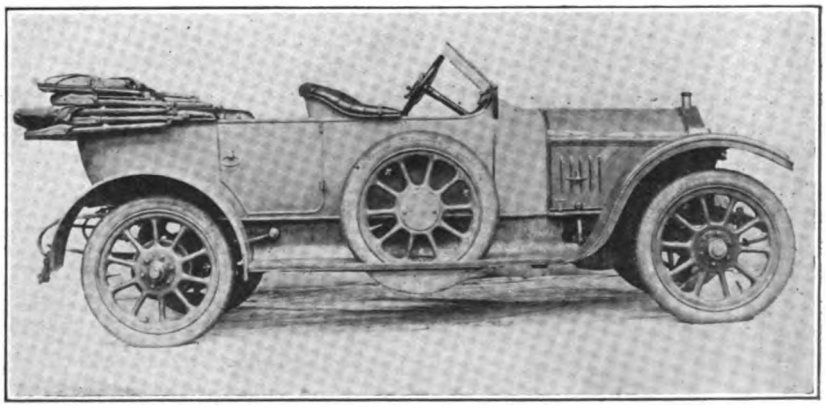
The Imperial Automobile Club of Austria has decided to hold the 1913 Alpine trials, from Vienna, June 10. The test will occupy nine days and will cover 2610 kilometers (practically 1620 miles) as against 2300 in 1912. It is hoped that a number of American makers will become interested in the event, which is international in character.

The first day's run will include the beautiful lake district of the Salzkammergut, ending at Salzburg. Then will follow the traversing of the Reshen-Scheideck or Finstermunz pass, and a visit to Innsbruck, while a departure from last year's itinerary will include the road about the Lake of Garde. The three most difficult roads in Austria—Loibl, Tanern and Katschberg—again will form the important features of the contest, as well as the road southward to the shores of the Adriatic at Trieste.

AMERICANS WIN SWEDISH RACES.

Hudson and Cadillac Finish in That Order in Ice Carnival on Lake Malar.

One of the most interesting events in connection with the annual winter ice carnival on Lake Malar, Sweden, early in the month, was the kilometer race from a standing start. Two American cars, a Hudson, made by the Hudson Motor Car Company, Detroit, and a Cadillac, made by the Cadillac Motor Car Company of the same city, finished first and second, defeating a number of foreign machines.



New Four-Cylinder Singer Touring Car, Fitted with Detachable Steel Artillery Wheels.

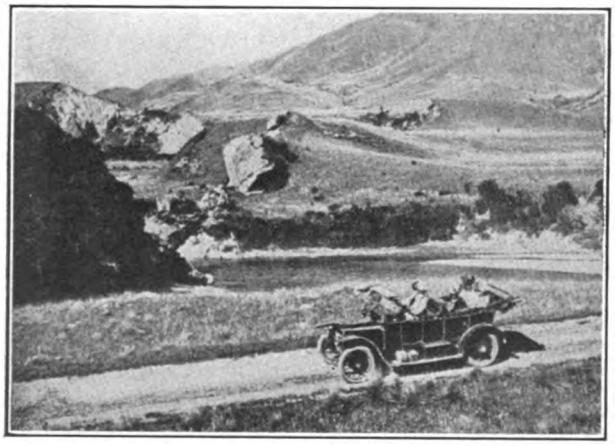
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It appears that the race was held on the ice, which was covered with snow practically all of the distance, although occasional glassy surfaces were encountered. The Hudson's time was 0:40, or at a speed approximating 65 miles an hour. The Cadillac finished in 0:45.

MOTORING IN NEW ZEALAND.

Excellent Roads and Beautiful Scenery as Well as Difficult Mountain Ways.

While many people in America have gained the impression that the difficult mountain roads in some portions of New Zealand comprise a fair sample of the ways to be met in these islands, nothing could be further from truth. Long before the advent of automobiles in any large number, several miles of improved highways had been constructed, and both resident and visiting motorists have found these admirable for touring.



Party of Tourists Enjoying Scenic Beauties of New Zealand in a Wolseley Car.

Those who have visited the islands are particularly pleased with the beautiful scenery, holding that it is a combination of the mountains of Switzerland, the lake regions of England and the interesting views of America. An accompanying illustration of a Wolseley car, made in England, gives an excellent impression of one of the scenes for which the islands are famous. Some idea of the road conditions also may be gained.

During the past year or so the number of cars has been increasing rapidly. Both American and British machines are represented. The situation is being fostered by numerous contests held by the Canterbury Automobile Association. The most recent was held over a five-mile course on the beach at New Brighton, near Christchurch.

NOTES FROM FOREIGN LANDS.

A motor volunteer corps has recently been formed in Sofia and is reported to have been in service with the Bulgarian army, transporting officers at the front.

The Wiltshire county council in England has decided to utilize a tar preparation for laying dust on the main roads connecting between 90 and 100 villages of the county during the coming year.

The first Japanese motoring magazine has made its appearance in The Jidosha, which being interpreted is The Autocar. It is a monthly organ, published by the Nippon Automobile Club, and is printed both in Japanese and English.

Austria has decided to impose a tax of 40 cents a day on all motor tourists in that country. Automobiles are permitted to stay three months before becoming subject to annual taxation, while a motorcycle may remain but one month.

Spain has appropriated $10,000,000 for road improvements, and a well defined movement is on foot to interest American and other foreign tourists in visiting that country. Within the past year 37,000 miles of road have been put in condition for motor touring.

The Cadillac Motor Car Company, Detroit, has sold through its Yokahama agent, Andrews & George, five 1913 Cadillac limousines to the Japanese royal family. Two of these were taken by Prince Sanjo, and one each by Count Hijikata, Count Nijo and Count Kanei.

As indicating the increasing popularity of the wire wheel abroad it is pointed out that of the 394 cars and chassis displayed at the recent Brussels Salon no less than 217 were thus equipped. At the 1912 exhibition but 65 of the 308 cars and chassis on display used wire wheels.

Arthur H. Collbran, a wealthy American, engaged in the mining business in Chinnampo, Korea, has purchased a Hudson car, made by the Hudson Motor Car Company, Detroit. This is said to be the seventh automobile in the country and all are of American manufacture.

In view of the increasing demand for Warner Auto-Meters in Great Britain, the Donald F. Johnston Company, sole European agent, has opened a branch at 211 Shaftesbury avenue, London, W. C., where the product of the Warner Instrument Company, Beloit, Wis., will be found in the future.

An interesting suggestion as to the fraternity that exists between the Institute of British Coachbuilders and Society of Motor Manufacturers & Traders in Great Britain, is found in the recent joint banquet held in London. The occasion was one of cementing the alliance between these two industries, and of perfecting plans for combined operation in the future.

During the past year 44 cars, valued at $62,438, were imported into Trinidad, 29 of which, valued at $41,505, came from the United States. Extensive improvements in the road system promise to create an enlarged demand for machines in 1913. The Ford, Herreshoff, Buick, Studebaker and Hupmobile are all well known there and the Overland is just being introduced.

The French government is preparing a bill giving an extra 8,000,000 or 10,000,000 francs to be utilized solely for the maintenance of the principal routes nationales, as the main highways are termed. It is proposed to raise this money by a special tax on automobilists, but the owners throughout the entire country have registered a decided protest on the ground that the present tax is sufficiently high, when it is considered in connection with the duty paid on gasoline and oil.

According to the Manchester Guardian of Manchester, England, one of the noticeable features of the recent North of England show in that city was the very evident tendency of British motor car manufacturers to concentrate their efforts upon the production of fewer models and the construction of a larger number of machines each year. It is understood that one of the largest British makers has announced that it will produce approximately 4000 machines during 1913. This is in marked contrast to previous practise in Great Britain.

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NEW YORK SEEKS DETROIT'S PLACE.

Merchants' Association Would Remove Heart of the Industry to Nation's Metropolis—Interest in Fuel Situation—Latest News of the Manufacturers.

SEVERAL cities throughout the country have envied the position held by Detroit in the automobile industry, and during the past year or more chambers of commerce and merchants' associations have been exceedingly busy in an attempt to secure additional motor car factories. Early in the month the industrial bureau of the merchants' association in New York City held an informal dinner at the Hotel Brevoort, at which a number of automobile manufacturers and dealers were present by invitation. The object of the meeting was to discuss fully the possibilities for encouraging the motor car industry to locate in that city.

As a result of this conference, the industrial bureau, of which Henry Morganthau is chairman, has issued an appeal to the industry comparing the advantages offered by Detroit and New York City. In this it is admitted that Detroit now is the predominant centre for the manufacture of automobiles, but the reasons do not appear to be exactly clear to the committee. The statement reads in part as follows:

Advantages Offered by Detroit.

Two or three of the large manufacturers began operations in Detroit, but there seems to have been no special advantages over other cities in the Middle West. Having acquired an early lead in the industry, Detroit became more and more advantageous to the manufacturer on account of the many lines of subsidiary industries which have been built up there, inasmuch as the manufacturing of automobiles is largely becoming a process of assembling.

The labor market in Detroit is said to be excellent, because the mechanics there are largely specialized. During the last two or three years the trend of the automobile market has been westward and now the great consumption of pleasure cars is in the Middle West; hence Detroit is conveniently situated as regards the large market for pleasure cars. Detroit is also near the raw materials. In addition to these many advantages, Detroit offers the automobile manufacturer a liberal banking policy.

Some Disadvantages.

While these advantages are in the main true of Detroit, many of them are passing away because of the very concentration of the single industry there and the points mentioned are becoming positive disadvantages. These disadvantages may be briefly enumerated:

1—The demand for labor is greatly in excess of the supply. A statement has just come, backed by the authority of the employment exchange conducted by the State of Michigan, that the price on common labor will reach 30 cents an hour in Detroit before the end of this year. The demand for every kind of skilled labor, which is so large in the automobile industry, is becoming acute in Detroit.

2—The housing facilities of Detroit are absolutely inadequate to meet the demand and the building operations of the city are not being carried on with sufficient rapidity to offset the increase in population.

3—Detroit has grown so rapidly that it is quite unprepared to cope with its new responsibility. The street car lines, for example, are inadequate and many of the workers in the factories at some distance from the residential section of the city are held up for long periods in the evenings before they are able to get cars.

4—Shortages of freight cars in Detroit which have been in evidence during the past year and up to the present, have proved a great handicap to the automobile manufacturer.

5—While it is true that the banking institutions in Detroit have been on the whole favorable to the automobile industry, the soundness of the financial condition there is questioned by some. The resources of the banks are perhaps too intimately bound up with the automobile industry. Liberal loans to comparatively insecure automobile manufacturers are said to be uncomfortably common, and one or two failures among either the manufacturers or the banks would cause trouble.

6—In short, the very concentration of the industry in Detroit has brought with it serious disadvantages. The automobile industry is in the same situation as the man who put all his eggs in a single basket.

Attractions in New York.

Now, can New York become a great centre for the manufacture of automobiles? Perhaps, to the casual observer New York might not seem to offer many advantages, but to the manufacturer who is carefully studying the situation New York does offer many advantages which are scarcely equalled by any in the Middle West.

Land values in New York—if we mean Manhattan—are pretty high, and it would not be good policy to locate in Manhattan a plant covering large acreage. But in the wide areas in Brooklyn, Queens, Bronx and Richmond land can be purchased and carried almost as cheaply as in any city in the country.

New York City is not distant from the raw materials, either the raw stuffs which go into the automobile, or the manufacturers who make the various parts. Many of the best automobile steels are made in Pennsylvania, near Philadelphia, and many of the most superior parts are manufactured in and about New York—castings, forgings, drop forgings, etc. New York is becoming a greater and greater centre for the manufacture of accessories, which go into the automobile.

Labor Situation and Market.

It is often urged that labor is high in New York. Labor may be somewhat higher than in a small country town, but it is not higher than in many of the automobile manufacturing centres of the Middle West, where the demand for labor has become acute. In addition to this, the supply of labor in New York, both skilled and unskilled, is large and diversified, and the amount of labor which a manufacturer in New York can command at his doors gives him the ability to "pick and choose." The unions are not recognized in the metal trades in New York City.

In addition to these advantages, New York is the centre of a tremendous market. Within 200 miles of New York City there lives almost one-fourth of the total population of the entire United States. Within 400 miles of New York there is almost one-third of the total population of the country, and within a 200-mile radius there is probably one-half of the producing power of the entire United States. Probably not less than 10 to 15 per cent. of all pleasure cars manufactured in the United States are marketed in a territory within 100 miles of New York City.

Financial and Selling Advantages.

The financial advantages of New York are absolutely the best in the country. If the New York banks have seemed somewhat unresponsive to the automobile industries, it is unresponsiveness born of experience. The New York banks are willing to extend credit to the automobile industry on exactly the same conditions and principles as to other industries.

More important, perhaps, than many of these advantages is the possibility of the New York manufacturer's reducing his heavy selling expenses because he can combine under his immediate supervision the manufacturing, selling and service divisions of his business.

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The advertising value of a location in New York City is of tremendous advantage. It is natural that the citizens of New York should look to the New York manufacturer.

The Export Trade.

The American made automobile is already invading the foreign market and the lowered tariff which is likely to come in the near future will increase our commercial relations with European countries. The New York manufacturer of automobiles will reap the immediate advantages.

New York City offers large natural inducements to the manufacturers of automobiles, even though there may be some disadvantages. It may be that land values and rentals are somewhat higher in New York than in some small western town, but there are advantages on the other hand which compensate. There are acres and acres of comparatively cheap land in the immediate vicinity of New York—in Queens, in Brooklyn, in the Bronx and in Richmond—which will furnish sites for some successful automobile manufacturers who realize the great advantages which the New York market has to offer.

EXPERIMENTS WITH KEROSENE.

Chief Engineer of National Line Has Been Making Exhaustive Fuel Tests.

Among the many motor car manufacturers making experiments with kerosene as fuel is the National Motor Vehicle Company, Indianapolis, Ind., maker of National cars. Chief Engineer William G. Wall has been supervising exhaustive tests for a number of months, and is quoted as saying that in his opinion it will be only a short time before a majority of automobiles will use kerosene instead of gasoline.

Although Mr. Wall holds that there is some question as to the feasibility of starting on kerosene direct and suggests that it may be necessary to use a little gasoline for this purpose, he believes that the electric motor starter will aid greatly in solving the problem. He adds that the disadvantages of the heavier fuel in winter are not too serious to be overcome easily; in fact, he claims to have accomplished this result in his winter experimenting at the National factory.

OFFERS FUEL ECONOMY TROPHY.

Chas. E. Miller Deeply Interested in Holding Contest of This Character.

In view of the present interest in the price and quality of motor fuel, Chas. E. Miller, the pioneer accessory man of 97-103 Reade street, New York City, announces his intention to donate a suitable trophy to be awarded to the car and carburetor which makes the best showing in fuel economy in a series of road tests to be conducted throughout the country. He believes that the award should be made on the basis of ton-miles a gallon, as the final test of efficiency.

Mr. Miller recalls that four years ago, during the automobile carnival in New York City, a fuel economy test was conducted by the local dealers' association under the direction of a committee of engineers. Later a similar event was held by the Automobile Club of Buffalo, utilizing the same set of rules and conditions. He believes that a series of tests of this character will do much to call attention to the economy possible by utilizing the devices now in the market. He says:

"During 1912 automobiles used 12,000,000 barrels of gasoline, which is an increase of 40 per cent. over the previous year. Notwithstanding the increased use of automobiles, if this large consumption of gasoline is not kept down by better mechanical outfits, the price of gasoline must increase. There are a host of good carburetors on the market, some of which are used by the makers of cars and some are not. Many of them, as well as the attachments called 'gas-savers,' really save from 20 to 40 per cent., so that their use more than pays for their extra cost and the expense of changing carburetors. Surely, every user of an automobile is interested in reducing the cost of maintenance, in which gasoline figures so largely."

CASE LEAVES LANSDEN COMPANY.

Succeeded by Blakesley, Giving Rise to an Entirely New Set of Consolidation Rumors.

W. L. Case, vice president and general manager of the Lansden Company, Newark, N. J., maker of Lansden electric vehicles, has resigned his position and his place has been taken by George E. Blakesley. It is understood that Mr. Case has disposed of his holdings in the company and will return to his consulting engineering practise after a trip through the South.

The Lansden Company was established about 10 years ago to develop an electric truck utilizing the Edison nickel iron batteries. After the International Motor Company took over the Mack plants at Allentown, Penn., a number of those interested in the latter business formed a syndicate to buy the Lansden Company, and it was taken over from Edison in January, 1912, when Mr. Case, who had a considerable part in the formation of the International company, was placed in charge.

Mr. Case's resignation would appear to set at rest rumors which have been circulated that the International company was to absorb the Lansden Company. That this supposition is without foundation seems to be further confirmed in the eyes of those interested, by the fact that Mr.

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Blakesley is said to be closely associated with John M. Mack, who although at one time a strong factor in the International company, has for the past few months been inactive in its management.

There is said to be some prospects of the formation of a new consolidation of the Lansden, the Mack and the Webb companies, all of which are owned by Mr. Mack and his associates. This possibility, however, has to date received no encouragement by those most intimately interested.

QUADRUPLED FORMER OUTPUT.

Annual Reports Show Business of Castle Lamp Company on Satisfactory Basis.

The annual meeting of the stockholders of the Castle Lamp Company, an Ohio corporation with its factory at Battle Creek, Mich., was held recently at Toledo, O., practically all the stock being represented. The reports of the officers were submitted and evidenced an improved condition of the company, the management of which was changed a short time ago. The concern is now a subsidiary of the Willys-Overland interests.

Under the new regime the output has been very much increased, being now four times what it was previously. The directors elected by the stockholders were: E. A. Williams, Jr.; Walter Stewart, Royal R. Scott, Rathbun Fuller and C. B. Mertz, who afterwards held a meeting and elected the following officers: President, E. A. Williams; vice president and treasurer, Walter Stewart; chairman of the board and secretary, Royal R. Scott.

SPONSEL ROTARY VALVE MOTOR.

Company Being Organized to Produce New Design Probably in Detroit.

C. W. Sponsel, formerly superintendent of the General Electric Company's plant in Pittsfield, Mass., is forming a company to be capitalized at $250,000, to manufacture the Sponsel rotary valve motor. Mr. Sponsel is working at present at Racine, Wis., but it is understood that Detroit capitalists are endeavoring to have the company locate in that city.

Mr. Sponsel has worked upon his motor for many years and his first patents were secured in 1903. It is stated that a balanced valve, eliminating about 150 parts found in a poppet valve motor, forms the principle of the new motor. A model is now being made in Detroit.

TO DIRECT BORLAND SALES.

W. C. Little, Well Known Throughout the Industry, Joins Borland-Grannis Company.

Announcement is made by the Borland-Grannis Company, Chicago, of the appointment of William C. Little as sales manager. Mr. Little is well known throughout the industry, through his connection with the sale of both electric and gasoline machines. For several years he was special representative for one of the large manufacturers of electrics, and as such was called upon to take long trips, by reason of which he became well acquainted with a large number of dealers in every section of the United States.

For some time past Mr. Little has been connected with the Lozier Motor Company of Detroit, maker of Lozier gasoline cars. With this concern he was a special representative in the sales department, and it was found that his former experience was of decided value in that position. There appears to be little doubt that in his appointment as sales manager of the Borland-Grannis Company the maker of Borland electrics has secured the services of an exceedingly valuable man.



W. C. Little, Sales Manager, Borland-Grannis Company.

TWO LYONS-KNIGHT CARS.

Models Designed by Concern in Springfield, Mass., to Be Produced in Indianapolis.

The Lyons Atlas Company, Indianapolis, Ind., which owns and controls one of the four American Knight licenses, and which is now manufacturing the Lyons-Knight automobile motors, appears to have absorbed the Atlas Motor Car Company of Springfield, Mass., maker of Atlas pleasure cars. As stated briefly in the last issue, the Indianapolis concern has acquired the

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sample cars, parts, drawings and patterns of the Atlas cars which were designed, developed and thoroughly tested during the last 18 months by Harry A. Knox of Springfield, one of the American pioneers in the automobile field and president of the Atlas Motor Car Company. Mr. Knox has located at Indianapolis and will have charge of the automobile work at the Lyons Atlas plant.

The Lyons Atlas Company recently purchased the property of the former Atlas Engine Works, which comprises over 65 acres of land, together with 627,000 square feet of factory floor space. James W. Lyons, president of the company, announces that a large part of the plant will be utilized for the manufacture of complete Lyons-Knight four and six-cylinder cars, which will be equipped with worm drive axle, left hand drive, centre control, electric lights, improved electric starter and a large gasoline tank in the dash. The transmission is embodied in the rear axle housing. The best features of the foreign and domestic Knight engines have been incorporated in the Lyons-Knight engines, together with many improved and exclusive features.

BRANCH FACTORY IN SAGINAW.

J. P. Beck Will Produce Automobile Tops and Jiffy Side Curtains.

J. P. Beck of Saginaw, Mich., has secured a branch factory of the Rudd Auto Top Company, Detroit, for the former city, and it will locate in Mr. Beck's new building at Germania and Second streets. The plant is now in operation in charge of E. E. Miner.

In addition to the making of automobile tops of every description, the new factory will also manufacture the new Jiffy side curtain for which Mr. Beck has secured certain rights. The output of the new factory will be considerable.

MAY LOCATE IN THE SOUTH.

Understood That the Maker of the Only Car Has Plans for Removal.

According to information from Charleston, S. C., the Only Motor Company, Port Jefferson, N. Y., maker of Only pleasure cars, will soon transfer its plant to Mt. Pleasant, S. C., where a factory having 25,000 square feet of space will be provided. It is stated that a charter has already been applied for and that negotiations have reached an advanced stage. It is understood that southern capital is interested largely in the Only Motor Company and that the present efforts are being made by the Isle of Palms Traction Company of Charleston.

Meetings of the stockholders have been held and favorable action taken, it is said. M. Rutledge Rivers has been engaged as counsel for the company and has applied for a charter under South Carolina laws, under the name of The Only Automobile Motor Company. It is understood that the principal request of the Only company will be that the town of Mt. Pleasant provide a free site for the factory and this matter is expected to be arranged easily. Rees Hawkins, a stockholder, who has been acting as general manager of the company, has looked the field over and expresses the opinion that nothing would stand in the way of the company's removal to the southern town.

ADDS ANOTHER BUILDING.

Increasing Demand for Hudson Product Creates Need for Larger Production Facilities.

The Hudson Motor Car Company, Detroit, Mich., has added another building, the third within a year, to its 26-acre plant. The combined floor area of the Hudson factory has been made 363,000 square feet by the addition of the new structure, which is 578 feet in length by 90 feet in width.

The building supplants the section of the factory grounds which for some time has been used to accommodate large tents in which work was done because of a lack of room. The output of the Hudson shops has increased steadily and this move was made necessary to care for the additional business.

GARFORD HEADS NEW CONCERN.

Expected That Plant Will Be Located in Toledo for Manufacturing Aluminum Products.

A. L. Garford of Elyria, O., formerly head of the Garford Company of the same city, maker of Garford pleasure cars and trucks, is at the head of a new company recently incorporated with a capitalization of $100,000. With Mr. Garford in the venture are Walter F. Brown, chairman of the Ohio Progressive state committee, and Attorneys Sigmund Sanger and E. C. Froelich of Toledo.

The new concern is known as the Garford Engineering Company and it will probably locate its plant in Toledo. Its purpose is to develop a new

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process of producing aluminum with the strength of steel in all forms. Mr. Garford sold his control of the Garford Company to the Willys-Overland Company about two years ago, but is understood to have retained a small financial interest in the Elyria plant.

ANOTHER CAR FROM DETROIT.

L. G. Hupp Intrested in the Formation of the Tribune Motor Car Company.

The Tribune Motor Car Company, Detroit, is a new concern which has filed incorporation papers to manufacture a five-passenger, 30 horsepower touring car to sell at a moderate price. Deliveries will begin about May 1 and a deal has already been concluded for a modern factory building to be ready for occupancy in the fall.

At the head of the new concern is Louis G. Hupp and associated with him are several well known Detroit business men. From a modest beginning Mr. Hupp built up a most successful business with the Hupp-Turner Machine Company, the Hupp-James-Geyman Foundry Company and the Hupp-Johnson Forge Company, all of Detroit, he being general manager. The three plants were later merged with the R-C-H Corporation, Detroit, maker of R-C-H cars, of which Mr. Hupp was secretary and treasurer, his brother, R. C. Hupp, being president and general manager. The headquarters of the new company will be located temporarily on Scotten avenue, where the first cars will be built.

TO MAKE ENGINE PARTS.

C. A. Goodspeed Organizes New Concern Which Will Locate in Detroit.

A new factory for the making of automobile engine parts, to cost $20,000 on a $4000 site, is to be built and operated by a new company, the Goodspeed-Detroit Manufacturing Company, Ltd., of Detroit. The concern has a paid in capital of $30,000, and the active head of the firm is C. A. Goodspeed, who is secretary, treasurer and general manager.

He was formerly connected with the Packard and Studebaker companies of Detroit, makers of high grade pleasure cars and trucks of the same names. The site of the new factory is on Harper avenue, opposite the plant of the Regal Motor Car Company, maker of Regal cars. The building will be two stories high and will afford a large floor area.

WITH HOLLY CARBURETOR.

Charles W. Cross Becomes Sales Manager—Concern Is Adding New Buildings.

President George M. Holly of the Holly Bros. Company, Detroit, maker of Holly carburetors, makes public the appointment of Charles W. Cross as sales manager. Mr. Cross has been connected with the industry directly and indirectly for the past 14 years and has a wide circle of friends and acquaintances who will be glad to learn of his latest change.

Soon after graduating from the engineering department of Cornell university he became mechanical engineer for the Diamond Rubber Company, Akron, O., and later joined the executive staff of the Crocker-Wheeler Company as manager of its Detroit office. During recent years Mr. Cross has been associated with the subsidiaries of the General Motors Company and last year he occupied a prominent position in the selling department of the General Motors Truck Company, Pontiac, Mich.



Charles W. Cross, Sales Manager, Holly Bros. Company.

President Holly also announces that additions to the plant are now underway which will enable the company to double its output for the next 12 months. It is understood that the concern has enjoyed a greatly increased business during the past few months, making larger manufacturing facilities decidedly necessary.

Bringing to a fitting close a day at the factory, the Ford Motor Company, Detroit, maker of Ford cars, recently entertained more than 500 branch managers, dealers, bankers and others from Indianapolis, Ind., Columbus, O., and Pittsburg, Penn., at the Hotel Tuller, Detroit. Norval A. Hawkins, sales manager of the company, was toastmaster.

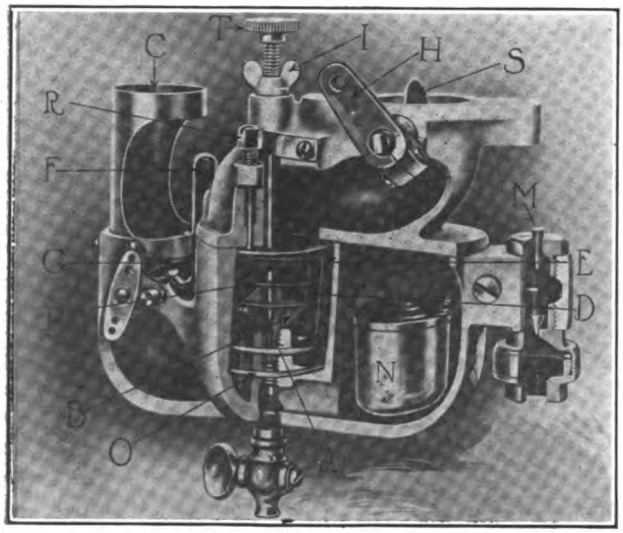
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THE REPAIR SHOP AND GARAGE.

Features of the New Air-Friction Carburetor Designed to Utilize Heavy Fuels Mixed with Gasoline---Mending Celluloid and Hard Rubber Articles.

ANNOUNCEMENT is made of a new model by the Air-Friction Carburetor Company, Dayton, O., maker of vaporizers bearing that name. The new design will be known as model B and it is of particular interest in that it is constructed to utilize fuels heavier than gasoline. The company states that of the number in actual use, in some instances two parts kerosene are employed to each part of gasoline, while others utilize half gasoline and half kerosene. The latter combination is recommended by the maker.

A sectional view of the new carburetor is presented in an accompanying illustration and each component is clearly depicted. The use of kero-



New Air-Friction Carburetor, Designed to Employ Heavy Fuels Mixed with Gasoline.

sene is held to be possible by the large wetted surface presented by the spray nozzle A, which retains the mixture between two discs B, .01 inch apart, in a film. The air is taken through one source C, being previously warmed by passing around the exhaust pipe, and being conveyed to the vaporizer by the conventional flexible metal tubing. As the heated atmosphere enters it lifts a truncated valve D, which is enclosed in a valve cage E, this providing the motor a proportionate volume of mixture at all speeds.

As the air passes the spray nozzle A it becomes saturated with the fuel, forming a gas instead of a spray, and is drawn into the cylinders without a vacuum being created. The maker points out that this is superior to a spray full of globules, as the latter are difficult to lift and allow a large percentage of the mixture to condense.

To overcome the difficulties of starting with a heavy fuel a U shaped plunger F is operated by closing the air butterfly valve G, pushing down the valve cage E and its truncated valve D, to restrict the air. This enriches the mixture required for starting. Upon gradually releasing the air butterfly valve G the cage E resumes its normal position. The velocity of the incoming air is dependent upon the throttle opening. The gasoline adjustment is secured by loosening the small winged, thumb jam nut I and rotating the needle T. The adjustment of the air is by the small hexagon nut R.

The bowl and top are constructed of aluminum with the float needle M of brass, tipped with an imported alloy. The float N is of drawn metal. The only spring employed is that at O, it being utilized for pushing the valve in place when the air butterfly member is released, and the small one P is entirely enclosed to prevent tension loss. All levers, nozzle parts, etc., are of brass.

SOME USEFUL CEMENTS.

Articles of celluloid can be mended by preparing a mixture of three parts alcohol and four of ether. The mixture should be kept in a well corked bottle, one having a ground glass stopper being preferred. When celluloid is to be repaired the broken surfaces are painted with the mixture until the material softens. The parts are then pressed together, bound and allowed to stand at least 24 hours.

For hard rubber articles the following formulae are suggested: Dissolve one part of gum camphor in four parts alcohol. Dissolve an equal weight of shellac in such strong camphor solution. The cement is applied warm and the parts must not be disturbed until the cement is hard. Another method is to melt together equal parts of gutta-percha and real asphaltum. The mixture is applied hot and the parts pressed together while cooling.

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HORSLEY CONVERTED DISC VALVE MOTOR.

AN INSTANCE of an old poppet valve type of engine being converted into a disc motor is noted in the Horsley disc valve engine, a

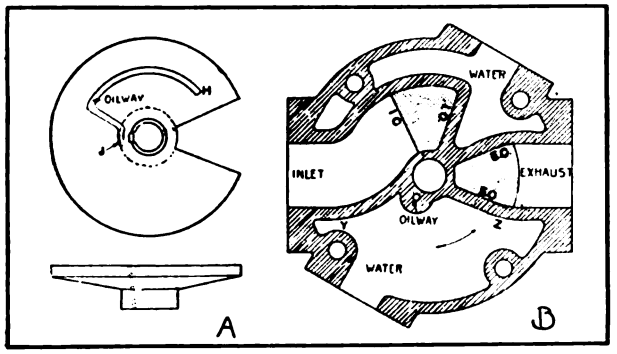


Fig. 1—Horsley Disc Valve Motor: A, Showing Disc Valve and Oilway; B, Section of Valve Chest Illustrating Action of Ports.

description of which appeared in a recent issue of The Autocar, a British motoring print. The design is the product of Horsley & Sons, Ltd., gunmaker of York, England, and it is stated that the bench tests were so satisfactory that the firm has constructed a four-cylinder unit and will place it in a chassis to undergo road tests. The motor has been running for some time in a power boat.

It is claimed to have developed 42.3 horsepower at 1400 revolutions a minute. The bore is 102 mm and stroke 127, or about four by five inches. Particulars of the motor and the valve gear are shown in the accompanying illustrations, and in general design the engine follows conventional practise with the exception of the height, which is somewhat more than usual considering the stroke.

On the top of each cylinder is a separate and removable water-cooled valve chest which carries the valve mechanism as well as the intake and exhaust ports. This is depicted at Fig. 2, also the manner in which it is fitted to the top of the cylinder, forming the head of the combustion space. It comprises a water-cooled body A in which the inlet, exhaust and waterways are formed. The face B is formed in one with the body A, and has a ground under surface, against and under which the valve C rotates. The valve is driven from an overhead chain driven shaft G through skew gearing E, and the vertical shaft D.

Suitable ball thrust bearings are provided, the valve being kept against the face B by springs shown above the valve chest. The springs being well away from the heat of the combustion are not liable to become weakened by loss of temper.

At Fig. 1 B is shown a section of the valve chest at the line M N in Fig. 2.

The valve runs in the direction indicated by the arrow in Fig. 1 B at half the speed of the motor. The valve has a V cut in it as shown at Fig. 1 A, so that the inlet port begins to open at the point I O and to close at point I C. From points Y to Z neither port is open, and while the valve is travelling between these ports the compression and firing strokes occur. From E O to E C the exhaust is open.

On the face of the valve an oilway is cut, and when the engine is on the suction stroke the part J of the oilway is passing under a duct in the valve chest B, and as the oilway is uncovered at H the suction of the motor draws sufficient oil along the oilway to keep the valve face and seating lubricated.

The motor is lubricated as follows: At the bottom of the crankcase there is cast a sump from which an ordinary pump conveys oil to the five main crankshaft bearings, and also to a distributor or dredger, which normally revolves four times a minute, and passes a quantity of oil to each valve by the respective ducts. There is a return pipe from the dredger to a box on the crankcase, which acts as a filter and also serves the purpose of a filler for the sump. The pistons, cylinders, etc., are lubricated on the splash system.

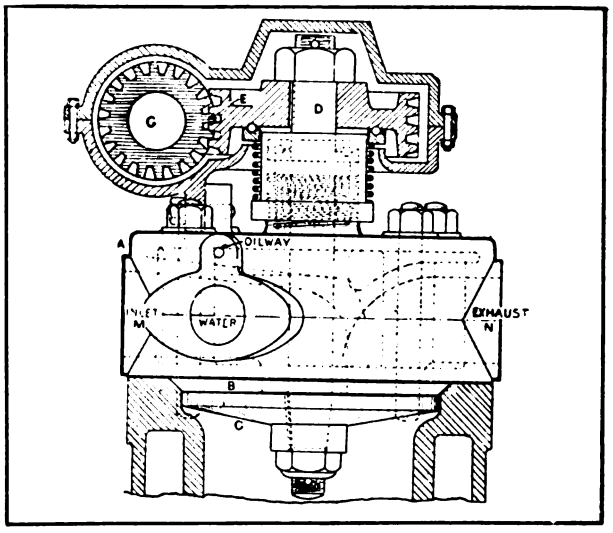


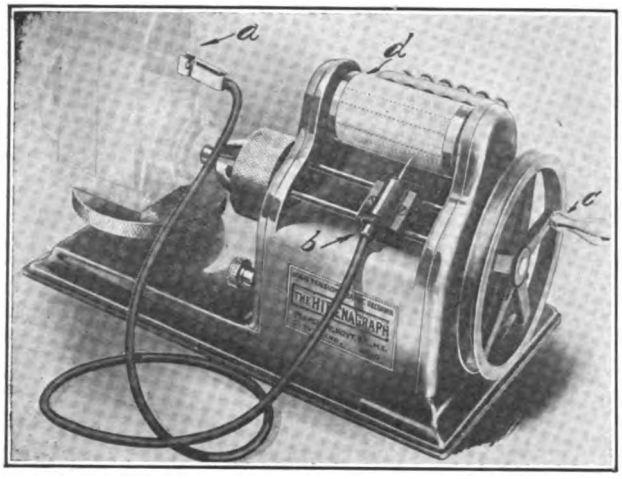
Fig. 2—Part Sectional View of Distributor on Cylinder Head of Horsley Disc Valve Motor.

W. H. Carlson, Jr., in a Benz car, won the recent 200-mile race at Point Loma, Cal. His time was 3:24:28. Three cars finished.

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HITENAGRAPH, A DEVICE FOR TESTING IGNITION.

EFFICIENCY with multiple-unit internal combustion motors depends largely upon the synchronization of the spark. A device for testing



The Hitenagraph, Designed for Testing High-Tension Currents, Magnetos, Etc.

and locating faulty operation of ignition systems is the Hitenagraph, announcement of which is made by Francis R. Hoyt of Cleveland, O. The name is derived from its function, that of creating a graphic record of the high-tension or secondary current.

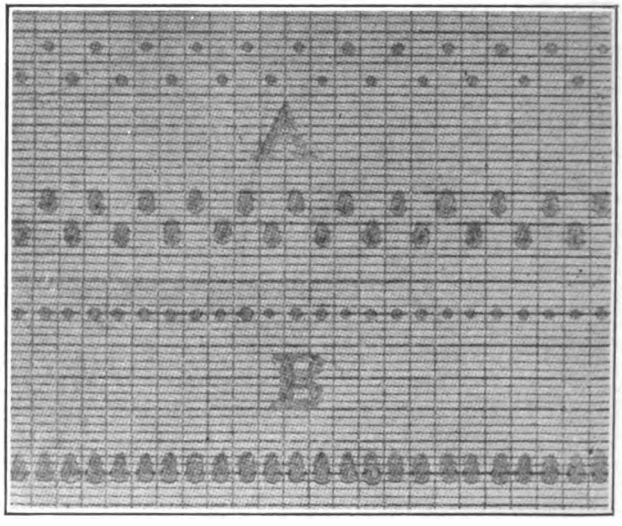
The device is shown in an accompanying illustration testing a magneto for accuracy of performance. The Hitenagraph is simply constructed and its base is provided with a stand for mounting the magneto. The armature shaft of the latter is secured to the driving shaft of the testing device by a coupling similar in construction to the chuck of a drilling machine. The connection is so designed that the tapered shaft of the magneto may be held securely.

Rotating the driving wheel C revolves the armature of the magneto. The wheel is fitted with a handle, although its periphery has a V groove, permitting drive by a belt if desired. The drive is direct, there being no reduction. The chart drum revolves at an increased speed and the design is such that the spark index b which travels (through connection with a worm) longitudinally across the drum, is always diametrically adjacent, at the time the discharge should occur, to the ordinate on the chart itself on which the last produced spark registered. In this manner is shown, by the alignment of the sparks on the chart, the relative timing or synchronism of each cylinder, also the intensity of the spark by the area effected by it on the chemically prepared chart.

Two sections of the chart are reproduced herein, that marked A illustrating a typical case of lack of synchronism. The lines across the chart represent degrees of crankshaft rotation, or in other words, the chart as attached to the drum, is divided into 180 degrees and travels twice as fast as the magneto being tested. Each time the latter produces a spark, which is ordinarily twice a revolution or 180 degrees apart, the chart makes a complete revolution and each succeeding spark should fall on the same line of the chart as the one preceding it. In the illustration at A the record shows that the magneto is five degrees out of time. The difference in the size of the spark at retard and advance, is also indicated. At B is presented a record of the same magneto after being repaired and adjusted.

The Hitenagraph may be utilized for testing a magneto without removing the latter from the car, a smaller model being manufactured especially for garage service. The larger or bench model is for use in factories and it is stated that it will test 20 machines an hour. This latter design is equipped with a variable speed device, and a tachometer giving graphically the revolutions a minute.

At the recent third annual automobile show



Chemically Prepared Chart Recording Lack of Synchronization at A and Proper Timing at B.

in Elmira, N. Y., held by the Elmira Automobile Club, the dealers sold cars to the value of $85,000 during the week.

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GARAGE AND REPAIR SHOP EQUIPMENT.

DETECTORPHONE.

An instrument for locating mysterious knocks or noises by an adaption of the microphone principle is being produced by the Boston Talking Machine Company, 41 West street, Boston. The device comprises a receiver, similar to that employed by telephone operators, and the phone member. The latter is provided with a microphone button, changing the position of which is held to magnify the sound through the vibration travelling up the rod through the button, thence to the receiver and the ear.

J. M. MOBILENE PACKING.

The H. W. Johns-Manville Company, New York City, is marketing the J-M mobilene sheet packing which is designed for service where extremely high temperatures are encountered, such as at the exhaust manifold, etc. The packing is constructed of asbestos with fine brass wires intertwisted in each strand. It does not burn or char and one side is graphited. It is pliable, easy to cut, and being compressible makes for a tight joint. It comes in rolls 40 inches wide and .03125 thick.

HARDY RATCHET WRENCH.

A wrench operating upon the ratchet principle is the Hardy, being marketed by the Hardy Manufacturing Company, Pendleton, O. It is an all steel tool having five parts, these comprising a handle, two side plates, a ratchet socket and a rivet. The latter is employed to secure the side plates to the handle.

FISHER QUICK ACTING VISE.

Fisher & Norris, Trenton, N. J., is manufacturing what is known as the Fisher quick acting lever vise. It is constructed of gun metal with a solid bar and all parts are interchangeable. The work is inserted in the jaws and held securely by a forward movement of the lever. The part cannot be removed until the lever is pushed back. The jaws are faced with steel, file-cut and properly tempered.

FORMULAE AND USEFUL MECHANICAL TABLES.

Use of Water on Cutting Tool.

With the best high speed steel tools a gain of 16 per cent in cutting speed can be made in cutting cast iron, steel or wrought iron by throwing a heavy stream of water directly on the chip at the point where it is being removed from the forging by the tool. Not less than three gallons a minute should be used for a two by 2.5-inch tool. The gain is practically the same for all qualities of steel, regardless of hardness and whether thick or thin chips are being cut.

Lubricant for Milling Cutters.

An excellent lubricant for milling cutters when used with a pump is made by mixing together and boiling for one-half hour, one-quarter pound sal soda, one-half pint lard oil, one-half pint soft soap and water enough to make 10 quarts.

Grades of Emery.

The numbers representing the grades of emery run from eight to 120, and the degree of smoothness of surface they leave may be compared to that left by files as follows: Eight and 10, represent the cut of a wood rasp; 16 and 20, represent the cut of a coarse rough; 24 and 30, represent an ordinary rough; 36 and 40, bastard; 46 and 60, a second cut; 70 and 80, smooth; 90 and 100, a superfine; 120 F and FF, a dead smooth file.

Patching Cement.

A cement for patching rubber boots and which will unite leather to leather, India rubber, etc., may be made by taking 100 parts of finely chopped India rubber, 15 parts rosin and 10 parts shellac, and dissolving in carbon disulphide. The vessel in which the solution is made should be kept tightly closed and should be shaken from time to time. Carbon disulphide is highly volatile and should not be exposed to a naked flame.

S. A. E. Horsepower Formula.

The standard formula for the rating of gasoline engines used in automobiles in this country is that adopted by the Society of Automobile Engineers, in which the bore is squared, multiplied by the number of cylinders and divided by 2.5.

The following table will be found to be of service in ascertaining the S. A. E. horsepower of four and six-cylinder motors, the bore being given in both inches and millimeters:

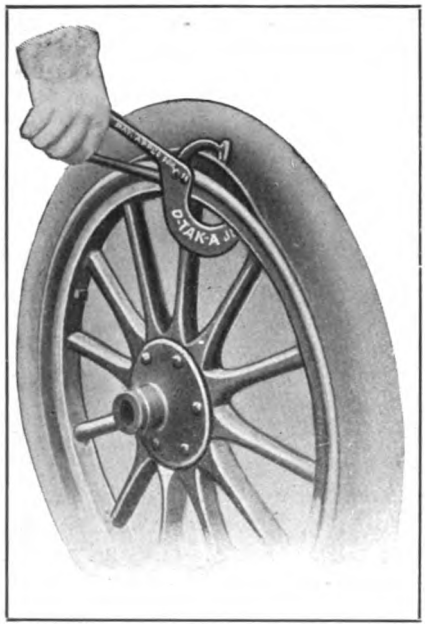
Bore		Horsepower	
Inches	Millimeters	Four-Cylinder	Six-Cylinder
2.500	64	10.000	15.0000
2.625	68	11.000	16.5000
2.750	70	12.100	18.2000
2.875	73	13.250	19.8750
3.000	76	14.400	21.6000
3.125	79	15.625	23.4375
3.250	83	16.900	25.4000
3.375	85	18.250	27.4000
3.500	89	19.600	29.4000
3.625	92	20.250	31.6000
3.750	95	22.500	33.7500
3.875	99	24.000	36.0625
4.000	102	25.600	38.4000
4.125	105	27.250	40.9000
4.250	108	28.900	43.8000
4.375	111	30.625	45.9375
4.500	114	32.400	48.6000
4.625	118	34.350	51.6000
4.750	121	36.100	54.1000
4.875	124	38.000	57.0000
5.000	127	40.000	60.0000
5.125	130	42.000	63.0000
5.250	133	44.100	66.2000
5.375	137	46.000	69.1000
5.500	140	48.400	72.6000
5.625	143	50.625	75.9375
5.750	146	53.000	79.5000
5.875	149	55.250	82.9000
6.000	152	57.600	86.4000

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O-TAK-A TIRE REMOVERS.

Regular Tool Is Supplemented by a Junior Adapted for Cars with Clincher Tires.

Announcement is made by J. W. Grumiaux, sales agent, Le Roy, N. Y., of the O-Tak-A Junior, a special tool for removing clincher shoes, designed and specially adapted for Ford, Metz and Brush cars. It is suited for all clincher shoes and the principle is identical to that employed on the O-Tak-A tire tool. It will loosen a clincher shoe from the rim and push it back far enough so that the bead may be pried out easily. As will be noted by an accompanying illustration the tool is equipped with two tong like extremities having handles which when brought together exert such pressure that it is a simple matter to overcome the resistance of the shoe even when badly rusted to the rim.



Showing the Application of O-Tak-A Junior to a Clincher Tire.

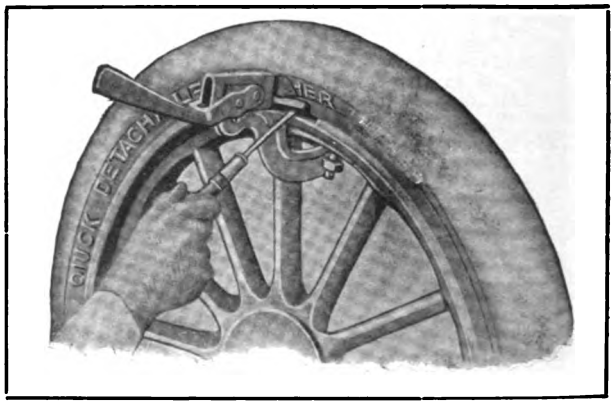
A feature of the design is that one tong fits the inside rim while the other has a projection so designed that when pressure is applied the bead is forced slightly downward and back. This prevents the tool slipping and at the same time energy is applied to the bead and not the walls of the casing. After the contact between the bead and rim is broken a further movement of the tool carries the shoe up and away from the rim, making it an easy matter to remove it. The O-Tak-A Junior is not only inexpensive, but it will not injure the paint, and being compact may be easily stored in the tool box. The method of applying the device is shown in an accompanying illustration.

The O-Tak-A differs from the Junior in that it is adapted to quick detachable and demountable rims. It may also be employed for large clincher tires, a small attachment being slipped over the nose of the plunger converting the tool into one suitable for this work. The large design is made in two sizes, the No. 1 fitting tires up to and including four inches and the No. 2 four inches and over.

The tool in service is shown in an accompanying illustration and it will be seen that the nose of the plunger passes over the locking ring of the tire and acts at right angles to the plane of the wheel. The tool locks at its extreme inthrow, being set so as to hold the inner ring just back of the flange of the locking ring, permitting easy removal of the latter and the tire. As it locks automatically the operator has both hands free to handle the shoe and locking ring. The yoke carries an extension which comes in contact with the under side of the rim extending beyond the felloe. This acts as a shoulder and prevents the tool from slipping.

A quality of the device is that tires may be removed from demountable rims easily and quickly either on the car or in the garage, a task usually involving considerable labor, especially some types of rims that require considerable pressure. The O-Tak-A, either large or small, is constructed of high grade material and is guaranteed to perform the work claimed of it. It is finished in aluminum or nickel.

John Muir of Beith, Scotland, recently addressed the Hoosier Motor Club, Indianapolis, Ind., on the subject of the "shock shifter" hub, which is his invention. This device is composed of a hub loosely filled with steel balls, which by constantly shifting their position, Mr. Muir claims, reduce the vibration resulting from road shock to a minimum.



Illustrating Use of O-Tak-A Tire Tool—Showing Tool Automatically Locked and Operator Free to Use Both Hands.

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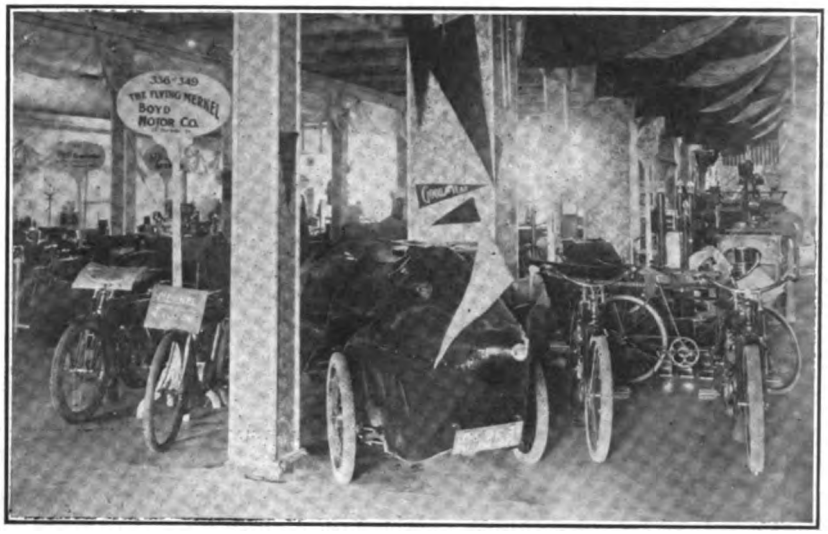
IN THE REALM OF THE MOTORCYCLIST.

The Boston Show and the Men and Machines Seen There---Some Recent Developments in Winter Riding---News of the Manufacturer and the Dealer.

IT IS more or less well known that the Motorcycle Manufacturers' Association no longer exhibits as such at the annual Boston show. This decision was reached just previous to the display of 1912. As an automobile exhibition this always has been a dealer's proposition, so that it may not occasion surprise to find that such motorcycles as are to be seen there are shown by dealers. However, the reputation of the Boston show as a business producer ought to hold good for motorcycles as well as automobiles, and the experience of those who made display this year appears to have borne out this assumption.

There were only five dealers represented, with a total of 10 different makes. In view of the importance of New England as a market for the two-wheeled mount it would seem that the manufacturers should have made more effort to see that their lines were on display. Not all of the exhibitors were local dealers, some being territorial distributors, and in almost every instance some one from the factory was present to see that all sales were properly closed.

The machines were displayed in the basement, and it is well known that this portion of Mechanics' building does not respond readily to decorative treatment. However, those who were desirous of inspecting the models presented had abundant opportunity, albeit the exhibitors were not located together as at New York or Chicago.



A Glimpse of the Motorcycle Display at the Recent Boston Show, with Merkel Machines in the Foreground.

Boyd, the Merkel Man.

The Boyd Motor Company, 27 Stanhope street, had a very comprehensive display of Flying Merkel machines, made by the Miami Cycle & Manufacturing Company, Middletown, O. This included one of the first spring frame machines, now 12 years old. There was decided contrast between the Merkel of 1901 and the Yellow Jacket, self-starting Flying Merkel of 1913, which stood beside it on the floor. And then there was R. C. Boyd's winter motorcycle, concerning which more is to be said later. This proved the centre of attraction and gave Mr. Boyd the necessary opportunity to seek out those who were interested in possessing a machine. C. A. Van Doren represented the factory during the week.

Emblem, Eagle and De Luxe.

This company also has the agency for the Emblem, made by the Emblem Manufacturing Company, Angola, N. Y.; the Eagle, made by the American Motor Company, Brockton, Mass., and the De Luxe, made by the Excelsior Cycle Company, Chicago. The Emblem was not shown, but the other two were well represented. L. B. Marsh and C. E. Crout of the American company were on hand to assist Mr. Boyd.

Grady Handles Three Lines.

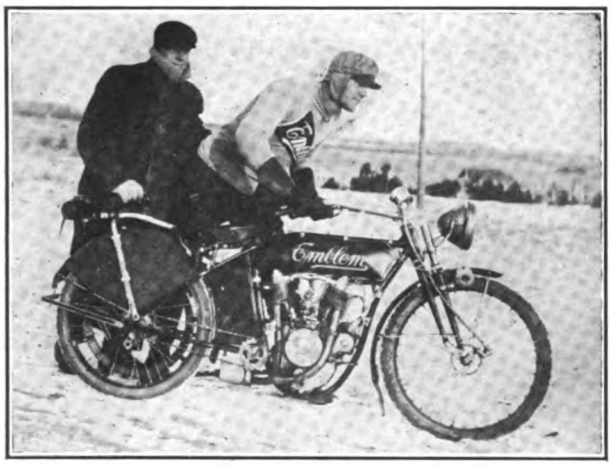
J. W. Grady & Co., Worcester, Mass., had three makes on display, comprising the Dayton, made by the Davis Sewing Machine Company, Dayton, O.; the Henderson, made by the Henderson Motorcycle Company, Detroit, and the Excelsior, made by the Excelsior Motor Manufacturing & Supply Company, Chicago.

Harley-Davidson and Pope.

The New England Motorcycle Company, 178 Columbus avenue, presented two lines—the Harley-Davidson, made by the Harley-Davidson Motor Company, Milwaukee, Wis., and the Pope,

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made by the Pope Manufacturing Company, Hartford, Conn. W. J. Walker of Danvers, Mass., New England branch manager for the



E. T. Swenson and F. L. Gladd of Des Moines with the Former's Emblem Mount.

Harley, was busy throughout the week signing up local dealers as well as assisting in the closing of sales. D. G. Ryan represented the Pope factory.

The Yale Display.

J. W. Kilham, Beverly, Mass., displayed the Yale line, made by the Consolidated Manufacturing Company, Toledo, O. O. W. Fuller, New England representative of the maker, also took occasion to close up a number of agencies, among which was the Combination Ladder Company, Providence, R. I., as distributor for that state.

Holden Demonstrates Indian.

George N. Holden, 188 Massachusetts avenue, had a very comprehensive line of Indian machines, made by the Hendee Manufacturing Company, Springfield, Mass. Of course, the new Indian sidecar also was exhibited, and with the exception of the Baxter sidecar, made by the Baxter Side Car Company, Cambridge, Mass., fitted to one of the Flying Merkels at the Boyd Company's display, was the only representative of this equipment in the show. J. P. McDowell of the Hendee factory assisted Mr. Holden throughout the week.

Satisfied with the Emblem.

An accompanying illustration presents E. T. Swenson of Des Moines, Ia., and his Emblem mount, which is supplied with a tandem attachment, preparing for an afternoon's ride with his friend, F. L. Gladd. Swenson is particularly pleased with the sturdy construction of the machine and has found it equal to every demand he has made of it, albeit the road conditions in Iowa are not always of the best. The machine is made by the Emblem Manufacturing Company, Angola, N. Y.

Shipping Sidecars Abroad.

The Majestic Manufacturing Company, Worcester, Mass., reports that the export of sidecars for motorcycles is gaining considerably and recent shipments have been made to South and Central America and to the Hawaiian and Philippine Islands. There is a steadily increasing sale in Cuba and Porto Rico and inquiries are constantly being received from Sweden, France, Austria, India and Japan.

To Select Convention Seat.

The board of directors of the Federation of American Motorcyclists will hold a special business session at the Auditorium Annex Hotel, Chicago, Thursday, April 3. Director Sauer will attend after completing his trip to the Pacific Coast and the board will act on a great deal of business in connection with his trip. The place of the location of the 1913 convention will probably also be determined.

With the Yale in Maine.

An accompanying illustration presents O. W. Fuller, New England travelling representative of the Consolidated Manufacturing Company, Toledo, O., on his Yale mount in Waterville, Me., Feb. 13, with the thermometer at 15 degrees below zero. Mr. Fuller declares that it has been as cold as that this winter—down in Maine. He rode this machine throughout the entire district, and he claims to be certain as to the weather



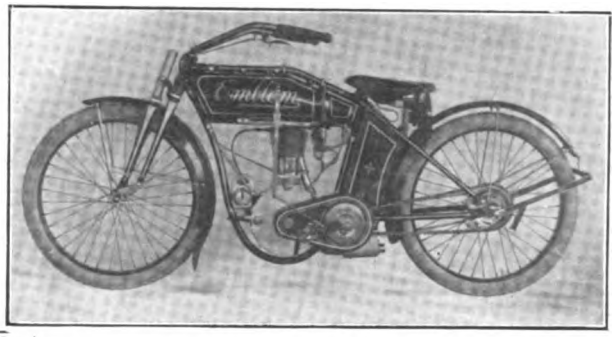
O. W. Fuller and His Yale, with the Thermometer at 15 Degrees Below Zero, in Waterville, Me.

conditions in that section. Incidentally, it may be remarked that the Yale did not fail to perform its function despite the low temperature.

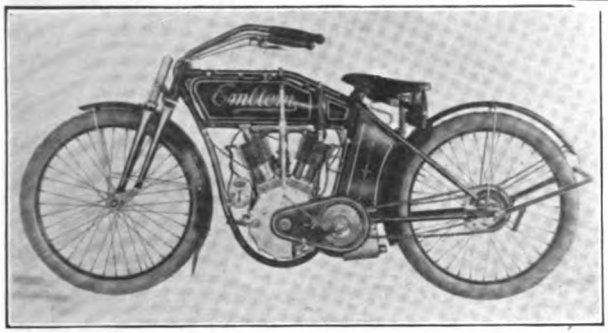
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ANGOLA ERIE COUNTY NEW YORK

Volunteer Motorcycle Patrol.

A plan has been formulated by P. E. Zimmerman, secretary of the Kansas Short Grass Motorcycle Club, on the advice of President Patterson of the F. A. M., for a volunteer state patrol of motorcycle riders to be organized to operate against thieves and robbers. The plan has been submitted to Gov. Hodges of Kansas. The idea to be followed out, according to Mr. Zimmerman's suggestion, is that a patrol be operated along similar lines to the Texas Rangers, save that they would be mounted on motorcycles instead of horses.

New Registered Repair Shops.

Following are new repair shops registered with the F. A. M.: Badger State Motorcycle Company, 858 23d street, Milwaukee, Wis.; Clark Cycle Company, 607 Broad street, St. Joseph, Mich.; Lents Garage, Lents, Ore.; G. S. Wilson, Bechtelsville, Penn.; D. W. Polkinhorn, Cherokee, Ia.; Guarantee Electric Company, Ltd., 1531 Canal street, New Orleans, La.; Roy R. Baer, 5 West Fourth street, Sterling, Ill.; Gerber & Winter, 688 St. Peter street, St. Paul, Minn.; Roy W. Brown, 195 Burnside street, Portland, Ore.; T. H. Smith, 605 Dale avenue, Roanoke, Va.; East Side Motorcycle Company, 41 Grand avenue, Portland, Ore.; Bicycle Garage, 210 Madison street, Tampa, Fla.; W. W. Smith & Sons, 518 Lincoln avenue, Clay Center, Kan.; Duersch Cycle Company, Hamilton, O.; General Repair Shop, 209 North 28th street, Billings, Mont.

Dr. G. B. Gibson, Westboro, Mass., secretary of the F. A. M., has issued a notice that the copy for the forthcoming booklet of registered motorcycle repair shops will close April 1. There probably will not be another complete compilation until the spring of 1914, as only a supplement of similar data will be issued Sept. 1, this year.

Bi-Car in Canadian Plant.

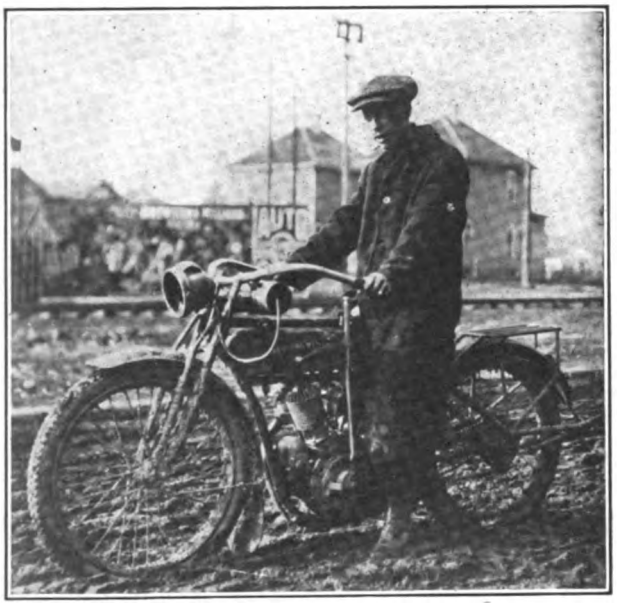
Brantford Autocycles, Ltd., has been formed at Brantford, Ont., for the purpose of manufacturing an improved Bi-Car, having acquired the rights and patents of the Detroit Bi-Car Company, organized at Detroit in 1911. The company has been incorporated under Canadian laws with a capital of $200,000. The officers are: President and managing director, H. B. Rowell; vice president, John Schultz; secretary and treasurer, T. L. Wood. These officers and George K. Wedlake and John Spence form the board of directors. R. B. Hawkins is factory manager and Taylor & Neuteboon of Detroit is consulting engineer.

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Cross Country Winter Trip.

Covering 338 miles in 15:10:00 on a seven horsepower, 1913 chain driven Flying Merkel, Herbert H. Huntsberry, assistant sales manager for I. H. Silsby, Cleveland, O., northern Ohio distributor for this make, believes he created a new record for midwinter riding recently. An accompanying illustration shows the machine and rider at the completion of the trip.

Huntsberry left Cleveland for the factory of the Miami Cycle & Manufacturing Company in Middletown, O., going through Elyria, Oberlin, Norwalk, Bucyrus, Marion, Columbus, Springfield and Dayton. On the first day he encountered plenty of snow and ice; the former in places being from four to six inches deep. From Bucyrus to Marion the roads were terribly muddy, although fair riding conditions prevailed between the latter city and Columbus.



H. H. Huntsberry of Cleveland, O., and His Flying Merkel at the Completion of Recent Midwinter Run.

The sole object of the trip was to ascertain how the new Flying Merkel would withstand severe winter riding. The only damage to the machine resulted from a slide on some ice near Bucyrus, where a pedal was broken. The total amount of gasoline used was five gallons, an average of 67.6 miles to the gallon, while two quarts of oil was sufficient, giving an average of 169 miles to the quart.

Baker Surprises Cubans.

E. G. Baker, the well known Indianapolis rider, is enjoying a tour of the West Indies, Panama and southwestern United States, and while in Cuba found that his mount attracted much attention. In many of the small towns in the interior a motorcycle had never been seen and the natives could scarcely believe it possible that a person could travel so fast upon one. Baker is the first man to ride entirely across the island, the roads a large part of the way being mostly in the nature of cow paths.

Three Stolen Machines.

Information concerning the following stolen motorcycles would be appreciated: H. K. McCotter, Flying Merkel, 1911 model, six horsepower twin, V type, factory No. 3988, carried Michigan license 2185 when stolen (report to Miami Cycle & Manufacturing Company, Middletown, O.); A. T. Merrick, 32 Union square, New York City, Indian, 1911 model, five horsepower twin, manufacturer's number, 20 C 087; C. E. Stauffer, 414 47th street, Brooklyn, N. Y., Indian, 1912 model, seven horsepower twin, manufacturer's number, 70 D 228.

Hedstrom Retires from Office.

Oscar Hedstrom, vice president and mechanical engineer of the Hendee Manufacturing Company, maker of Indian motorcycles at Springfield, Mass., has resigned, although he retains a financial interest in the concern. This action comes as distinct surprise to the trade. He announces that he will take a vacation and has no plans for the future.

Mr. Hedstrom is looked upon as the founder of the motorcycle industry in America. It was he who imported several of the motor driven machines from France, where they had been used to pace bicycle riders in races. Finding the motors crude he perfected them until they became in large demand for this purpose in this country. George M. Hendee, then identified with bicycle racing, suggested that the motorcycles could be made for road use and Mr. Hedstrom experimented and perfected the invention at Middletown, Conn. Since that time he has been vice president and mechanical engineer of the Hendee company.

Recently Appointed Commissioners.

The following local commissioners have been appointed by the state commissioners: T. D. Shumate, traffic department, N. & W. Railway, Roanoke, Va.; G. H. Tompkins, 311 West Broad street, Richmond, Va.; J. F. S. Duke, 546 Park street, Charlotteville, Va.; William F. Stembler, Jessups, Md.; A. E. Midgley, Menlo Park, Cal.; R. J. Kreirauck, Niles, Cal.; R. E. Adelmeyer, Sierra Madre, Cal.; W. M. Smith, Brawley, Cal.; William G. Baker, New Windsor, Md.

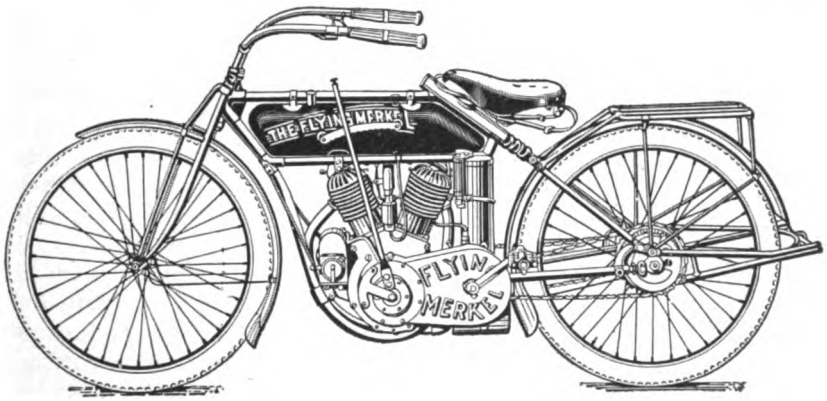
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1913 1913

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Boyd's Winter Motorcycle.

Those who visited the Boston show did not fail to become interested in R. C. Boyd's winter



R. C. Boyd's Idea of a Practical Winter Motorcycle.

motorcycle, which is shown in an accompanying illustration in operation upon the road. This device, which resembles a submarine boat in outward appearance, occupied the centre of the Flying Merkel booth, and a large portion of the time during the show Mr. Boyd received his visitors from a seat in the forward end.

It appears that some months ago Mr. Boyd was injured in an automobile accident. Usually he is the moving spirit in the Boyd Motor Company at 27 Stanhope street, Boston, where he is a decidedly active salesman in the interest of Merkel machines. For weeks after the accident he was unable to leave his bed, but as soon as he was able to sit up a little his thoughts turned toward his favorite mount.

As a result of his dreaming, if such it may be termed, a tricar was attached to one of the latest two-speed models and over and around this was fitted a sheet iron covering, painted yellow. This covering is conical in shape and comes to a point at both front and rear. In the forward end a bright headlight has been fitted, and a short distance above this, like two eyes, are two side lights, one red and the other green. At the point in the rear is a red tail light, and below this is the number plate, complying with the Massachusetts law in every particular. Painted on the after deck is the name, "Yellow Jacket." The mudguards are in the shape of fins and a small gangway offers an easy means of entrance and egress.

That the arrangement is thoroughly practical is borne out by the fact that it was used by Mr. Boyd during his convalescence, and throughout the winter. As may be seen, the occupants are almost completely protected from the weather, only their heads appearing above the metal covering. And it is claimed that the shape of the body is such that it adds to rather than diminishes the speed of the machine.

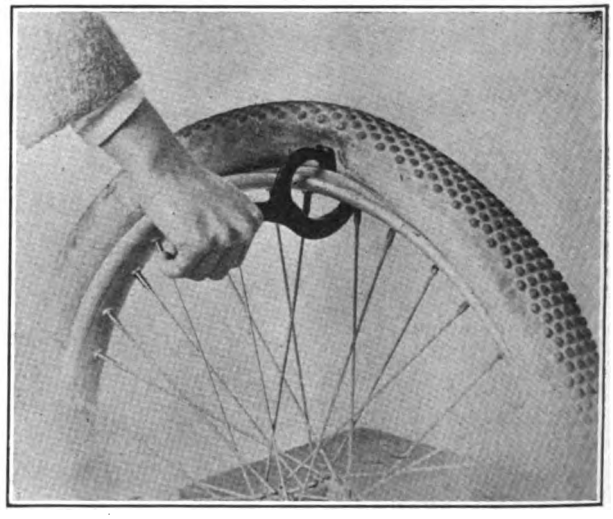
Legless Rider on Minneapolis.

Alfred Leroy of Los Angeles, Cal., recently made a motorcycle trip from that city to San Francisco, Cal., in three days. Mr. Leroy has no legs and but one good arm, but he has a side car attachment which enables him to work the levers with this, while he steers with the stump of his other arm. He rode a Minneapolis motorcycle, made by the Minneapolis Motor Company, Minneapolis, Minn.

O-Tak-A Tire Remover.

Among the new accessories for motorcycles revealed at the Boston show was the special motorcycle O-Tak-A tire remover, marketed by J. W. Grumiaux, sales agent, Leroy, N. Y. This concern makes three sizes of tools, two of which are designed for automobile use. The motorcycle device is the smallest of the three and is designed to loosen a clincher tire from the rim and push it back so that the bead can be pried out over the clinch. The operation is decidedly simple.

The tool is shaped somewhat like a pair of tongs, having two handles, designed to give full control so that it may be held in the most advantageous manner to overcome the resistance of the tire. As indicated in the accompanying illustration, the hand grasps the two handles and one end of the remover is inserted between the spokes until it hooks onto the rim on the opposite side



Illustrating Method of Using O-Tak-A Motorcycle Tire Remover.

from that at which the operator is working. The "nose" on the other end is pressed firmly against the bead, and it is maintained that the construc-

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tion is such that it will not slip even when the tire has become rusted or frozen to the rim. After the bead has been loosened the tool can be raised, thus throwing the tire up and away from the rim, permitting easy removal. It will be noted that the tool does not come in contact with the spokes or felloe.

American Machines Race in India.

Two American machines competed in the recent Tourist Trophy race of 297 miles in India. A. Lee rode a 3.75 horsepower Indian, made by the Hendee Manufacturing Company, Springfield, Mass., and finished second after suffering a fall which broke a foot rest on his machine. He rode most of the distance with one foot on the frame and averaged 35 miles an hour. T. Cameron was mounted on a three horsepower Pope, made by the Pope Manufacturing Company, Hartford, Conn., and after running out of gasoline 20 miles from the finish, he walked 14 miles before being overtaken by another rider, who loaned him his emergency supply of gasoline, permitting him to finish eighth.

Thor Maker to Move.

It is announced that arrangements practically have been completed for moving the motorcycle plant of the Aurora Automatic Machinery Company, maker of Thor motorcycles, from Aurora, Ill., to Chicago. It is stated, however, that only the motorcycle plant is to be moved, as that part of the company's business has grown to such proportions that more room has become necessary to expand the output. The building to be leased at Chicago has been decided upon, the only remaining thing being the signing of the lease, which is expected to take place in a short time.

Club Notes, Here and There.

The Bay State Motorcycle Club has been organized at Boston with 75 charter members. Quarters have been taken at 325 Columbus avenue, and the club has affiliated with the F. A. M. The officers elected are: President, G. J. Downs; vice president, F. H. Hart; secretary, H. J. Stearns; treasurer, D. E. DeLong.

A climb to the top of Mt. Hamilton was enjoyed recently by the members of the San Jose Motorcycle Club, San Jose, Cal.

A campaign for new members is being conducted by the St. Joseph Motorcycle Club, St. Joseph, Mo., and it is hoped to increase the membership to at least 75.

A membership campaign conducted by the Aberdeen Motorcycle Club, Aberdeen, S. D., resulted in the addition of 92 names to the club roster.

The Salt Lake City Motorcycle Club, Salt Lake City, Utah, held a big celebration St. Patrick's Day. Early in the evening there was a motorcycle parade, headed by the city's motorcycle policemen. A dance in the club rooms followed. The club has also made arrangements for a carnival for Memorial Day and later a hill climb will be held.

Indianapolis, St. Paul, Minneapolis and Kansas City are being considered as the sixth city of the American League of Professional Motorcycle Racing Clubs, which already includes Cleveland, Chicago, St. Louis, Cincinnati and Detroit.

A Decoration Day endurance run is being planned by the New Jersey Motorcycle Club of Newark, N. J., which promises to furnish one of the most severe tests of rider and machine that has yet been undertaken by the Newark organization. The run will cover about 427 miles through the surrounding hills and mountains and will occupy a period of two days.

JOIN THE F. A. M.

which is the National Organization fostering the interests of motorcyclists along legislative and other lines. Cut this out, mail it, and you will get the reasons.

E. M. ESTABROOK
Chairman Membership Committee Federation American Motorcyclists,
BANGOR, MAINE.

Please send me the F. A. M. Booklet and all information interesting to prospective members.

Name .....

Address .....

INDIAN RIDERS

Cold weather is here. Motor turns over hard. Very hard work to get started. A little kerosene or gasoline injected into cylinder head will remedy this at once. A priming cup is needed in top of cylinder head as it takes too much time to take out spark plug each time. Indian riders, send at once for a finely made and finished priming cup to fit top of cylinder head of your Indian. Price, postpaid, $1 each. Money refunded if you are not satisfied.

B. A. SWENSON 522 Broad St., Cor. Blackstone St., Providence, R.I.

1913 F. N. SHAFT-DRIVE MOTORCYCLES.

Lightweight Single, with Two-Speed Gear $275
Only Machine Built With Handle Bar Control of Clutch.
Four-Cylinder $300
With Handle Bar Control of Clutch $350
Two-Speed Gear, Extra $50
Equipment includes two brakes, footrests if desired, compound spring fork, combined luggage carrier and stand.

American F. N. Company, Boston, Mass.

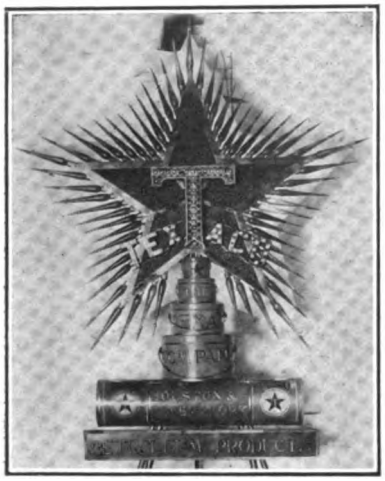
Branch—415 Trumbull St., Hartford, Ct.

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THE TEXACO TRADE MARK.

Illuminated Red Star and Green T Make Effective Display at Boston Show.

One of the exhibits which attracted unusual attention at the recent Boston show was that made by the Texas Oil Company, New York City. This concern really had two exhibits, one in the basement showing storage systems for oil and gasoline and the other being in the balcony of Exhibition hall, where the well known Texaco lubricants were to be seen.



Illuminated Trade Mark at Texaco Oil Display.

The centre of the latter display was the monster illuminated red star and green T comprising the trade mark of this company. The large star, visible across the entire hall, was made of rich red Bohemian glass, and on this was mounted the green T and the name Texaco in brass letters studded with miniature electric lights.

A nickeled frame outlined the star and bore a number of sockets, each of which was a holder for a ray shaped glass container. These containers were filled with various lubricating oils, ranging from a ruby colored product at the apex of each point to an almost white oil at the base. The whole was illuminated by powerful electrics concealed behind a frosted glass star shaped background.

CONCERNING NATIONAL SHOWS.

Manufacturers' Executive Committee Favors Abandoning Truck Displays at Least.

In connection with the discussion considering the advisability of discontinuing the national shows in New York City and Chicago, it was announced last week that at a meeting of the executive committee of the National Association of Automobile Manufacturers in New York earlier in the month, it practically was decided to hold a national show in that city again next year. Similar action was taken with respect to the Chicago display in Chicago, Feb. 5.

It appears that there developed during the meeting some little opposition to a continuance of the truck shows in these two cities, and while no definite action was taken, the matter was referred to a special committee for further consideration. It also is announced that the trade failed to respond in sufficient numbers to warrant the erection of a special building for automobile exhibits at the Panama-Pacific exposition, and it was decided to accept the 60,000 square feet offered by the exposition authorities in the Transportation building.

WITH INVADER OIL.

E. F. Kalkhof Is Still Associated with T. E. Tomlinson as Advertising Manager.

An accompanying illustration presents E. F. Kalkhof, advertising manager of the Invader Oil Company, 80 Broad street, New York City, which recently took over the business of Chas. F. Kellom & Co., maker of Invader lubricants. He has a wide and very successful experience in this line of endeavor, and his copy while advertising manager of the Havoline Oil Company, and later of the Wolverine Lubricant Company, was of such character as to make him extremely well known in the industry as a publicity man.



E. F. Kalkhof, Advertising Manager, Invader Oil Company.

It will be remembered that T. E. Tomlinson, who helped to organize the Wolverine concern and has been for a number of years a decided force in the automobile lubricant field, is now vice president and general manager of the Invader company. Mr. Kalkhof has been associated with Mr. Tomlinson for a number of years and received his training under that leadership.

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In connection with the announcement of Mr. Kalkhof's appointment comes the information that Mr. Tomlinson proposes to maintain his former policy in the development of the Invader oil business, and undoubtedly a vigorous advertising campaign will be inaugurated to place this product before the motoring public in a forceful manner.

PLANNING WOLVERINE TOUR.

Many Detroit People to Watch Burman Pilot Keeton in 500-Mile Race.

The Wolverine Automobile Club, the leading motoring organization of Detroit, is preparing a tour to Indianapolis, Ind., when the 500-mile race is run May 30. The run will be the event of the year and the members will be particularly interested in Robert Burman, who is expected to have the single Detroit entry in the race, a Keeton car, made by the Keeton Motor Car Company. The club plans a record breaking entry for the trip, which will probably be by way of Chicago and return through Cleveland, O.

A special train has been arranged to take the members direct to the Speedway. Over 40 rooms have been engaged at the Claypool Hotel, Indianapolis, for May 29 and 30, and a special dining room has been reserved for the club members. Lunches will be served at the track and a block of 300 seats in the grandstand opposite the starting and finish line are already on sale at the club rooms. The Keeton company has reserved three boxes in the grandstand and eight rooms at the Claypool Hotel. Driver Burman will carry the colors of the Wolverine Automobile Club on his car and members of the club will be at the pits to assist Burman in every way possible.

ANOTHER PERU FACTORY.

Will H. Brown Is Instrumental in Securing Accessory Concern for That City.

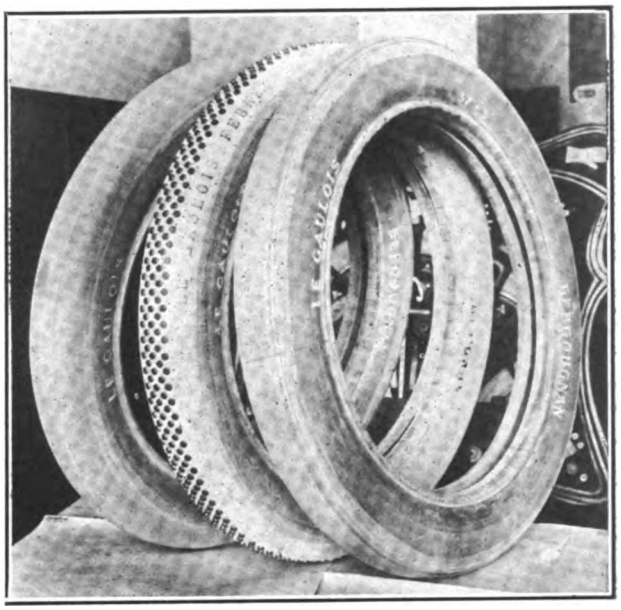
Through the efforts of Will H. Brown and the directors of his company, the Brown Commercial Car Company, Peru, Ind., the Crum-Wiley Manufacturing Company, which has been enjoying an increase of business the past year, has been induced to locate at Peru. The company will manufacture all automobile accessories made in brass, its specialty being grease cups and other small parts used in the building of motor vehicles.

Besides Mr. Brown, the directors of the new concern are: President E. L. Crum, Vice President Max Krauss, Secretary-Treasurer S. A. Shesler and J. R. Woodring. The company was formerly located at Decatur, Ill.

GAULOIS TIRE DISTRIBUTION.

Etablissements Bergougnan to Be Well Represented in the Several States.

Following the recent announcement of the location of an American selling branch of the Etablissements Bergougnan, Clermont-Ferrand, France, maker of Gaulois tires, at 49 West 64th street, New York City, comes the information that those in charge are rapidly perfecting a system of distribution by states. It is expected that the appointment of several New England distrib-



Gaulois Tires of French Make Now Being Introduced in America.

utors will be made public in the near future.

It is understood that the French house is offering unusual inducements to jobbers and others, a sliding scale of discounts having been adopted with a view to hastening a general trial of Gaulois tires by users all over this country. The maker lays considerable stress upon the statement that there is no "speeding up" system in vogue in its shops and that each tire produced is leisurely built and carefully examined.

As an indication of the esteem in which these shoes are held abroad, it is pointed out that of the 34 cars taking part in this year's tour de France, held under regulations corresponding in a measure to the Glidden tour in this country, no less than 22 were equipped with this product.

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NEW INCORPORATIONS AND MAKER'S NOTES.

The following concerns have been incorporated recently to manufacture and deal in motor cars, accessories, etc.:

International Filter Company, Denver, Col.; $100,000; to manufacture gasoline filters for automobiles, motorcycles and gas engines; E. D. Motz, John N. Stewart, H. W. Kirby.

Willets Service Company, Inc., New York City; $50,000; motor vehicles and trucks; William C. Willets, Marius Jurgensen, Estelle M. Naylor.

United Auto Association, Los Angeles, Cal.; $10,000; H. W. Bohrman, Burt Dequine, C. L. Robinson.

Ross Ketchum Company, Inc., Saratoga Springs, N. Y.; $18,400; automobiles and bicycles; J. Arthur P. Ketchum, Norman B. Ross, James W. Northrup.

Hudson-Phillips Motor Car Company, St. Louis, Mo.; $10,000; to manufacture, sell and repair automobiles and trucks; C. F. Phillips, J. H. Phillips, J. E. Stewart.

Overland-Winton Sales Company, Worcester, Mass.; $10,000; George F. Fuller, Harlan T. Pierpont, Jay Clark, Jr.

W. C. Bates Company, Boston; $10,000; William C. Bates, William J. Munday, George A. Kersley.

Kingsbury Motor Sales Company, Inc., Hudson Falls, N. Y.; $10,000; Earle H. Wells, Esther L. Wells, Leonard Wetsell.

K. & K. Motor Car Company, Inc., Richmond, N. Y.; $10,000; Lillian E. Killian, Agnes E. Killian, Frank B. Killian.

Carels Diesel Motor Company of America, Wilmington, Del.; $10,000,000; H. E. Latter, W. J. Maloney, N. P. Coffin.

Capitol Body Company, Indianapolis, Ind.; $10,000; to manufacture and sell automobile tops and fenders; Elmer Hinshaw, Fred W. Heaschen, Elmer W. Hughey.

Brookville Auto Company, Brookville, O.; $10,000; sales, garage and repairs; J. Ward Somers, Edward B. Somers, V. T. Somers, John E. Somers, Anna Somers.

H. M. S. Motor Company, Inc., New York City; $22,500; motors and engines; Charles K. Starr, Joseph J. Myers, George P. Harvey.

Savoie Tire Company, Providence, R. I.; $100,000; Joseph Savoie, Edward C. Clines, Harry D. Reed.

Aquaero Manufacturing Company, New London, Conn.; $60,000; aeroplanes; Henry R. Bond, Jr., Edward C. Hammond, P. Leroy Harwood.

Norwood Garage, East Orange, N. J.; $10,000; Walter C. Jacobs, Dwight R. Davies, Louis Boehme.

National Garage Company, Cleveland, O.; $20,000; John A. Nally, C. A. Gardner, George L. Williams.

Pierce Speed Controller Company, Anderson, Ind.; $25,000; to manufacture and sell speed indicating and speed controlling devices; George W. Pierce, F. E. Mustard, U. M. McCullough.

Automobile Protective Association Company, Columbus, O.; $5000; guarding owners against theft of automobiles or parts thereof; William Lester, Mark A. Caputo, R. M. Switzer, E. L. Richards, A. M. O'Harra.

Chicago Original Auto Polo Company, Chicago; $6000; dealing in automobiles and operating places of amusement; Joseph R. Deahl, Frederick W. Moore, Marie C. Suhr.

Parsons Manufacturing Company, Toledo, O.; $10,000; to manufacture automobile appliances, novelties, etc.; George R. Seney, Irvin E. Austin, Charles W. Parsons, Henry T. Parsons, Helen W. Keier.

WITH THE MANUFACTURER.

The Kelly-Springfield Motor Truck Company, Springfield, O., maker of Kelly-Springfield motor trucks, has announced the following managers of branches conducted in various cities, all under the firm name of the Kelly-Springfield Motor Truck Company: A. S. Holly, 239-241 West 56th street, New York City; P. S. Aultman, Shoe & Leather building, Cambridge A, Boston, Mass.; James Joyce, 4518 Baltimore avenue, Philadelphia, Penn.; Charles B. Packham, 1523 McGee street, Kansas City, Mo.; L. B. Garrison, 2439 Cottage Grove avenue, Chicago; Henry E. Schmidt, 511-513 East Pike street, Seattle, Wash.; Frank G. Miner, Fourth and Harrison streets, San Francsico, Cal.; J. L. Stone, 1036 South Grand avenue, Los Angeles, Cal.; A. R. Hayden, Dallas Transfer Company, Dallas, Tex.; D. C. Hathaway, 1829 East 13th street, Cleveland, O. A branch is also located at 800 Third avenue, Birmingham, Ala.

President J. J. Cole of the Cole Motor Car Company, Indianapolis, Ind., maker of Cole cars, is on a trip through the West, repeating a similar trip through the East last year to familiarize himself with actual trade conditions.

I. R. Bailey, formerly manager of the mechanical goods department of the Diamond Rubber Company, Akron, O., maker of Diamond tires, has recently been appointed manager of the mechanical goods department of the Goodyear Tire & Rubber Company of the same city, maker of Goodyear tires. Mr. Bailey has been in the rubber business 25 years. With him also, W. M. Metzler, for 15 years factory superintendent of the mechanical goods department of the Diamond company, joins the Goodyear forces.

The Rapp Manufacturing Company, Toledo, O., maker of Visco spark plugs, has changed its corporate name to the Toledo Spark Plug Manufacturing Company, and is occupying the new Manufacturers' building. In addition to the well known Visco plug, so constructed as to show at a glance ignition trouble, the company will build a new spark plug to be known as the Ohio, without the visible spark gap seen in the Visco, in large quantities. It is also entering the motorcycle and marine engine field and a number of plugs for these engines has already been turned out.

The Planhard Manufacturing Company, Kokomo, Ind., maker of Planhard carburetors, has appointed through E. H. Stickles, its New York sales manager, the Eisner-Lenk Company of 1074 Boylston street, Boston, distributor for the Planhard carburetor for the entire New England territory. This firm is well known to the trade and will inaugurate an aggressive sales policy.

The Schacht Motor Car Company, Cincinnati, O., maker of Schacht cars, recently held an election of directors at a meeting of its stockholders, with the following results: G. A. Schacht, William Schacht, Harry G. Pounsford, A. O. Elzner, John F. Dietz, John H. Miller and Arthur Stem.

The Vanguard Manufacturing Company, which has been building for some time at Detroit, preparatory to removing from Joliet, Ill., is now in its new plant with a capacity for 1000 windshields a day.

The Bowling Green Motor Car Company, Bowling Green, O., maker of light motor trucks, has voted to double its capitalization from $100,000 to $200,000.

The Stewart-Warner Speedometer Corporation, Chicago, announces that the recent report that R. H. Baldwin had been appointed manager for the Stewart-Warner Corporation, was incorrect. Mr. Baldwin becomes assistant to E. W. McGookin, who for some time has been in charge of the Detroit office of the company.

The Stewart Motor Corporation, Buffalo, N. Y., maker of Stewart commercial vehicles, announces the appointment of the following agencies: Alco-Pittsburg Sales Company, Pittsburg, Penn.; Albany Garage Company, Albany, N. Y.; Stewart Auto Sales Company, Los Angeles, Cal.; Charles F. Brown, White Plains, N. Y.; Capitol City Auto Company, Hartford, Conn.; S. G. Chapman, San Francisco, Cal.; Ralph Careu, Montreal, Can.; Edward McK. Hunt, Newark, N. J.; Ross Maddocks, Medford, Mass.; Eastern Motor Company, Atlantic City, N. J.; Robert W. Powers, Fall River, Mass.; Middlebury Garage, Akron, O.; Medicine Hat Garage, Medicine Hat, Alberta; Pratt & Co., Argentine Republic; The Overland Company, Grand Rapids, Mich.; The Motor Power & Transit Company, Calgary, Alberta.

The Henderson Motor Car Company, Indianapolis, Ind., maker of Henderson cars, announces the appointment of O. R. Wolf as factory representative and territory manager for the Central States district. Mr. Wolf will make his headquarters at Chicago with the Henderson distributor, the Tennant Motor, Ltd.

The Thomas B. Jeffery Company, Kenosha, Wis., maker of Rambler cars, has announced the appointment of J. A. Cramer, long recognized as a leading motor car dealer of Buffalo, N. Y., as exclusive representative in that territory.

The Studebaker Corporation, Detroit, maker of Studebaker pleasure cars and trucks, preparatory to the spring and summer business, has located its branches in new homes in the following cities: St. Louis, Mo.; Atlanta, Ga.; Omaha, Neb.; Minneapolis, Minn.; Salt Lake City, Utah, and Washington, D. C.

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RECENT PATENTS.

Engine Hood Cover—Clinton D. Miller, Washington, D. C., No. 1,054,592. The cover is designed to envelop the hood and has a pliable flap adapted to swing over an opening in front.

Automobile Seat—Arthur F. Draper, Berkeley, Cal., No. 1,054,755. A casing is secured to the body of the car and the seat proper is hinged thereto. Means are provided for folding the seat member into the casing.

Bumper—George E. Legendre, Chicago, No. 1,055,057. Spring socket heads are attached to the extension of the frame and a link member is also employed in the connection. The plunger rods are equipped with springs.

Resilient Wheel—William Frederick Doll, Liberty, N. Y., assignor of one-half to Lee McClung, Washington, D. C., No. 1,053,976. The wheel comprises a continuous piece of spring metal coiled to form an inner member, a felloe and supporting member.

Automobile Pump—Richard Anton Goeth, Robert B. Rodgers and John Albert Dittmar, San Antonio, Tex., No. 1,054,762. The pump is designed to be secured to the wheel of the automobile and the piston is actuated by gears which are rotated by the wheel.

Detachable Tread—Junius A. Bowden, Los Angeles, Cal., No. 1,064,820. The shoe is provided with a detachable tread which has projections fitting recesses in the main tread. A wire is employed on each edge of the detachable tread for securing the parts.

Cushion Tire—Dexter J. Thayer, Pittsburg, Penn., No. 1,051,465. The tire is solid and is fitted to a channel shaped rim. Cushioning springs are mounted in the rim beneath the tread and retained by beads. An air space is provided between the springs and rims proper.

Shock Absorber—Fulton A. Green, Kittanning, Penn., No. 1,055,164. The device comprises a cylinder containing a non-expansible fluid, and a hollow piston. The downward movement of the car spring compresses the fluid and the recoil is compensated for by a spring member.

Dirigible Lights—Julius Marion Raiky, Coffeeville, Miss., assignor of one-half to C. K. Bailey of the same place, No. 1,055,225. The headlights are pivotally mounted and are actuated by a pair of arms which in turn are moved by a third arm connected to the steering mechanism.

Wrist Pin Device—Foster C. Rhoads and Hugh A. Leis, Dayton, O., No. 1,054,942. One of the bosses retaining the wristpin is fitted with an aperture carrying a spring and a retaining member. The latter is so constructed that it locks the wristpin, which has a shallow cavity.

Fender and Lamp Support—Richard Tyrell, Missoula, Mont., No. 1,049,946. The fender is made in two sections, partially covers the wheel and is secured in such manner that it moves when the front wheels are deflected. Provision is also made for the mounting of the headlights.

Electrical Connector—Richard H. Welles, Kenosha, Wis., assignor to the Badger Brass Manufacturing Company of the same place, No. 1,054,810. The device is a connector for electric lamps and comprises two shells or casings within which is the connector proper. A spring gripping member is employed having arms for locking the parts.

Auxiliary Steering Gear—John D. Maxfield, Hemet, Cal., No. 1,054,975. The steering device is detachably connected to the forward wheels of a car and projects in opposite directions. A hanger bar is secured to each of the members. Connection is by a cable which is led to a drum. Winding the cable upon the drum moves the wheels as desired.

Muffler—William J. Griffith, Plymouth, Mich., No. 1,055,270. The conventional shell has a number of circumferential grooves and the baffle plates are slidably mounted on rods extending longitudinally through the cylinder. The plates are held in a normal position by a spring and the arrangement of the parts is such that movement of the plates from normal increases the unrestricted area within the shell.

Anti-Skidding Device—Michael C. Harris, Philadelphia, No. 1,053,504. The device comprises a circular series of levers, each member projecting rearwardly between its ends in general V shape, the ends of each lever extending beside each side of the shoe for a short distance. Links are utilized for connecting the levers and a chain for retaining the device.

COMING EVENTS.

March.

March 24-29—Show, Indianapolis, Ind.
March 27-April 3—Show, Quincy, Ill.
March 29-April 5—Show, St. John, N. B.
March 31-April 5—Show, Manchester, N. H.

April.

April 1- 6—Commercial car show, San Francisco, Cal.
April 5-12—Show, Pittsburg, Penn.
April 14-16—Motor truck trials, Chicago, Ill.
April 16-17—Race meet, Taylor, Tex.

May.

May 5-8—Motor truck trials, Washington, D. C.
May 26-June 13—American visit, British engineers.
May 30—500-mile race, Indianapolis, Ind.
May 30—Inter-Club run, Chicago, Ill.

June.

June 19—Algonquin hill climb, Chicago, Ill.
June 25-28—Non-stop day and night run, Chicago-Boston.

July.

July 1—Manufacturers' tour, Indianapolis-San Francisco.
July 4—Track meet, Taylor, Tex.
July 4-6—Road race, Tacoma, Wash.
July 27-28—Road races, Tacoma, Wash.

August.

Aug. 30-Sept. 6—Reliability tour, Chicago, Ill.

September.

Sept. 1—200-mile race, Columbus, O.

November.

Nov. 24—Vanderbilt Cup race, Savannah, Ga.
Nov. 26—Grand Prize race, Savannah, Ga.

FOREIGN.

March.

March 22-April 15—Automobile and agricultural implement show, Algiers.
March 29—100-mile cyclecar race, Brooklands track, England.
March 31-April 30—Agricultural show, Montevideo, Uruguay.

April.

April 5-20—Show, Marseilles, France.
April 20-May 1—Show, Prague, Bohemia.
April 26-May 11—Show, Turin, Italy.
April 27—Hill climb, Limonest, France.

May.

May 1-15—Agricultural motor tractor show, Avignon, France.
May 1-31—Show, Barcelona, Spain.
May 7-21—Show, St. Petersburg, Russia.
May 8-12—De la Sarthe race meet, Le Mans, France.
May 11-12—Targa Florio race, Sicily.

June.

June 4- 6—Tourist Trophy race, Isle of Man, England.
June 10-16—Alpine trials, Vienna, Austria.
June 23-28—International road congress, London, England.

July.

July 1-16—Plowing competition, Winnipeg, Manitoba.
July 12—Grand Prix race, Amiens, France.
July 19-20—Grand Prix race, Belgium.

August.

August 10—Hill climb, Mount Ventoux, France.
August 15—Hill climb, Tonale, Italy.

September.

September 28—Hill climb, Mont Verdun, France.

NEW BOOKS RECEIVED.

The Knight Motor, How the World Receives It, by Knight & Kilbourne, Chicago. Contents are devoted to letters of appreciation from users of motor cars equipped with the Knight engine. Titled owners are given, also the names of all companies in the world licensed to use the motor.

Gas Power, by C. F. Hirshfeld, M. M. E., professor of power engineering, Sibley College, Cornell University, and T. C. Ulbricht, M. M. E., instructor of department of power engineering, Sibley College, Cornell University. Deals with internal combustion engines, fuels, carburetion, ignition, etc. Illustrated. John Wiley & Sons, New York City, publisher. Price, $1.25.

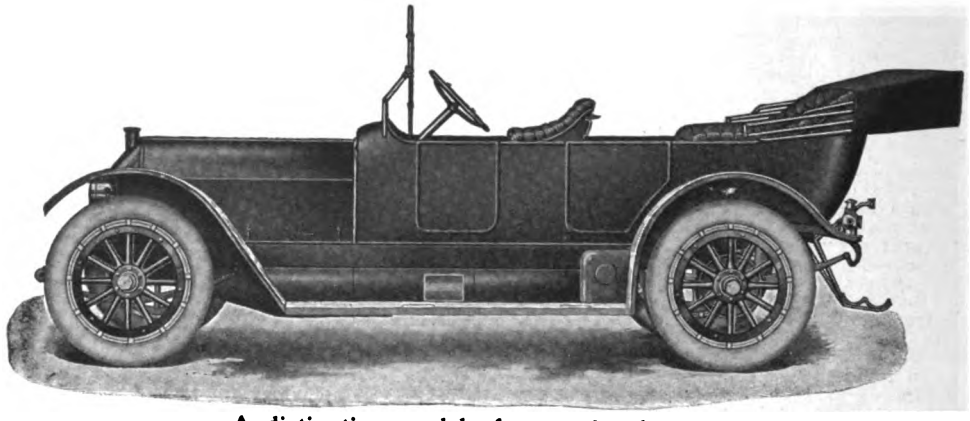
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Knox

"LITTLE SIX"

Knox

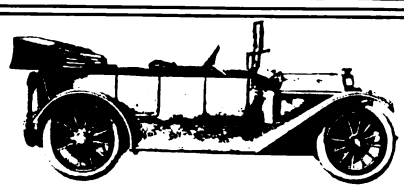
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Speedometer



Accurate, durable---the one speedometer with a daily trip register that can be set at any mileage at any time.

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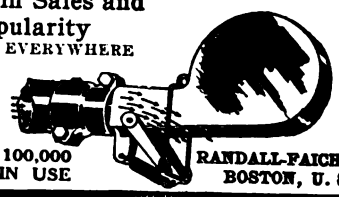
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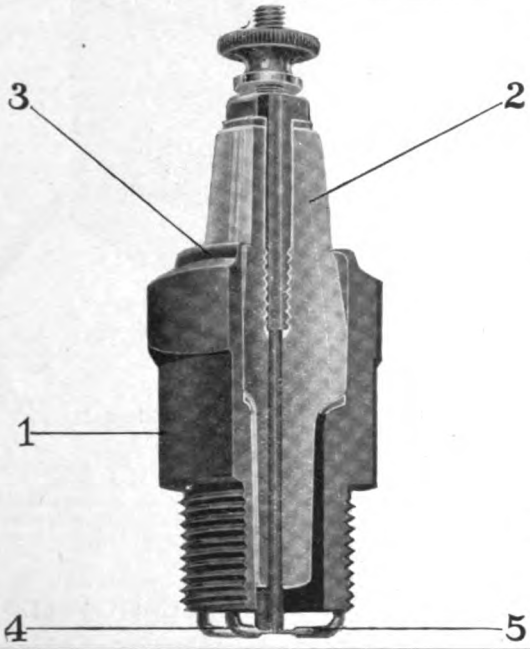
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BOSCH PLUGS



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1 Substantial Construction—A liberal sized heavy insulator and solid steel body provide a massive yet neat construction.

2 Indestructible Insulator—The insulator is Steatite, an artificial stone having exceptional insulating properties, and neither brittle nor affected by heat, carbon or oil.

3 Leak Proof Assembly—But three principal parts allow a special construction forming one piece, eliminating all joints.

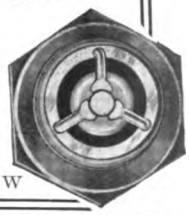
4 Heat Resisting Electrodes—Three nickel electrodes of extra weight withstand the heat of the most intense spark.

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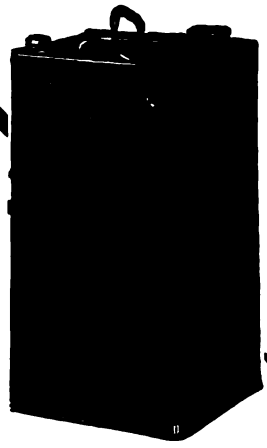
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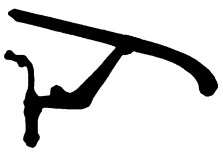


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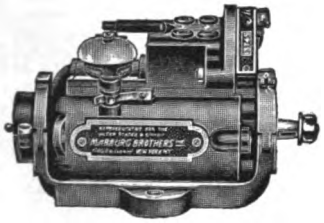
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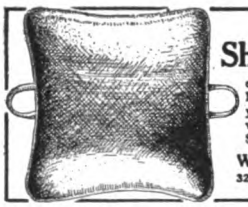


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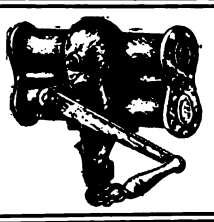
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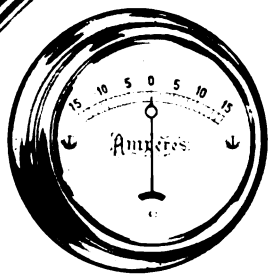
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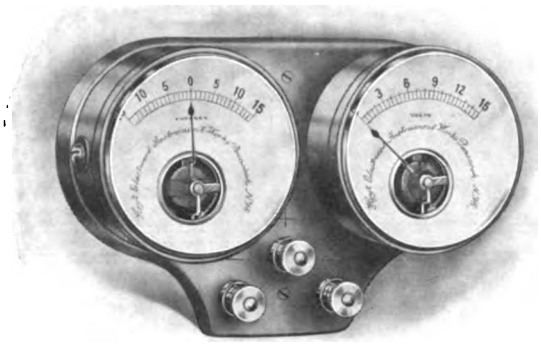
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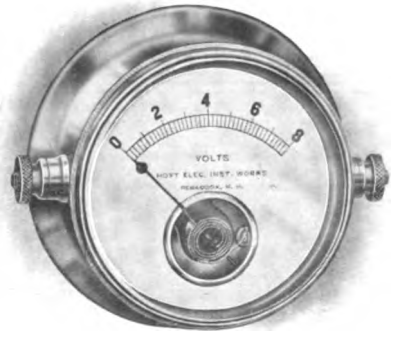
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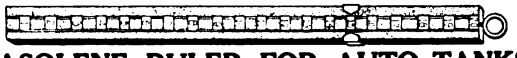
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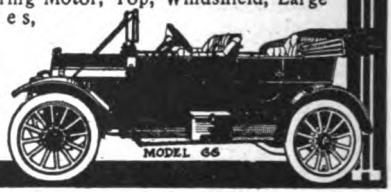
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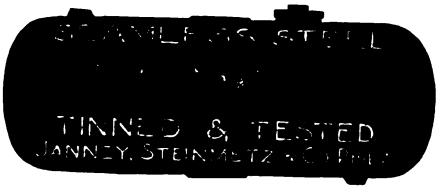
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Johns-Manville Co., H. W., Madison Ave. and 41st St., New York City.
Randall-Faichney Co., Boston. (Mac-Kae Blits.)
Branches: See Horns.

SPEEDOMETERS.

Hoffecker Co., The, Motor Mart, Boston. (Hoffecker.)
Jones Speedometer, New Rochelle, N. Y.
Branches: Broadway and 76th St., New York; 109 Massachusetts Ave., Boston; 1416 Vine St., Philadelphia; 1430 Michigan Ave., Chicago; 852 Main St., Buffalo; 253-255 Jefferson Ave., Detroit; 530 Golden Gate Ave., San Francisco; 1229 So. Olive St., Los Angeles, Cal.; 329 Ankeny St., Portland, Ore.; 917 E. Pike St., Seattle, Wash.
Warner Instrument Co., 1221 Wheeler Ave., Beloit, Wis. (Auto-Meter.)
Branches: 116 Edgewood Ave., Atlanta, Ga.; 925 Boylston St., Boston; 720 Main St., Buffalo; 2420 Michigan Ave., Chicago; 807 Main St., Cincinnati; 2062 Euclid Ave., Cleveland; 1518 Broadway, Denver; 870 Woodward Ave., Detroit; 330½ North Illinois St., Indianapolis; 1618 Grand Ave., Kansas City; 748 S. Olive St., Los Angeles, Cal.; 1902 Broadway, New York; 302 N. Broad St., Philadelphia; 5940 Kirkwood Ave., Pittsburg; 14 N. Seventh St., Portland, Ore.; 36-38 Van Ness Ave., San Francisco; 611 E. Pike St., Seattle, Wash.; 3928 Olive St., St. Louis; 559 Yonge St., Toronto, Can.

SPRINGS FOR AUTOMOBILE SUSPENSION.

Marburg Bros., 1790 Broadway, New York. (Marburg-Hagen.)
Perfection Spring Co., No. 1 Plant, 2414 Superior Ave., N. W.; No. 2 Plant, East 65th and Central Ave., Cleveland.

SPROCKETS.

Boyd, F. Shirley, 903 Boylston St., Boston. (Baldwin.)

STEEL PARTS, SEAMLESS.

Standard Welding Co., Cleveland.

STORAGE SYSTEMS—GASOLINE AND OIL.

Janney, Steinmetz & Co., Philadelphia.
Scaife & Sons Co., Wm. B., Pittsburg, Penn.
Branch: New York City.

SWITCHES, LOCK.

Blackburn Specialty Co., 1120 Prospect Ave., S. E., Cleveland. (Autolock.)

TANKS, ACETYLENE GAS.

Prest-O-Lite Company, 271 East South St., Indianapolis. (Prest-O-Lite.)
Branches: See Cylinder Cleaning Compound.

TANKS FOR FUEL AND WATER.

Janney, Steinmetz & Co., Philadelphia.
Scaife & Sons Co., Wm. B., Pittsburg, Penn.
Branch: New York City.

TANKS, TIRE INFLATING.

Prest-O-Lite Co., 271 East South St., Indianapolis. (Baby Tire Filler, The Emancipator.)
Branches: See Cylinder Cleaning Compound.

TAPE, ASBESTOS.

Johns-Manville Co., H. W., Madison Ave. and 41st St., New York City.

THERMOS CASES.

Dover Stamping & Manufacturing Co., Cambridge, Mass.

TIRE ACCESSORIES.

Firestone Tire & Rubber Co., Akron, O.
Branches: See Rims—Removable and Detachable.
Shaler Co., C. A., Waupun, Wis.

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CLASSIFIED BUYERS' GUIDE—Continued

TIRE CASES.

Hopewell Brothers, Newton, Mass. (Hopewell.)
Branch: 1974 Broadway, New York.

TIRE CHAIN GRIPS. (See Chains.)

TIRE PRESERVATIVES AND PROTECTORS.

Gray Specialty Co., 148 Avon Ave., Newark, N. J.
National Rubber Co., 4433 Papin St., St. Louis, Mo. (Tirenew.)
Page-Lester Co. 2644 Indiana Ave., Chicago. (Tite-Wad Rubber Putty.)

TIRE REMOVERS.

O-Tak-A Tire Remover, Le Roy, N. Y.

TIRES—CASINGS AND INNER TUBES.

Diamond Rubber Co., Akron, O. (Diamond.)
Firestone Tire & Rubber Co., Akron, O. (Firestone.)
Branches: See Rims—Removable and Detachable.
Fisk Rubber Co., Chicopee Falls, Mass. (Fisk.)
Branches: 811-813 Boylston St., Boston; 17½ Dorrance St., Providence.
Frontier Tire & Rubber Co., 1054 Main St., Buffalo, N. Y. (Frontier.)
Gaulois Tire Co., 1926 Broadway, New York. (Gaulois.)
Goodyear Tire & Rubber Co., Madison St., Akron, O. (No-Rim-Cut.)
Branches: In all principal cities.
Hood Rubber Co., Watertown, Mass. (Shawmut.)
United States Tire Co., Broadway and 58th St., New York. (Continental, G & J, Hartford, Morgan & Wright.)
Branches: See Rims—Removable and Detachable.

TIRES—CUSHION.

Cataract Rubber Co., Wooster, O. (Cataract.)
Branches: Boston, New York, Providence.
Firestone Tire & Rubber Co., Akron, O. (Firestone.)
Branches: See Rims—Removable and Detachable.
Motz Tire & Rubber Co., The, Akron, O. (Electric Special Motz Cushion.)
Branches: Boston, New York, Philadelphia, Pittsburg, Chicago, Kansas City, Detroit, Cleveland, Los Angeles.

TIRES—MOTORCYCLE.

United States Tire Co., Broadway and 58th St., New York. (Morgan & Wright. G & J.)
Branches: See Rims—Removable and Detachable.

TIRES—SOLID AND COMMERCIAL.

Diamond Rubber Co., Akron, O. (Diamond.)
Firestone Tire & Rubber Co., Akron, O.
Branches: See Rims—Removable and Detachable.
Fisk Rubber Co., Chicopee Falls, Mass.
Branches: See Tires—Casings and Inner Tubes.
Motz Tire & Rubber Co., The, Akron, O. (Motz.)
Branches: See Tires—Cushion.
Polack Tyre and Rubber Co., 246 W. 59th St., New York City. (Polack.)
Republic Rubber Co., Youngstown, O. (Republic.)
United States Tire Co., Broadway and 58th St., New York.
Branches: See Rims—Removable and Detachable.

TOPS AND ATTACHMENTS.

Springfield Metal Body Co., 20 Medford Ave., Springfield, Mass.

TROUBLE FINDERS.

Hopewell Brothers, Newton, Mass. (Vibrator.)
Branch: 1974 Broadway, New York.

TRUCKS—See Cars, Commercial.

TRUNK RACKS.

Connecticut Steel & Wire Co., Hartford, Conn.

TUBING, GAS.

Johns-Manville Co., H. W., Madison Ave. and 41st St., New York City.

TURNTABLES.

Beach Co., T. C., 108 Ottawa St., St. Johns, Mich. (Beach.)
Canton Foundry & Machine Co., Canton, O. (Universal.)

UNIVERSAL JOINTS.

Bretz Co., J. S., 520 W. 54th St., New York. (Hartford.)
Kinsler-Bennett Co., The, P. O. Box 124, Hartford, Conn. (Kant-Break.)

VALVE GRINDERS.

Wall, J. H., 290 Hope St., Bristol, R. I. (Ford.)

VULCANIZERS.

McVey Manufacturing Co., Third and Canal Sts., Dayton, O. (McVey.)
National Motor Supply Co., 1911 Euclid Ave., Cleveland. (Garage and Individual.)
Branches: In all principal cities.
Shaler Co., C. A., Waupun, Wis.
Williams Foundry & Machine Co., Akron, O.

WELDING OUTFITS.

Prest-O-Lite Co., 300 W. South St., Indianapolis. (Prest-O-Welder.)
Branches: See Cylinder Cleaning Compound.

WELDING, STEEL.

Standard Welding Co., Cleveland.

WHEELS.

Eberly & Orris Mfg. Co., Mechanicsburg, Penn.

WIRES AND CABLES.

Diamond Rubber Co. of N. Y., Akron, O. (Diamond.)

WIRE MECHANISM.

Bretz Co., J. S., 250 W. 54th St., New York. (Bowden.)

WRENCHES AND COMBINATION OUTFITS.

Coes Wrench Co., Worcester, Mass.
Cutter, George A., Taunton, Mass.
Walworth Manufacturing Co., Boston. (Stillson.)

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THE AUTOMOBILE JOURNAL THE MOTOR TRUCK
THE ACCESSORY AND GARAGE JOURNAL

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The Automobile Journal Publishing Company

Times Building **Pawtucket, R. I.**

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Automobile Manufacturers Who Have Contracted for



Storage Batteries

For Starting or Lighting or Both

Abbott Motor Co.	Detroit, Mich.
Allen Motor Car Co.	Fostoria, O.
Alpena Motor Car Co.	Alpena, Mich.
American-LaFrance Fire Eng. Co.	Elmira, N. Y.
American Locomotive Co.	Providence, R. I.
American Motors Co.	Indianapolis, Ind.
Ames Motor Car Co.	Owensboro, Ky.
Apperson Bros. Automobile Co.	Kokomo, Ind.
O. Armleder Co.	Cincinnati, Ohio.
Auburn Automobile Co.	Auburn, Ind.
Bartholomew Co.	Peoria, Ill.
Buckeye Mfg. Co.	Anderson, Ind.
Canadian Standard Auto & Tract. Co.	Ft. Wayne, Ind.
Cartercar Co.	Pontiac, Mich.
J. I. Case T. M. Co. Motor Wks.	Racine Jct., Wis.
Chadwick Engineering Works	Pottstown, Pa.
F. Coleman Carriage & Harness Co.	Ilion, N. Y.
Columbus Buggy Co.	Columbus, Ohio.
Commerce Motor Truck Co.	Detroit, Mich.
Corbitt Automobile Co.	Henderson, N. C.
Crawford Automobile Co.	Hagerstown, Md.
Crescent Motor Co.	Cincinnati, Ohio.
Crow Motor Car Co.	Elkhart, Ind.
Croxton Motor Car Co.	Washington, Pa.
Jas. Cunningham, Son & Co.	Rochester, N. Y.
Cutting Motor Car Co.	Jackson, Mich.
Geo. W. Davis Carriage Co.	Richmond, Ind.
Elkhart Carriage & Harness Co.	Elkhart, Ind.
Enger Motor Car Co.	Cincinnati, Ohio.
F. I. A. T. Company	Poughkeepsie, N. Y.
Flanders Motor Co.	Detroit, Mich.
H. H. Franklin Mfg. Co.	Syracuse, N. Y.
Gramm-Bernstein Co.	Lima, Ohio.
Gramm Motor Truck Co.	Lima, Ohio.
Gramm Motor Truck Co.	Walkerville, Ont.
Great Western Automobile Co.	Peru, Ind.
Haberer & Co.	Cincinnati, Ohio.
Havers Motor Car Co.	Port Huron, Mich.
Haynes Automobile Co.	Kokomo, Ind.
Henderson Motor Car Co.	Indianapolis, Ind.
Herreshoff Motor Co.	Detroit, Mich.
Ideal Motor Car Co.	Indianapolis, Ind.
Imperial Automobile Co.	Jackson, Mich.
Jackson Automobile Co.	Jackson, Mich.
Kelly-Springfield Motor Truck Co.	Springfield, O.
King Motor Car Co.	Detroit, Mich.
Kline Motor Car Co.	Richmond, Va.
Knox Automobile Co.	Springfield, Mass.
Lenox Motor Car Co.	Boston, Mass.
Lexington Motor Car Co.	Connersville, Ind.
Little Motor Car Co.	Flint, Mich.
Locomobile Company of America	Bridgeport, Conn.
Lozier Motor Co.	Detroit, Mich.
Lyons Atlas Co.	Indianapolis, Ind.
Marathon Motor Co.	Nashville, Tenn.
Maritime Motor Car Co., Ltd.	St. John, N. B.
Marion Motor Car Co.	Indianapolis, Ind.
Martindale & Millikan	Franklin, Ind.
Maxwell Motor Car Co.	Detroit, Mich.
W. H. McIntyre Co.	Auburn, Ind.
McLaughlin Motor Car Co.	Oshawa, Ont.
Mercer Automobile Co.	Trenton, N. J.
Metzger Motor Car Co.	Detroit, Mich.
Michigan Buggy Co.	Kalamazoo, Mich.
Midland Motor Car Co.	Moline, Ill.
Moline Automobile Co.	East Moline, Ill.
Moon Motor Car Co.	St. Louis, Mo.
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Nova Scotia Carriage Co.	Kentville, N. S.
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Packard Motor Car Co.	Detroit, Mich.
Paige-Detroit Motor Car Co.	Detroit, Mich.
Palmer & Singer Mfg. Co.	Long Island City, N. Y.
Paterson Wagon Works	Flint, Mich.
Peerless Motor Car Co.	Cleveland, Ohio.
Pilot Motor Car Co.	Richmond, Ind.
Pope Mfg. Co.	Hartford, Conn.
Premier Motor Car Co.	Indianapolis, Ind.
Pullman Motor Car Co.	York, Pa.
Regal Motor Car Co.	Detroit, Mich.
Reo Motor Car Co.	Lansing, Mich.
Reo Motor Car Co. of Canada	St. Catharines, Ont.
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Schacht Motor Car Co.	Cincinnati, Ohio.
Seagrave Co.	Columbus, Ohio.
Selden Motor Vehicle Co.	Rochester, N. Y.
Simplex Automobile Co.	New Brunswick, N. J.
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Speedwell Motor Car Co.	Dayton, Ohio.
Stanley Motor Car Co.	Newton, Mass.
F. B. Stearns Co.	Cleveland, Ohio.
Stegeman Motor Car Co.	Milwaukee, Wis.
Sternberg Mfg. Co.	Milwaukee, Wis.
Stevens-Duryea Co.	Chicopee Falls, Mass.
Stoddard-Dayton Co. (Maxwell)	Dayton, Ohio.
Studebaker Corporation	Detroit, Mich.
The Tudhope Motor Car Co.	Orillia, Can.
Velie Motor Vehicle Co.	Moline, Ill.
Warren Motor Car Co.	Detroit, Mich.
Wayne Works	Richmond, Ind.
Webb Co.	Allentown, Pa.
Westcott Motor Car Co.	Richmond, Ind.
White Company	Cleveland, Ohio.
Wichita Falls Motor Co.	Wichita Falls, Tex.
Winton Motor Car Co.	Cleveland, Ohio.
Zimmerman Mfg. Co.	Auburn, Ind.

Need We Say More?

Willard Storage Battery Co.

Cleveland, Ohio

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COES

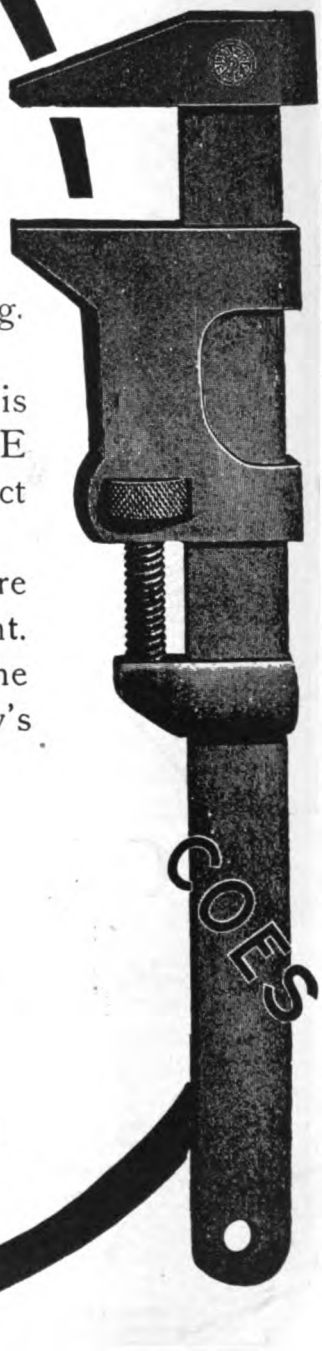
THE
Wrench Supreme

Strength without bulk or clumsiness.
Ease of handling without slipping or bruising.
Perfect balance and right grip

Everything the motorist desires in a wrench is to be found in the "COES" AUTOMOBILE MODEL, and you will never know perfect wrench service until you pin your faith to it.

It stands to reason that the 5 per cent. more you pay for a "COES" wrench goes for 60 per cent. more quality and service—put this wrench in the tool kit and shop. You will get your money's worth.

Send for Literature Now.



Coes Wrench Co.

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J. C. McCARTY & CO.,
21 Murray St., New York City
JOHN H. GRAHAM & CO.,
113 Chambers St., New York City

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AMICO

WHY WORRY ABOUT YOUR SPARK PLUGS

AMICO

Why not equip now with the AMICO plug—non-leakable—un-breakable—the SERVICE plug, with the LONG LIFE. Absolutely the only plug made that will give guaranteed service. Note below its unique features. Try a set—if they are not as good as we claim, we refund your money cheerfully.

$1.00 EACH



High tension electrical porcelain of large diameter affording extra strength and durability—almost impossible to break.

Vamped ridge—holds porcelain rigid at uniform pressure.

Asbestos packing set in taper seat ensuring perfect protection from explosion chamber—perfect joint, no leakage, each explosion blows clean the exposed parts in cylinder. Construction allows porcelain to expand on incline. Old types of plugs have square seat with no chance of expansion either way.

$4.00 the Set

The porcelain has an annular ridge which affords protection to the asbestos packing from the explosion.

Order a set to-day from your jobber or dealer or order direct. We pay Parcel postage. State size of thread

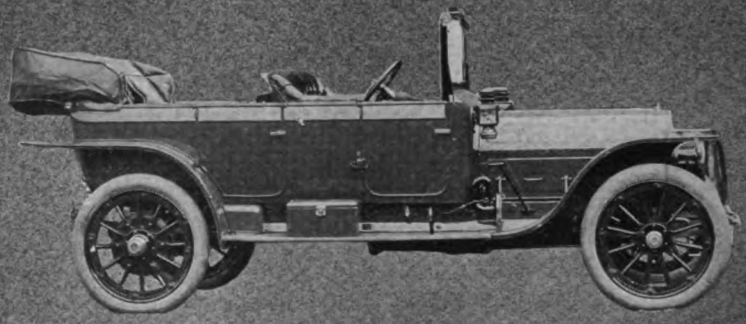
American Ignition Company, Inc.

Office and Factory
319 Adams Street, Dorchester, Mass.

AMICO AMICO

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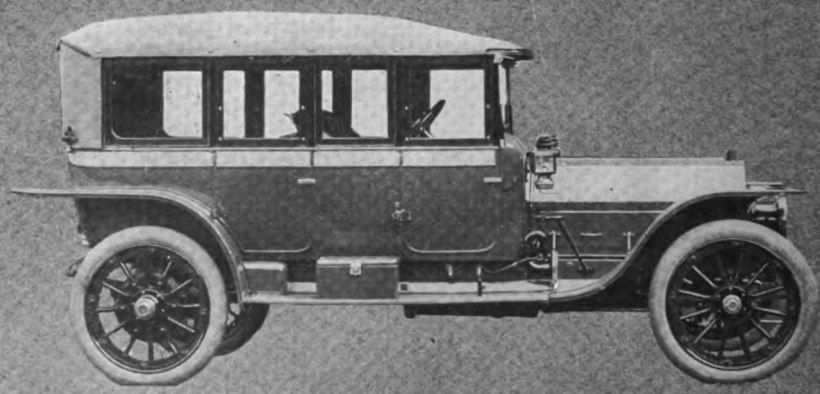
SPRINGFIELD METAL BODY CO.



Why not be comfortable all the year?

Our new light weight convertible bodies protect you from heat, cold, rain, snow and dust.
Send for catalogue.

SPRINGFIELD METAL BODY CO.,
SPRINGFIELD-MASS.



SPRINGFIELD, MASSACHUSETTS.

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United States Tires

have actually increased the sale of motor cars.

¶ It is a known fact that United States Tires today yield an average mileage from 25 to 50 per cent higher than that given by any make of tire previous to the organization of the United States Tire Company two years ago.

¶ Dealers, owners and car manufacturers everywhere acknowledge this.

¶ This increase in tire mileage has made the biggest reduction in the high cost of motoring that has ever been made since the automobile first came into use.

¶ It is a reduction that is bound to bring the automobile into still wider use among people of moderate means.

¶ It is a reduction that is bound to materially increase the car sales of every dealer in the country.

¶ Four-Factory Co-operative methods of tire building are responsible for it.

¶ America's Predominant Tire Concern has truly been a help to the whole motor car industry.

UNITED STATES TIRE COMPANY

United States Pneumatic Tires are guaranteed when filled with *air* at the recommended pressure and attached to a rim bearing either one or both of the accompanying inspection stamps. When filled with any substitute for *air* or attached to any other rims than those specified, our guarantee is withdrawn.

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NEW PRICE LIST IN EFFECT OCTOBER 1, 1911, Cancelling all former price lists

The 8-DAY HIGH GRADE } **"BOSTON" AUTO CLOCKS**

☞ These superbly built 8-day, high-grade clocks have seven-jeweled escapements, Breguet hairsprings, cut steel pinions, compensation balances, dust and water proof cases, etc., and are dealt in and used by those demanding a first-class article.

QUALITY and PRICE — UNAPPROACHABLE

Ask Your Dealer for the "BOSTON" AUTO CLOCK

MODEL B



MODEL C



Adjustable to various angles by Ratchet and Nut at back. In general appearance it closely matches many makes of speedometers.

MODEL D



MODEL E



PRICE LIST— PER CLOCK	SIZE (Dial)	MODELS A, B, C.	MODEL D	MODEL E
	3-inch	$18.00	$21.00	$24.00
	3 1-2-inch . . .	20.00	24.00	27.00
	4-inch	22.00	27.00	30.00

For (Patent Applied for) Outside Stem Winding and Stem Setting Device, ADD $3.00 to above prices.

Superior to other devices. A great convenience for winding clock and setting the hands without opening the clock case.

☞ All sizes stated are the approximate diameters of the dials

The 8-Day High Grade } **"BOSTON" AUTO CLOCK** { For AUTOMOBILES and MOTOR BOATS

On Sale By Leading Jobbers and Dealers.
If Not With Your Dealer Sent on Receipt of Price.

BOSTON CLOCK CO., 16 State St., Boston, Mass.

When Writing Advertisers, Please Mention The Automobile Journal.

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No-Rim-Cut Tires 10% Oversize

They Now Occupy the Throne

Goodyear tires, after fourteen years, hold top place in Tiredom. After men have used two million of them, they outsell all others. And by far.

Why don't you find out this year why so many men prefer them?

Visible Savings

No-Rim-Cut tires can't rim-cut. One glance will tell you that. With old-type tires, 23 per cent are ruined in this way.

You can also see that these tires are 10 per cent oversize. And that, on the average, adds 25 per cent to the tire mileage.

These visible savings alone are sufficient to win you to these tires.

The Invisible

But there are other savings, due to years and years of research and experiment.

Scores of experts, mostly technical graduates, devote their whole time to bettering Goodyear tires.

They have compared, by actual mileage, 240 formulas and fabrics.

On this department we are spending still $100,000 yearly, all to cut down cost of tire upkeep.

That's how Goodyears won. That's why hundreds of thousands of motorists now insist on Goodyear tires.

They mean no petty saving. The difference will amaze you. Ask any user, or go see these tires.

Write for the Goodyear Tire Book—14th-year edition. It tells all known ways to economize on tires.

GOODYEAR
AKRON, OHIO

No-Rim-Cut Tires

With or Without Non-Skid Treads

THE GOODYEAR TIRE & RUBBER COMPANY, AKRON, OHIO

Branches and Agencies in 103 Principal Cities—More Service Stations Than Any Other Tire
We Make All Kinds of Rubber Tires, Tire Accessories and Repair Outfits.
Main Canadian Office, Toronto, Ont.—Canadian Factory, Bowmanville, Ont.

(1056)

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$985

F. O. B. Toledo

Completely Equipped

Self-Starter
30 Horsepower
5-Passenger Touring Car
110 inch Wheel Base
Timken Bearings
Center Control

Overland

$985

F. O. B. Toledo

Completely Equipped

Remy Magneto
Warner-Speedometer
Mohair Top and Boot
Clear Vision, Rain Vision
Wind Shield
Prest-O-Lite Tank

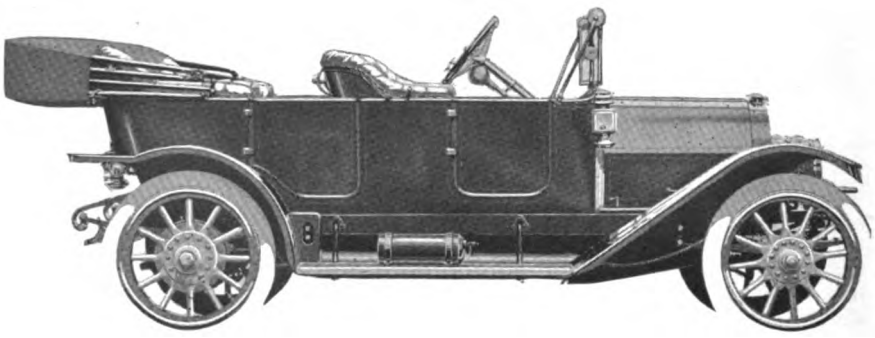
IN ten years the world's automobile production increased 8000 per cent. But in six years Overland sales have increased nearly 10,000 per cent. This phenomenal popularity is the greatest proof in the world that in the Overland you get more car for less money than any other manufacturer can give.

For example—study the specifications given above.

Catalogue on request. Please address Dept. 52.

The Willys-Overland Co.

Toledo, O.



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REMY

Electric Company

(With a country-wide system of branches and service stations)

Designers and Builders
of
High Grade
Starting and Lighting
Equipment For Motor Cars
(Sold to car makers only)

Makers of magnetos for fourteen years

Our country-wide service is available to each user of Remy equipment

Write us today about our magneto exchange offer. We will make a liberal allowance for old equipment (any make)

REMY

Pioneer Manufacturers of Ignition Equipment

Factory and General Offices:
Anderson, Indiana

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This Sign Points The Way To The Best Lubricants



THE MOTORIST KNOWS—that the garage, supply man or dealer who carries HARRIS OILS and displays the HARRIS OIL sign is a RELIABLE dealer—the kind of man who seeks to serve his customers with the ***best*** regardless of "how much profit there is in it for him!"

MOTORISTS

Look for the HARRIS OIL sign. It's a sign of reliability—both as to the lubricants and the sincerity of the dealer who sells HARRIS OILS. You can buy ANYTHING in such a store with absolute confidence.

THE DEALER KNOWS—that customers come to him because of the HARRIS OIL sign. First, for the reason that it indicates a QUALITY dealer; second, for the reason that motorists who want to get ***real*** lubrication seek the supply store which sells HARRIS OILS. The wise motorist will go miles away from his route to obtain this most necessary accessory.

DEALERS

Get in line—get the sign—and hang it up before your store. Realize that this is another HARRIS OIL year. The motoring fraternity now know the value, the necessity of using HARRIS OILS—these lubricants are sweeping the field. Write us.

A. W. HARRIS OIL COMPANY

326 S. Water St., PROVIDENCE, R. I. • 143 No. Wabash Ave., CHICAGO, ILL.

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Raybestos REG. U.S. PAT.

Overhaul Your Brakes

Make your car SAFE. See that the brake lining is in good condition, for upon the lining will depend the safety of your car.

If you need NEW lining, be sure to buy the *best*—it's by far the cheapest in the long run. Get the Standard brake lining—get

TRADE MARK Raybestos REG. U.S. PAT. OFF.

"THE ORIGINAL AND BEST ASBESTOS BRAKE LINING"

Used and recommended by all motorists, dealers and manufacturers who are not swayed by "price."

RAYBESTOS is made of genuine LONG FIBRE asbestos and we pay a premium to secure this high grade, for nothing goes into RAYBESTOS that is not of the very best quality.

If your brakes need re-lining—get RAYBESTOS. All reliable dealers sell it. It grips and holds in ANY emergency and makes EVERY automobile safe. We stamp the name in every foot for your protection.

THE ROYAL EQUIPMENT COMPANY

Railroad and Bostwick Aves. **BRIDGEPORT, CONN.**

We also make Duplex and Raymond Brakes and Gyrex the Mixer

When Writing Advertisers, Please Mention The Automobile Journal.

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They Won't Do

By R. E. Olds, Designer

Right-side drive won't do in these days. Not when all the leading cars in America have come to left-side drive.

Old-style side lamps won't do. Not when all the leading cars have the set-in, flush dash lights.

Side and center levers are bound to be abandoned. The driver won't have his way blocked on one side—won't be forced to step out in the street.

Common ball bearings won't do. Roller bearings cost five times as much, but durable cars must come to them.

Undersize tires won't do. Men are learning that big tires cut tire cost right in two.

Cars that are skimped in any way won't do. Men want big brakes, big springs. They demand big margin of safety.

They want analyzed steel. They want parts properly tested.

Men in these days buy cars for keeps. One-summer cars won't do. They seek a car which in five years from now will run as well as new.

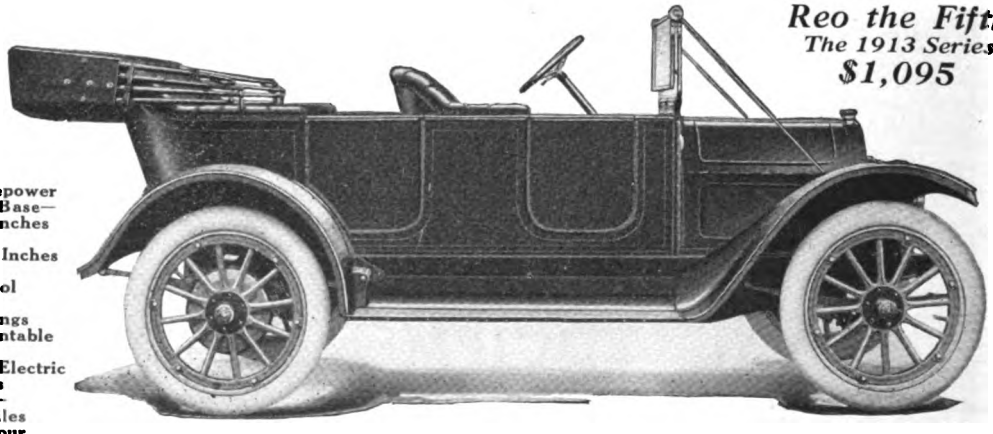
They want a trouble-proof car. They want low cost of upkeep.

The demand for these things has made Reo the Fifth the leader of its class. It has sold on the average, since this car was created, twice our factory output.

Write for our catalog, then see this car at the nearest Reo showroom.

R. M. Owen & Co., General Sales Agents for Reo Motor Car Co., Lansing, Mich.

Canadian Factory, St. Catharines, Ont.



30-35 Horsepower
Wheel Base—112 Inches
Tires—34x4 Inches
Center Control
Roller Bearings
Demountable Rims
Three Electric Lights
Speed—45 Miles per hour
Made with 5 and 2 Passenger Bodies

Top and windshield not included in price. We equip this car with mohair top, side curtains and slip cover, windshield, Prest-O-Lite gas tank for headlights, speedometer, self-starter, extra rim and brackets—all for $100 extra (list price $170)

Gray & Davis Electric Lighting and Starting System at an extra price, if wanted. (171)

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Here's a lesson for all new owners of cars—especially new owners of new cars

We want to reach you and teach you before you start your motoring career.

Know this: A motor car is essentially a power plant plus a system of shafts, bearings and gears. The real wear which disables and destroys, falls upon these mechanical units. Beautiful paint and upholstery can fade or crack but still your car remains a valuable machine if the working parts are true and silent in operation.

The car manufacturer puts his brains and money chiefly into these working parts—bearings and gears. That is where you must use supreme prudence and care if you wish long service from your car.

Lubricate every bearing systematically with NON-FLUID OIL.

That is advice reiterated now for fifteen years—advice which has helped thousands and thousands of motorists to realize service value from their car investments.

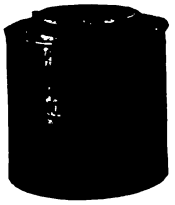
It is advice which has been strengthened and spread by over seventy manufacturers of cars who have tested the failure of other lubricants and proved the success of NON-FLUID OIL.

We cannot prove to you with bald statements that NON-FLUID OIL reduces friction to a harmless degree nor that it removes the nightmare of wear and tear. Friction diagrams, chemical shop talk, claims, comparisons, disparaging statements about other lubricants—all these things are a worthless means to urge conviction upon you.

We simply invite you in your own interest to use NON-FLUID OIL this first year.

If your dealer does not sell it, you will have to look elsewhere. Don't be tempted to accept another kind of lubricant. Don't do it. Be sure you get genuine NON-FLUID OIL packed in orange colored cans bearing this trade mark.

TRADE MARK REGISTERED IN UNITED STATES PATENT OFFICE NON-FLUID OIL



Get it surely, or write us for it. We will ship it prepaid and arrange for your future supply with some dealer who will carry a stock.

NON-FLUID OIL is made in several grades and is sold in 3 lb., 5 lb., 10 lb., 20 lb. and 50 lb. cans.

K-000 Grade—for all the grease cups, for universal joints, steering knuckles, wheel hubs and for differentials requiring a heavy lubricant.

K-00 Special Grade is for sliding gear transmissions and for differentials which are oil tight. This lubricant has been so exceptionally successful for gears that it is regarded as a standard for this work. Other grades for timing gears, pump, etc.

Read "Lubrication of the Motor Car."

This is a complete treatise on lubrication, including a splendid LUBRICATING CHART.

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Index To Advertisers

	Page
Abbott Motor Co	81
American F. N. Company	75
American Ignition Co	8
Anti-Rust Paint Co	91
Approved Auto Specialties Co	80-81
Austin Automobile Co	Cover
Barrett Manufacturing Co	79
Beach Co., T. C	90
Borne, Scrymser Company	89
Bosch Magneto Company	85
Boston Clock Co	6
Boyd, F. Shirley	82
Bretz Company, The J. S	81
Brown Company	92
Buckeye Manufacturing Co	90
Cameron Mfg. Co	86
Cartercar Company	92
Cataract Rubber Co	18
Coes Wrench Company	2
Cole Motor Car Company	92
Croxton Motor Car Co., The	86
Cutter, Geo. A	87
Cutting Motor Car Co	87
Dayton Rubber Mfg. Co	88
Dean Electric Company	91
Dixon Crucible Co., Jos	87
Dover Stamp. & Mfg. Co	84
Eagle Oil & Supply Co	92
Eberly & Orris Mfg. Co	83
Edwards Mfg. Co	83
Empire Automobile Co	87
Federation Amer. Motorcyclists	75
Firestone Tire & Rubber Co	84
Fisk Rubber Company	87
Gaulois Tire Co	15
Geiszler Bros. Storage Bat. Co	87
Goodnow Mfg. Co	90
Goodyear Tire & Rubber Co	7
Gray Specialty Co	92
Harris Oil Company, A. W	10
Hawthorne Mfg. Co	82
Haynes Automobile Co	82
Herreshoff Motor Co	91
Hoffecker Company, The	90
Ideal Motor Car Company	86
Indian Refining Co	87
Invader Oil Co	82
Invincible Tire Co	89
Jackson Automobile Co	84
Janney, Steinmetz & Co	92
J. H. Tonneau Shield Co., The	86
J. M. Shock Absorber Co	82
Johns-Manville Co., H. W	89
Jones Speedometer Company	86
Kissel Motor Car Company	Cover
Knox Automobile Company	85
K-R-I-T Motor Car Co	82
Leavens & Co., William	82
Lenox, Hotel	90
Lenox Motor Car Company	87
Marburg Bros	87
McVey Mfg. Co	90
Mea Magneto	87
Mercer Automobile Company	89
Miami Cycle & Mfg. Co	73
Michigan Motor Car Co	91
Miller, Chas. E	Cover
Milwaukee Auto Specialty Co	84
Moller Brothers Controller & Economizer Co	86
Mosler & Co., A. R	81
National Motor Vehicle Co	84
New Departure Mfg. Co	87
Nordyke & Marmon Co	83
N. Y. & N. J. Lubricant Co	13
O-Tak-A Tire Remover Co	81
Owen & Co., R. M	12
Paige-Detroit Motor Car Co	90
Perfection Spring Co	92
Pilot Car Sales Co	90
Planhard Mfg. Co	88
Pyrene Co. of N. E	84
Randall-Faichney Co	81
Remy Electric Company	9
Reo Motor Car Company	12
R. I. V. Company	82
Royal Equipment Co	11
Sager Company, J. H	83
Shaler Co., C. A	87
Speedwell Motor Car Co	87
Splitdorf Electrical Co	89
Springfield Metal Body Co	4
Standard Co., The	91
Standard Oil Company	82
Standard Welding Co	90
Standard Woven Fabric Co	83
Studebaker Corporation	92
Sumner, George, Inc	19
Swenson, B. A	75
Texas Company, The	82
United States Tire Co	5
Vacuum Oil Co	Cover
Valvoline Oil Company	91
Waite Auto Supply Co	91
Walpole Tire & Rubber Co	17
Warren Motor Car Company	90
Weed Chain Tire Grip Co	84
White Co	20
Willard-Storage Battery Co	1
Willys-Overland Company	8

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TAKE THE RATTLE OUT OF YOUR CAR. MAKE IT QUIET. ANTI-RATTLE used according to directions, on all worn parts and loose connections, will do it. Send $1.00 for package with directions. Anti-Rattle Co., Wallingford, Conn.

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RE-COVERING A SPECIALTY

SECOND HAND TIRES BOUGHT AND SOLD

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Gaulois Tire Co..

New York City,

Gentlemen:-

During our nineteen twelve season our attention was called to four of your tires which had been run over 8,000 miles and seemed to be good for a thousand more.

Our customer asked us if it was possible to purchase that make of tire in this country and we told him it was not.

In looking through "The Automobile Journal" we see that you have established a branch office in New York.

Will you kindly send us your dealers and consumers price lists also any advertising matter that will attract attention.

If possible, will you kindly send us a few cross sections.

Thanking you in advance for anything you can do for us in this matter, we are

Respectfully yours,

ANTHONY & HARRINGTON.

DICT/CFH

Per. Chas. F. Harrington Jr

The above letter contains a message that will be read with interest by all users of automobile tires.

GAULOIS TIRE CORPORATION

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CANADIAN AGENCY, 325 ST. JAMES STREET, MONTREAL

A few reliable distributors are wanted.

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Page

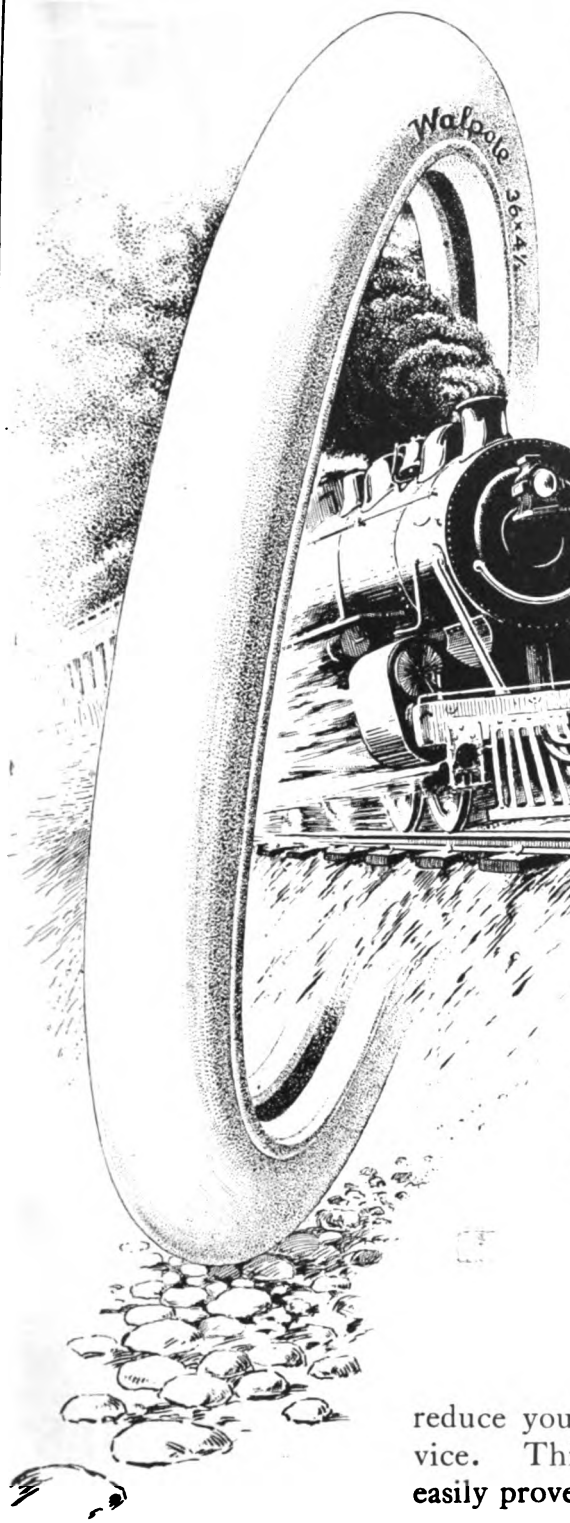
*Automobile Supreme in Disaster....21
*The New Vulcan Electric Gearshift....27
*Features of New Keeton Six-Cylinder Car....28
General News of the Industry—
Goodyear Plant in Brazil....32
The New Tariff Bill....32
Branch Factory in Toledo....32
Lozier Increases Capital....33
Maxwell Absorbs Flanders....33
Secures Manufacturing Plant....33
Another Tire Concern....33
Purchases Detroit Factory....34
Fisk Rubber Wins Suit....34
New Insurance Company....34
Southern Tire Plant....34
*New and Novel Accessories....35
*With the Motoring Interests Abroad—
International Stock Car Race....38
Interesting Body Design....38
The French Grand Prix....39
Testing Mixed Fuels....39
Nyberg in Russia....40
Awards in Swedish Trials....40
Notes from Foreign Lands....40
*The New Tribune Touring Model....41
*Mechanical Notes for Owners—
Proper Treatment for Circulation System....42
Valve Repairing Tool....43
Anti-Dazzling Lens....43
Care of the Magneto....44
Equipping the Private Garage, Part VI....45
Editorial—The Problem of Good Roads....46
*Recent Developments in Tire Holders....47
*In the Commercial Vehicle Field—
Walter-Latil Front Drive Models....50
Trucks in Strike Emergency....51
Some Interesting Dumping Bodies....52
Dow Dual Wheel....52
Automobiles for Parcel Post....53
With Motor Trucks in Service....53
Motoring Laws and Their Enforcement—
Troublesome Clause Unconstitutional....54
Situation in New York....54
Seven Words Left Out....54
Skidding in Montana....55
Universal Lighting Bill....55
Non-Residents in New Mexico....55
*Elliott Rotary Valve Engine....56

Page

*Henderson Solves Problem....57
*Correspondence with the Reader—
Rutenber Motor....58
S. A. E. Horsepower Formula....58
Timing Magneto....58
Lighting Cable....58
Four vs. Six-Cylinder Crankshafts....59
Piston Displacement and Horsepower....59
Repairing Magneto....60
Valve Timing....60
*Features of E-C Demountable Wheels....61
Aviation in America and Abroad....62
*New Roadster Model....63
*K-D Six-Cylinder Car....64
Wants Traffic Census....65
*Miller's Annual Catalogue....65
*The Repair Shop and Garage—
New Daimler Carburetor....66
Dynamo Clutch Adjustment....66
Softening Cast Iron....67
*Garage and Repair Shop Equipment....68
Formulae and Useful Mechanical Tables....69
*Cataract Tire Policy....70
Would Organize Buyers....70
*In the Realm of the Motorcyclist—
Elgin Road Races....71
Motordrome Racing Circuit....71
New Clubs Recently Affiliated....71
Will Distribute Flying Merkels....72
Los Angeles "Sunset Ramble"....72
Motorcyclists Guard President Wilson....72
Promotion for Mershon....72
Motorcycles in South Africa....74
Seeks Dr. Thornley's Place....74
Motorcycles in the Navy....74
Pleased with His Eagle....74
That Stolen Merkel....74
Hoover Organizes Ball Company....74
Club Notes, Here and There....75
New Stewart Motorcycle Speedometer....75
*With the Manufacturer and Dealer....76
Recent Patents....78
Coming Events....78
New Books Received....78
Hold Their First Show....80

*Indicates article is illustrated.

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The Path of the Locomotive And the Path of the Tire

Consider this: The locomotive runs on a path that is smoother than a billiard table. Its tires are made of steel.

The automobile runs on a path that varies from the smoothness of the boulevard to the stone-strewn roughness of the back-country road in the hills. Its tires are resilient rubber.

As a matter of fact, the modern automobile tire is a marvel and its efficiency and economy in the face of the task it has are remarkable.

With the improvements found in WALPOLE TIRES—the extra-tough tread and extra-heavy sidewalls scientifically designed to protect against stone-bruise—still greater efficiency and reduction of tire cost are attained.

Walpole

"NO STONE BRUISE" Tires

reduce your tire cost per mile through longer service. This is a plain statement of fact that can be easily proven. Let us give you the proof.

WALPOLE TIRE & RUBBER CO.

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4000 MILE GUARANTEE

Mr. Motorist:—

Cataract Tires are the finest produced. Only the best of materials and workmanship enter into their construction. They cost more to produce per tire than any other tire made in America.

This season equip with Cataract Tires —They wear longer and give better service.

We guarantee them 4000 miles, but let us send you our book of testimonials. It will surprise you.

Mr. Dealer:—

A few territorial rights still open—get in touch with us by wire, phone or letter.

WHEN YOU TIRE OF OTHERS RE-TIRE WITH US

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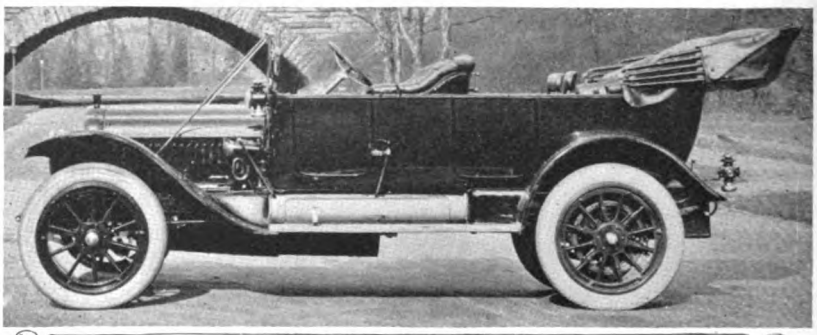
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Include All of the Improvements Which the Purchaser Should Insist Upon Obtaining in a High-Priced Car

The discriminating purchaser should protect himself against the possibility of his car becoming obsolete in design shortly after his investment.

It is not enough that the car he chooses measures up to the prevailing standards of the day. Undue depreciation is bound to occur unless the car embraces every one of these fundamental features of design:

Left Side Drive—Right Hand Control—Electrical Starting and Lighting
Long Stroke, Economical Motor—Monobloc Cylinders—
Four Speed, Selective Transmission.

To purchase a car that does not have every one of these important features is to purchase a car that is already practically obsolete.

White cars have possessed every one of these up-to-date, practical features for two years. In White Cars the protection of your investment is unquestioned for years to come. The superior value of White Cars is therefore evident.

And White Owners Know It

Gasoline Motor Cars, Trucks and Taxicabs

THE WHITE COMPANY
CLEVELAND

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THE AUTOMOBILE JOURNAL

VOL. XXXV, No. 5 APRIL 10, 1913 Price, $1.00 the Year

AUTOMOBILE SUPREME IN DISASTER.

Floods in Ohio and Indiana, and Tornado in Nebraska Demonstrate Its Pre-Eminence in Emergency---Industry Escapes Serious Losses and Concerns Affected Recover Rapidly---Latest Information from Stricken Districts.

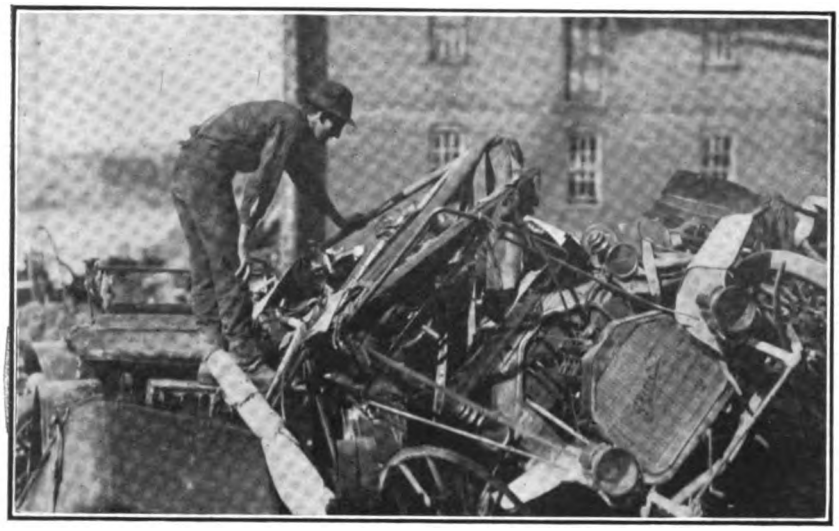
REPORTS from stricken districts in Nebraska, Ohio and Indiana, as the result of the recent tornado and floods, immediately after work of re-establishing communication with the outside world had begun, seem to indicate that the automobile and kindred industries were not seriously affected. Several factories were reached by the rising waters, and while the financial loss in a few instances may be considerable, in a general way the concerns in that section will suffer most by the absence of shipping facilities. Business was suspended in many cities only because employees could not reach the plants and because they were engaged in the work of rescue.

But if motor car and accessory makers escaped serious damage through some fortunate combination of circumstances, the situation in each instance served to demonstrate in a very forceful manner the practicability and dependability of the modern automobile whether designed for business or pleasure. Railroads were washed away and trains bearing food and supplies were unable to reach their destination. Automobiles not only supplanted these in rushing needed supplies, but proved in-



Maj. Wallace Sherwood, in Charge of Rescue Work, at North and Caldwell Streets, Indianapolis—Building on Right Was Carried Two Blocks by Flood.

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Twenty New Cars Wrecked in Garage at Hamilton, O., Showing Effect of the Water at That Point—Photo by Underwood & Underwood, New York.

valuable in saving life. Long after horses were forced to give up the task because of the rising waters, motor cars and trucks were taking people from the threatened districts to higher land.

The conditions are such that the value of the motor vehicle will be brought still more to the attention of the public as the work of restoration progresses. Highways, bridges and railroads throughout the entire district affected in Ohio and Indiana must be replaced. In many sections it appears that the damage to highways was not as great as at first supposed, but for a time at least business of all sorts must depend to a greater or less extent upon the mechanical transport.

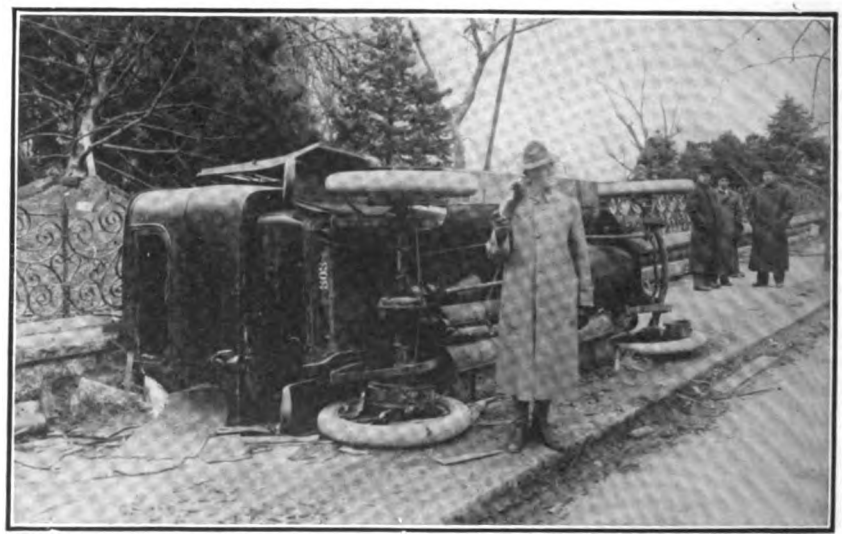
Dayton, O., suffered most seriously as a result of the flood. It appears that the three buildings of the Dayton Motor Car Company, now a subsidiary of the Maxwell Motor Company, had their lower floors filled with water. The offices and the finished stock room were damaged, but as there were only a very few cars on hand the loss was not great. Workmen were notified to report for duty March 31.

The Dayton Engineering Laboratories Company, maker of Delco starting and lighting equipment, and the Apple Electric Company, maker of the Aplco system, had their first floors flooded to the ceiling. The damage was largely to the building, this portion of the two plants being devoted to offices and shipping departments. The Dayton Manufacturing Company, producing lamps, and the Apple Top Company, also report slight damage from water.

The Speedwell Motor Car Company, maker of Speedwell cars and trucks, was located on high land and the water did not reach within two squares of the buildings. The same thing is true of the Davis Sewing Machine Company, maker of the Dayton motorcycle. The Wright Company, producing Wright aeroplanes, had a slight loss by fire, the old shop in which the Wright brothers made their first machines, being entirely destroyed.

The Speedwell company immediately placed all its available finished cars at the service of the relief committee, and cars and trucks were rushed from nearby cities. The Kelly-Springfield Motor Truck Company of Springfield, O., sent six Kelly trucks, and the Packard Motor Car Company of Detroit, eight Packard machines. All motor cars entering Dayton were commandeered and placed at the disposal of J. H. Patterson, president of the National Cash Register Company, as chairman of the relief committee.

The local agencies were situated on Third street, in the heart of the district most severely damaged. Not only were the buildings wrecked,



Soldier Guarding Overturned Car in the Path of the Tornado at Omaha—Photo Copyright by N. E. A., Underwood & Underwood, New York.

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but show cars and office records were a total loss. It is estimated that some 200 machines owned in Dayton were carried away.

In the western part of Indianapolis, Ind., or West Indianapolis, the plants of the Nordyke & Marmon Company, Marion Motor Car Company, the Motor Car Manufacturing Company and R. J. Irvin & Co., were flooded by the breaking of a levee on the White river. The business section of the city was not damaged. The first floor of the Marion administration building was filled with water and many of the rescued were taken to the second floor in boats. While the Marmon plant was partially submerged, the company states that practically all of the finished product, considerable material, records, drawings, patterns, etc., were out of harm's way. It reported that it would be able to resume shipments within 10 days. The Pathfinder plant found itself in a similar situation. The Irvin company produces bodies and will not be affected seriously.

None of the other concerns in the industry in Indianapolis was a loser. The Cole, Henderson, National, Stutz, Premier and other companies not only placed a large number of testing machines and finished cars at the disposal of the Red Cross Society, taking people from the threatened district to their homes, before the flood really broke, but at least one, the National, was able to send relief cars to Dayton, O. The Empire Automobile Company, the Lyons-Atlas Company, the American Motors Company and the Waverley Company escaped damage and announced that they would be able to fill all orders as soon as the railroads were able to restore connections out of Indianapolis. The only doubt in the minds of any Indianapolis car manufacturer appears to lie in the possible inability to secure material on schedule time.

Wheeler & Schebler reports there will be absolutely no delay in the production of Schebler carburetors. The Prest-O-Lite Company was forced to shut down its plant temporarily on account of lack of power, but this should not interfere with shipments as a large number of full cylinders always is carried in stock. During the height of the flood this company equipped each rescue boat with a complete Prest-O-Lite tank and outfit.

The show of the Indianapolis Automobile Trade Association at the Coliseum, which was scheduled for March 24-29, was opened only one evening. The flood cut off all approach to the building, but after this had subsided somewhat, the display was opened Sunday, March 30, no admission being charged. Each person contributed as he saw fit, the entire proceeds, some $873, going toward the relief of the rescued.

Paul R. Martin, director of the Indianapolis motor speedway, announces that this track was undamaged. The speedway is situated on high ground northwest of the city and was several miles removed from the flood zone. Mr. Martin also is authority for the statement that the roads leading to Indianapolis are unharmed and with a few days of sun will be in excellent condition for touring. The flood will in no way affect the running of the third annual 500-mile international sweepstake race, Memorial Day.



One of the Six Kelly Trucks Taking on a Load of Supplies for the Flood Refugees in Dayton, O.

While the electric light and water plants were closed down in Anderson, Ind., as a result of the flood, thus depriving the manufacturing concerns of power, the resourcefulness of the automobile industry was amply demonstrated. A carload of Lambert farm tractors was on the loading platform at the Buckeye Manufacturing Company's plant, and immediately these were placed at the disposal of the proper officials. After nine hours' pumping with power supplied by the tractors the water plant was again in operation, the tele-

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Henderson Car on Its Way to Relieve Householders Just Before Breaking of Levee in West Indianapolis.

phone plant was kept in service and other business was able to proceed.

The Remy Electric Company, maker of Remy ignition equipment, was soon able to resume operations, workmen in the plant hastily bolting a bank of American locomotive headlight generators, also made by this concern, to the floor and stringing temporary wiring through the various departments. An automobile engine was connected to a big generator in the dynamometer room, supplying power for the laboratory and development work.

None of the automobile concerns in Anderson was affected by water. The Buckeye Manufacturing Company's Lambert car and truck factory was unharmed, as well as that of the Nyberg Automobile Works, maker of Nyberg cars and trucks.

Although it was at first reported that the tire concerns in Akron, O., were badly damaged as the result of the flood, it transpires that the only plant to suffer was one of the Goodyear Tire & Rubber Company's buildings. Here the water entered the basement and put out the fires in the engine room. There was no damage to stock.

While the industry did not suffer in Youngstown, O., the Republic Rubber Company, maker of Republic tires, was able to render valuable aid to the city. The water works pumping station was flooded Tuesday morning, March 25, and immediately the rubber concern tendered the use of its private supply. Early Wednesday morning fire broke out in the business section, damaging property to the amount of $75,000. Had it not been for the Republic Rubber Company's supply it is probable nothing could have prevented the spread of the flames to adjacent buildings and the loss would have been tremendous. This service was continued until Saturday, when the city pumping station was able to resume. The city council has given the Republic company a vote of thanks and the citizens have expressed their appreciation of the service extended.

The flood did not reach Connersville, Ind., despite the reports sent out. Railroad communication was cut off by the absence of bridges for a week, and the most serious affliction was a shortage in the coal supply. The branch plant of the Empire Automobile Company, Indianapolis, was forced to close down because of a lack of fuel. The McFarlan Motor Car Company reported no loss and expected to resume shipments within a week.

The Inter-State Automobile Company, Muncie, Ind., reports that none of the factories in that city suffered directly by reason of the flood, although



Cole Machine Engaged in Rescue Work in West Indianapolis, Indicating the Extent of the Flooded District.

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the water works system was shut down for 24 hours, because the boilers were submerged. While the railroads were crippled to a certain extent at first these have resumed operations and the Inter-State learns from the concerns supplying materials that there will be no delay.

The Muncie Gear Works learns that 13 bridges on prominent roads in Delaware county, leading to Muncie, were destroyed, but adds that active steps are being taken to replace these at once. The plant of this company was not affected, and it is understood that the same thing was true of the Muncie Auto Parts Company.

The Great Western Automobile Company, Peru, Ind., reported the resumption of shipments



Interior of the Coliseum in Indianapolis as Arranged for the Automobile Show, During Benefit for Flood Sufferers.

April 1. Although there was about five inches of water in the factory, the loss was very nominal. The first car left the paint shop after the flood April 3. The Peru Auto Parts Manufacturing Company says that while the plant contained from one to two feet of water, the damage was slight, and work was resumed under normal conditions March 31. Many of the workmen in Peru lost all their personal effects.

At Troy, O., which was located in the heart of the flooded district in that state, at least two concerns connected with the industry were seriously affected by water. The Troy Wagon Works Company, which manufactures wagons utilized as trailers for motor trucks, reports that the damage to the factory proper was very considerable, but by prompt and energetic measures everything was soon running normally. The office was badly flooded, damaging records and hampering work temporarily. The Troy Carriage Sun Shade Company, maker of windshields and other goods, announces that its plant was under six feet of water. It was expected that the windshield department would be reopened by April 7.

From Springfield, O., the Kelly-Springfield Motor Truck Company reports that this company was in no way damaged by the flood. The sole concern was with relation to the railroad situation, and it was feared that the receipt of material and the shipment of completed trucks would be delayed for a brief period.

The Miami Cycle & Manufacturing Company, Middletown, O., maker of Flying Merkel motorcycles, issued a statement indicating that the factory was not damaged, although it was forced to shut down because employees could not reach their work. A large number of officials and workmen lost their effects in the flood.

The Rutenber Motor Company, Marion, Ind., reports that the water did not reach its plant in that city, although within two feet of the east side of the factory. The concern's foundry at Logansport, Ind., is said to have been flooded to an average depth of three feet.

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Water came very close to the plant of the Willys-Overland Company, Toledo, O., maker of Overland cars, but the factory escaped all damage.

The plant of the Columbus Buggy Company, Columbus, O., maker of Firestone-Columbus and Columbus electric machines, was reported as flooded to a depth of 10 feet, although the water did not reach the electric car department and the battery room was undamaged.

At Kokomo, Ind., it is understood the plant of the Apperson Bros. Automobile Company, maker of Apperson cars, was badly flooded. The Planhard Manufacturing Company, maker of Planhard carburetors, escaped damages, as well as the Kokomo Rubber Company, Kokomo Electric Company and Byrne, Kingston & Co. In the absence of definite information it is assumed that the Haynes Automobile Company, maker of Haynes cars, also was not damaged.



Ideal Truck Utilized to Pump Out Flooded Cellars in Its Home Town of Fort Wayne, Ind.

According to G. B. Hall, president of the Ideal Auto Company, Fort Wayne, Ind., maker of the Ideal commercial cars, the conditions in that city were not as bad as at first supposed. The Ideal factory was under four feet of water for 10 days, but the direct loss in materials was not as large as was anticipated. Mr. Hall thinks the main loss will come through the fact that the company had been doing a good deal of business and had many prospects in the towns and cities which suffered much more than Fort Wayne. Ideal trucks were utilized in a number of instances to pump water from flooded premises.

The Wayne Oil Tank & Pump Company, engaged in producing storage systems in Fort Wayne, had from two to 2.5 feet of water in the first floor of the office building, and the damage to machines, furniture, building, etc., is estimated at several thousand dollars. S. F. Bowser & Co., in the same line, suffered very little and the plant was closed down only about three hours.

The Ross Gear & Tool Company, Lafayette, Ind., reports that its factory was shut down for a week, but was making shipments the same as usual, April 3. Edward A. Ross, secretary of the company, does not believe the flood will have any serious effect upon the industry, except that there probably will be more trucks bought than would have been the case on account of the large amount of work that must be done over the flooded districts.

J. W. Wellington, factory manager of the Maxwell plant at Newcastle, Ind., writes that this concern was not injured in any way, the town being on the highest point of land between Cincinnati and Chicago.

Although no direct word has been received from Hamilton, O., it is understood that much damage resulted in that city. An accompanying photograph shows the effect of the flood upon one of the local garages, in which were quartered a score of new cars. The Republic Motor Car Company of that city is reported from Fort Wayne, Ind., to have received serious loss.

Homer McKee, director of sales and advertising for the Cole Company, Indianapolis, one of the most vivid writers of the industry, has summed up the situation with respect to that city in a manner which may be applied to the entire district. Mr. McKee says:

The automobile show has been held—but not where the band was playing. There was no lavender ribbon, no polish, no sales talk, no competition. Hub-to-hub Indianapolis cars proved that the city which they had made they could save.

The automobile has saved at least 1000 lives that the horse, the trolley car, the locomotive and even the boat would have missed. It has been everywhere. It has dragged the half-dead out of the water, hurried them to hospitals and then "beat it" for food and clothing. And it has not wearied.

Indianapolis has held her automobile show—out where humanity could see. Yesterday we admired the motor car for its beauty—today we stand before it in awful love of the steel that is in it—of the strength that was sufficient.

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The floods in Ohio and Indiana were preceded only a few days by a destructive tornado in Nebraska, which cut a path across Omaha from the southwest to the northeast, leaving over 200 people dead, many hundreds injured, thousands homeless and a property loss estimated at from $5,000,000 to $10,000,000. C. G. Powell, secretary of the Omaha Automobile Show Association, writes that within 15 minutes after the storm broke over the city, automobiles of all kinds were bringing soldiers, firemen, police, surgeons and nurses to the scene of devastation. He adds:

"It would have been an absolute physical impossibility to have accomplished the great relief work which has been done in as short a time, without the use of these machines. They have been carrying provisions, stoves, bedding and clothing to the suffering; taking the injured to the hospitals and carrying soldiers, surgeons and nurses wherever needed. The automobile has done much for civilization, but nothing greater than the work it has been doing in Omaha."

THE NEW VULCAN ELECTRIC GEARSHIFT.

IN THE last issue of The Automobile Journal mention was made of the electric gearshift fitted to the S. G. V. car exhibited at the Boston show. Additional details of this product of the Vulcan Motor Devices Company, Philadelphia, are given herein and in an accompanying illustration is shown a sectional elevation, also the solenoids.

The system is not complicated, being controlled by solenoid coils, one for each forward speed and reverse. Two switches are utilized between the battery and solenoids, a knife switch controlled by the clutch pedal and the push button member located on the steering wheel. The knife switch controls all the changes and the wheel member only arranges the circuit for the particular speed desired.

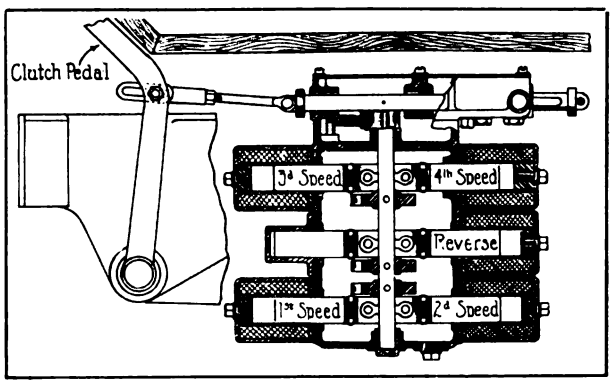
As will be noted by the drawing the clutch pedal moves through a link during the first part of its motion and during the balance picks up the link and carries it along with it. Thus the first movement is the conventional operation of the clutch, but the completion of the throw actuates the knife switch, current flows from the battery through the solenoid coil and pulls a plunger against a magnet with a force of 150 pounds. The energy is transmitted through an arm to the gear shifting fork and gear, securing the desired speed change.

The plungers are shown in a neutral position in the sketch and when the button is pressed on the control member a 12-volt current passes through the coils around the plungers, drawing them against the magnets. The current required to make the shift is held to be about 17 amperes and it is stated that about 300 changes of speed may be made with less current than is required to start the motor.

The gears cannot be stripped because the clutch must be disengaged before a shift is made, and the gears are always in neutral before the solenoids accomplish the change. This is purely a mechanical action through means of the clutch movement. No two speeds can be utilized at the same time because each speed is governed independently of any other and an interlocking device prevents the use of any two buttons at once by mistake.

The box containing the switches and solenoid coils is mounted at the side of the gearbox and it is stated that it adds but 46 pounds to the weight of the chassis.

On the S. G. V. car the control buttons were mounted in a neat aluminum box on the steering



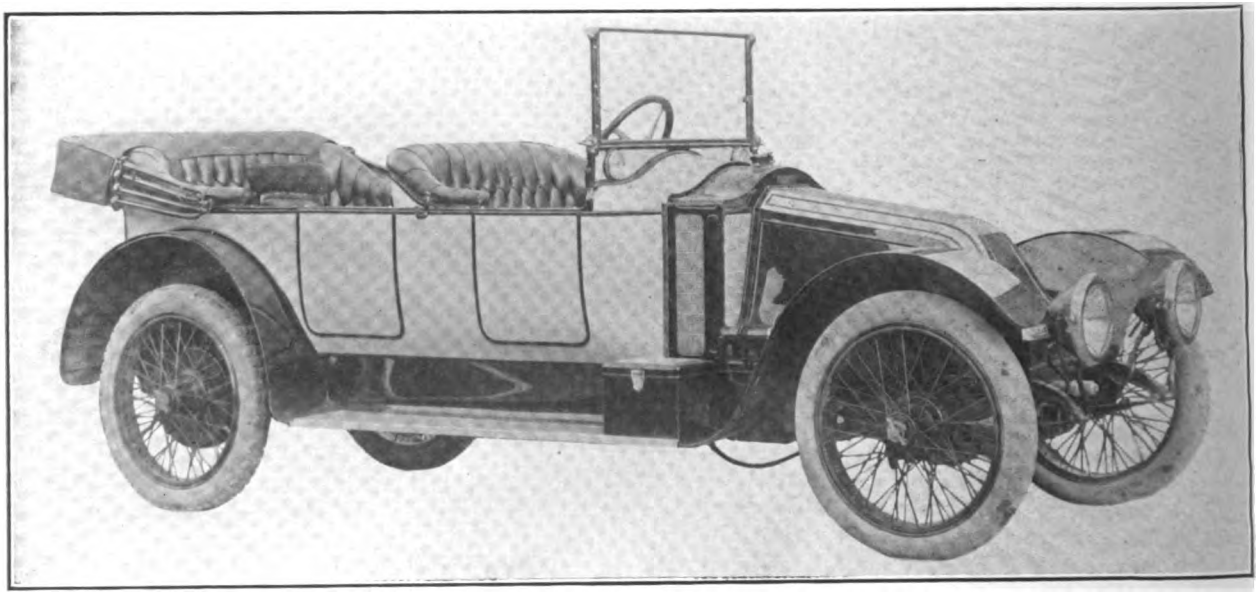
Sectional View of the Vulcan Electric Gearshift, Showing Solenoids and Clutch Pedal Control of Knife Switch.

wheel, one for each speed and including a neutral member. The operation of the system is very simple. If the fourth speed button is pushed down the clutch thrown out and then re-engaged, the machine will be in the fourth speed. If in travelling in traffic on the third, the driver can set the second speed button and by depressing the pedal fully, shift into second. Similarly, changes may be made up. This is an advantage in that the operator does not have to lift his hands from the wheel. The system is quiet, the only perceptible noise being a slight click as the gears engage in the changing of different ratios.

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FEATURES OF NEW KEETON SIX-CYLINDER CAR.

THE Keeton Motor Company, Detroit, is producing one chassis for the present season to which is fitted three types of bodies. The Keeton Six 48 was designed to meet the demand for a medium size light weight car having ample power to meet all requirements of service at a minimum cost of upkeep. The chassis embodies mechanical features indorsed by leading foreign engineers and each component is such as to provide a large factor of safety. Throughout attention has been paid to small details and the material and workmanship are high grade. The bodies are roomy and comfortable and every convenience is included in the equipment, comprising electric lighting and motor starting, wire wheels, left hand drive and centre control. The standard bodies are a seven-passenger touring, a roadster and a coupe, these being known as the Riverside, Meadowbrook and Tuxedo, respectively.



The Keeton Riverside, a Seven-Passenger Touring Car of Distinctive Lines Having Six-Cylinder Motor of Ample Reserve Power to Meet All Requirements of Service.

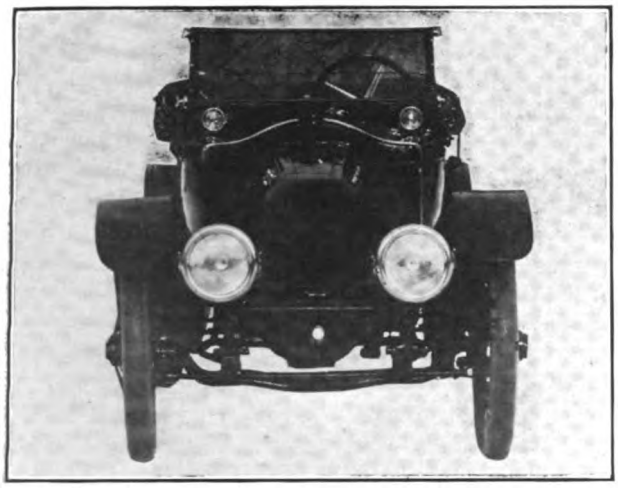
The power plant of the Keeton is not only compact, but is noticeable for its simplicity and accessibility. The cylinders are cast en bloc of a special grade of gray iron and particular attention is paid to aging and machining. The motor is of the L head type with valves located on the left and has a bore of 3.75 inches and stroke of 5.5, a bore to stroke ratio of 1:1.47, which places it in the long stroke class. Although the S. A. E. rating is 33.75 the company claims a rating of 48 horsepower at 1100 revolutions a minute, which appears conservative when its piston displacement of 364.35 cubic inches is considered. Each motor is run on the block and carefully tested before and after being placed in the chassis.

The crankshaft is drop forged of high grade nickel steel, 1.75 inches in diameter, and is provided with four bearings of a special alloy metal. The dimensions of the bearings are ample, being as follows: Front, three inches; rear, four, and centre, two. The same material is employed for the connecting rod bearings, which are 1.75 inches in diameter by 2.25. Carefully cut timing gears and well designed cams not only make for accurate timing, but for a very quiet motor.

The valves are large, being 2.0625 inches in diameter, with nickel steel heads electrically welded to carbon steel stems. The valve guides and tappets are carefully machined from high grade material and the tappets are adjustable. The valve mechanism is enclosed by a single plate easily removed when desired.

Carburetion is by a Zenith of the float feed automatic type located on the right hand side of the motor and heated air is utilized to facilitate vaporization. A strangler or valve is employed for making easy starting in cold weather. The intake pipe is well designed and free from bends, eliminating opportunity for the condensation of the gas. The exhaust manifold is a separate casting having radiating fins and its diameter and

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Front View of Keeton Touring Car, Illustrating Dash Radiator and Compactness of Power Plant.

that of the exhaust pipe are sufficiently large to reduce back pressure to a minimum. The ignition system includes a true high-tension magneto.

The oiling system is of the circulating type, a gear driven pump forcing the lubricant from the crankcase direct to each of the main crank and connecting rod bearings through ducts in the crankshaft. The cylinder walls, pistons, rings, gears, etc., are lubricated by the surplus oil thrown off by the connecting rods. An accessible gauge is provided on the crankcase and being calibrated it is a simple matter to maintain the proper level and to prevent smoking. The capacity of the oil reservoir is three gallons.

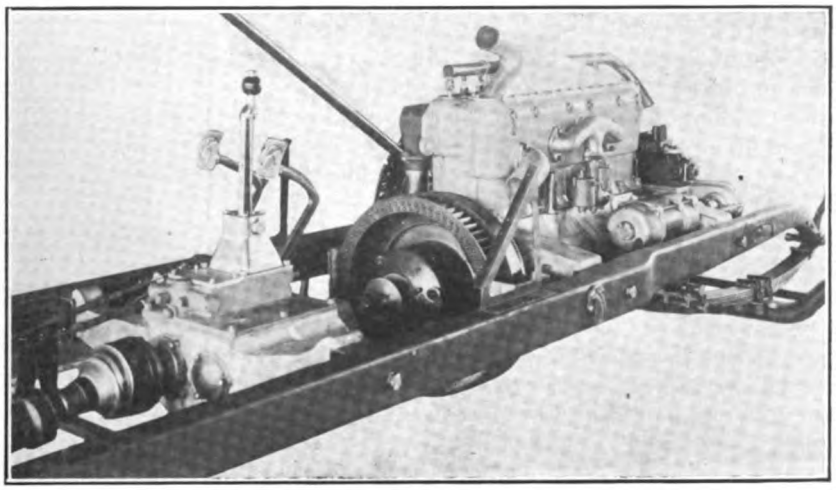
Cooling is by the thermo-syphon system. The water jackets are cast integral with the motor and are ample in size. The cooled fluid enters the cylinder from the radiator through a large sized pipe and passes out at the back through the outlet manifold, which is a single piece casting. The design and location of the radiator follow the practise of the makers of the Renault, Darracq and Arrol-Johnston. It is placed on the dash, affording protection as well as making for a greater "head" to the thermo-syphon circulation. Cooling is further aided by a large blower fan riveted to the flywheel, which forces the air through the sides of the radiator away from the body, keeping the floor boards cool.

The clutch is composed of 48 cone shaped steel discs, eight inches in diameter, enclosed within the flywheel, and operates in a bath of lubricant. Emphasis is put upon the easy engaging qualities of the clutch and it is also stated that it will not slip. Thrusts are cared for by large ball bearings.

The transmission is of the selective type, providing four speeds forward and reverse with direct drive on the third, the fourth speed being geared up 20 per cent. over the direct. The final gear ratio is 3.5:1, although 3:1 or 4:1 is optional. The gears are of chrome nickel steel, carefully cut to insure quiet operation and the shafts are of the same material, rotating in F. & S. imported annular ball bearings. The gearset is located amidships and provision is made for the replenishment of the supply of lubricant by means of a large inspection plate. By displacing the housing containing the gear shift mechanism the entire transmission is accessible for inspection, etc. But one universal joint is utilized, at the rear of the transmission housing, as the drive is a straight line under load through a concentric torque arm.

The rear axle is of the full floating type with a pressed steel housing and the axles are 1.375 inches in diameter of a heat treated chrome vanadium steel. The propeller shaft is of similar material and rotates in large F. & S. imported annular ball bearings. All gears are of chrome nickel steel, heat treated and carefully cut to insure noiseless operation. Provision is made for adjustment and inspection by a large plate back of the differential housing.

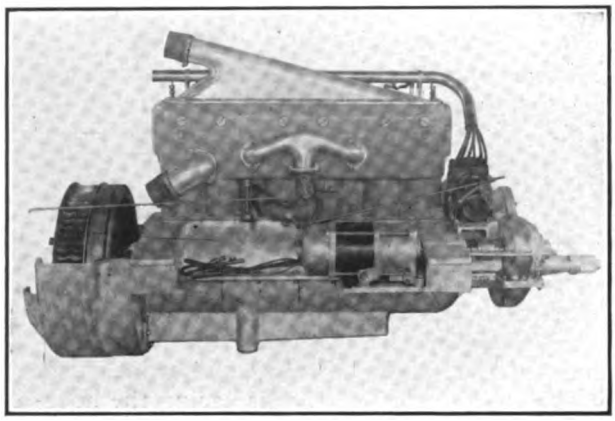
The front axle is of the Mercedes type, a single piece drop forging of heat treated steel of the I beam section design. All spindles, steering



View of the Keeton Chassis, Showing Centre Control, Left Hand Drive and Accessibility of Components.

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arms, etc., are of the same material, and are ample in size, affording a large factor of safety as well as serving to increase the durability.



Intake Side of the Keeton Motor, Showing Location of Combined Dynamo and Motor and Method of Driving Magneto.

Particular attention has been paid to the matter of springs and a special alloy silico manganese spring steel is utilized. Each leaf is carefully ground and polished, the front members being semi-elliptic, 36 inches long and two wide. Three-quarter elliptic springs are fitted at the rear, these being 50 inches long and two wide. Grease cups are provided at all points subject to friction.

The frame is of heat treated pressed steel with depth of channel 4.0625 inches and is inswept at the front, providing a short turning radius. The drop in front is 5.5 inches, while the kick-up at the rear is five inches. Although the centre of gravity is low there is a road clearance of 11.25 inches under the lowest part of the chassis.

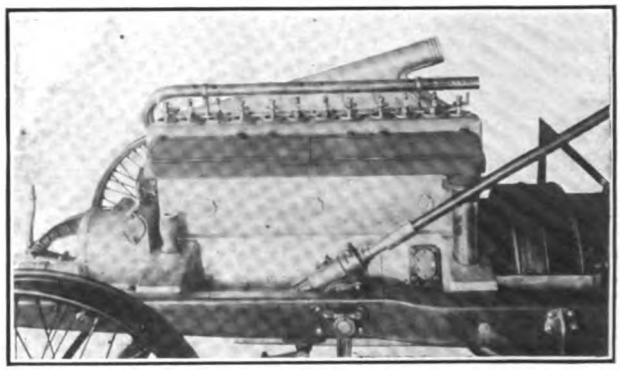
The steering gear is of the worm and full gear semi-irreversible type and is provided with large thrust bearings, easily adjusted for wear. The column is set at a comfortable angle and is surmounted by a walnut steering wheel, 18 or 20 inches in diameter, as desired. It carries but one control member, that of the gas.

Detachable wire wheels with quick detachable rims or demountable rims with wooden wheels are fitted, and 36 by 4.5-inch tires are standard both front and rear. The wire wheels are interchangeable and may be removed by a quarter-turn of a wrench. When this type is utilized the spare wheel is carried at the rear of the body, over the fuel tank, on a false hub. The wheelbase of all models is 136 inches with tread standard, 56.

All models are equipped with very powerful brakes and both sets are contained within the rear wheels, fully enclosed and protected from dust, etc. Each set acts on separate drums of two-inch face and the diameter of the service members is 16 inches; that of the emergency, 12. Both are of the internal expanding type lined with Thermoid, and equalizers are utilized, these being mounted directly on the rear axle. Both sets of brakes may be adjusted by turnbuckles under the front floor boards and the mechanism is very accessible.

The fuel tank is located at the rear of the chassis, and its capacity of 24 gallons is sufficient to meet all requirements in touring, as the motor is held to be very economical of gasoline. The container is equipped with a gauge for noting the amount of fuel on hand. Pressure feed is utilized with pump located on the power plant and two pounds is normally maintained in the tank. The usual hand pump mounted on a bracket between the front seats provides pressure for starting after refilling the tank and when the car has stood for a considerable period. The conventional pressure gauge is located on the front toe board.

The control of the Keeton is very simple and it should be handled easily. The operator is seated at the left with the speed changing lever in the centre at the right. This lever is of the rocking type, surmounted by a ball grip containing the reverse release latch, which prevents shifting into the reverse by mistake. The clutch and service brake pedal are at the left and an aluminum heel rest is incorporated in the floor board. The emergency brake is actuated by the right pedal and it may be locked when desired by a simple ratchet, and as easily released. This arrangement of the brakes not only simplifies control, but enables the operator to employ both



Exhaust Side of Keeton Power Plant, Noticeable for Its Accessibility and Clean Appearance.

hands in steering. The usual accelerator is located between the pedals with a cut-out member at the right of the emergency brake pedal. The

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gas control differs from conventional practise in that the lever is similar to an inverted U and is mounted on the column under the wheel.

The dash is noticeable for its clean appearance, containing only the combined 80-mile speedometer and eight-day clock mounted flush and lighted by electricity. The electric lighting and motor starting system is a Jesco, a combined unit mounted on the right hand side of the motor and gear driven. The system is operated by a very compact switch located between the front seats and provision is made for locking. Energy from the motor starter is imparted by silent chain to the end of the crankshaft and all parts are fully enclosed and well lubricated.

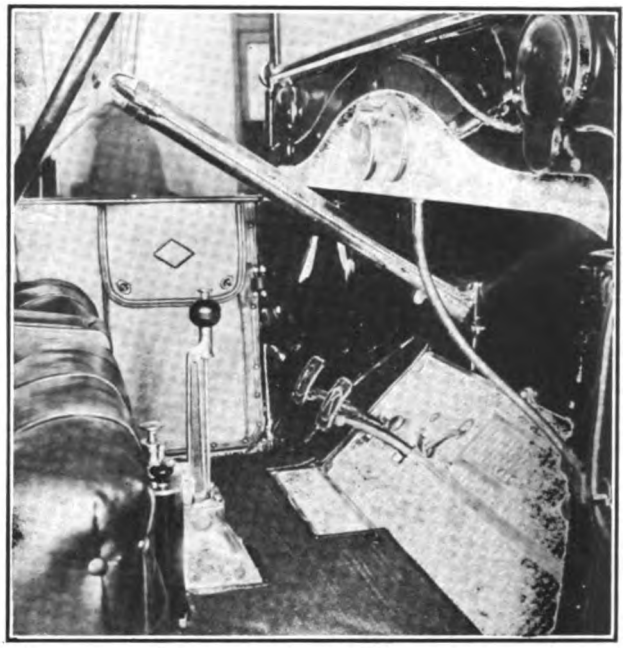
Thoroughness of detail is noticeable throughout. The motor is fully protected from dust, mud, etc., as the lower half of the crankcase forms an aluminum pan that extends under the flywheel and blower fan. This with a hood completely enclosing the power plant prevents the entrance of foreign elements. The mudguards and aprons are reinforced sheet steel, securely retained to prevent rattling and are black enamel. The running boards are laminated wood covered with cork linoleum and bound with aluminum angle strips, a construction easily kept clean.

The bodies fitted to the chassis not only present attractive lines, but were designed to provide ample space both in front and in the tonneau. There is room for auxiliary seats in the touring bodies. The material employed is sheet steel over a wooden frame, making for strength and durability. The upholstery is deep, of the finest grade of hand buffed, pebble grained, black leather stuffed with curled hair over special springs. The seats are very wide and their angle, as well as that of the back cushions, is such that long trips may be undertaken with comfort. Pockets are provided for the storing of maps, gloves, etc., in the doors and shroud.

The equipment is very complete and the accessories are high grade. The top is a special design of carefully selected silk mohair with glove fitting envelope and self-contained inside folding Jiffy curtains. The windshield is of the rain vision type and has special ventilating features. Included in the electrc lighting system is an extension light which is plugged in on the dash, and a device for warming the carburetor and intake pipe in cold weather. Large tool boxes are located on the front end of the running board and the balance of the equipment comprises the usual pump, jack, kit of tools, tail light, license holder, electric horn, robe and foot rails, tire repair outfit, among other accessories.

The Riverside model is a fore door, seven-passenger touring car, very roomy and distinctive in appearance. The Meadowbrook is a two or three-passenger fore door roadster, the extra passenger being carried in a detachable folding seat on the rear deck. This design provides large space for the carrying of baggage. The Tuxedo model is of the coupe type, fully enclosed. The finish is in keeping with the high grade construction throughout and all trimmings are nickel or black enamel.

Under the terms of a new ordinance in New York City, anyone having charge of or handling gasoline in a public garage must secure a certificate of fitness from the fire department. The fee is $5 and the penalty for non-compliance is a fine of $500 or imprisonment not exceeding six months, or both. The ordinance applies to owners who have been accustomed to enter garages and fill their own tanks as well.



Operation of the Keeton Is Simplified by Grouping the Convenient Control Members.

The B. F. Goodrich Company, Akron, O., has announced a reduction in prices affecting the Goodrich tires made by it and the Diamond tires, made by the Diamond Rubber Company, a subsidiary corporation. Similar announcement has been made by the Fisk Rubber Company, Chicopee Falls, Mass., maker of Fisk tires, and it is assumed other concerns will be added to the list. The reduction in price went into effect April 1.

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GENERAL NEWS OF THE INDUSTRY.

Goodyear Tire & Rubber Company to Erect Factory in Rio de Janeiro, Brazil---Proposed New Tariff Bill and Its Effect---Business Changes, Etc.

ACCORDING to announcement made in New York City, the Goodyear Tire & Rubber Company, Akron, O., maker of Goodyear tires, has entered into an agreement with the government of Brazil for the erection of a factory for the production of rubber articles in that country. The move is understood to be in accordance with an act passed by the Brazilian congress some time ago, under which the President was authorized to grant exceptional favors to the first concern to locate a plant of this character in Rio de Janeiro. These included a cash award of about $167,000, the right to expropriate land upon which to erect the factory, and exemption of all customs duties on chemicals and products used as compounding ingredients and fabrics of all sorts, as well as municipal, state and federal taxes.

Proposals were received after specific regulations defining the real intention and purpose of every clause bearing on these concessions were prepared by the minister of agriculture and commerce, and a committee was appointed to pass upon them. It appears from the report that the proposition presented by the Goodyear company was most acceptable.

THE NEW TARIFF BILL.

Rates on Automobiles Unchanged but Parts and Tires Are Considerably Reduced.

Coincident with the opening of the extraordinary session of Congress, April 7, the new Underwood tariff measure was introduced and its provisions made public. The automobile industry is very much interested in the effect this would have if the bill were to be enacted into law as presented. It is expected, of course, that numerous amendments will be made before the measure reaches President Wilson for his signature.

The new tariff bill is a voluminous document, and doubtless there are many articles utilized in the production of motor cars and their accessories which do not appear in the summary which has been prepared for more ready reference by those who may be interested. This summary shows that the rate on automobiles, as such, is unchanged, being the same as under the so-called Payne bill, 45 per cent. Automobile parts, excepting tires, however, are listed at 20 per cent. and chassis without bodies are placed at 30, instead of 45. Motorcycles also receive a cut of 5 per cent., the Underwood rate being 40 instead of 45. Aeroplanes are reduced from 45 per cent. to 25.

Schedule N provides for duties on manufactured articles from india rubber, gutta percha, etc., and shows a reduction on this item from 35 per cent. to 10. The item covering rivets, studs, steel points, brightened, and same for automobiles, in schedule C, bears a reduction from 45 per cent. to 20. Tungsten bearing ores are to be admitted free.

Among the articles entering into the manufacture of automobiles or fittings to be affected are: Mica and manufactures of, 10 cents a pound and 20 per cent., to 30 per cent.; carbon electrodes, brushes and plates, 30 per cent. to 25; lava burner tips, 10 cents a gross and 15 per cent., to 15 per cent.; oils and greases not otherwise provided for, 25 per cent. to 15; aluminum scrap and alloys, seven cents a pound to 25 per cent.; aluminum plates, sheets, bars and rods, 11 cents a pound to 25 per cent.; calcium carbide, 25 per cent to 10.

BRANCH FACTORY IN TOLEDO.

Perfection Spring Company to Erect Plant Near Willys-Overland Property.

It is announced that the Perfection Spring Company of Cleveland, O., is to build an automobile spring plant at Toledo, O., and construction work will begin in a few weeks. The Perfection company recently purchased six acres of land, situated between the Willys-Overland company and the boulevard, with railroad frontage.

According to Christian Girl, president of the company, the capacity of the plant when finished will be 9000 tons a year. A large portion will be run exclusively for the Willys-Overland company, with which the spring concern has long time contracts. About 100 men will be employed at the start, but later it is expected that fully 800 men will be engaged.

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LOZIER INCREASES CAPITAL.

Stockholders Approve Plan to Add $2,000,000 Needed to Meet Increased Demand.

Stockholders of the Lozier Motor Company, Detroit, maker of Lozier cars, at a recent meeting, authorized an increase in the company's capital from $3,000,000 to $5,000,000. This will consist of $1,000,000 in 7 per cent. cumulative preferred and $1,000,000 in new common. The additional stock is necessary, according to President H. M. Jewett, to meet the big demand for the new type of car introduced in December.

The stockholders of the Lozier company have already subscribed for a large proportion of the new preferred which is being offered at par, and the new common will be retained in the treasury for use in conversion of the preferred. With the new issues the company's capital will consist of $3,500,000 of common and $1,500,000 7 per cent. cumulative preferred.

The present year marks the 10th anniversary of the Lozier company, the first Lozier car having been produced at the Plattsburg, N. Y., factory in 1904. March 15, 1911, the new $1,000,000 plant at Detroit began active operations with the shipment on that date of the first car to be completed in the Detroit plant. Between 1200 and 1500 men are employed in the two plants at Detroit and Plattsburg and in order to keep pace with sales this working force may soon be largely increased.

MAXWELL ABSORBS FLANDERS.

Formal Announcement Indicates That Previous Information Was Somewhat Premature.

Announcement is made by the Maxwell Motor Company, Inc., that arrangements have been completed for the acquisition by it of the property and business of the Flanders Motor Company, subject to the necessary corporate action on the part of the two companies, which it is expected will be obtained shortly. Pending the transfer to the Maxwell company of the property of the Flanders company, the latter will be operated as a branch of the Maxwell Motor Company.

Commenting upon the formal announcement, a prominent officer of the Maxwell company stated that while it was generally understood in the trade that the Flanders company was already a part of the Maxwell concern, this was not so, action being delayed until inventories were taken, audits made and other matters straightened out. Simultaneous with the absorption of the Flanders Motor Company, the financial and accounting officers of the Maxwell company were removed to Detroit. That city now becomes the centre of operations for the new concern.

SECURES MANUFACTURING PLANT.

New Detroit Concern to Produce Automobile Fenders and Stamped Steel Goods.

John W. Murray, formerly connected with the Michigan Steel Stamping Company, Detroit, has purchased the buildings and site at Clay and Michigan Central streets, formerly occupied by the Old Crown White Lead Company, and will begin the manufacture there of automobile fenders and other articles in stamped steel.

Machinery has been installed and operations have been begun. There are two brick buildings, each two stories high, and a frame structure, giving a total floor space of 22,000 square feet. The property, which was formerly owned by the Acme White Lead Works, is valued at $50,000.

ANOTHER TIRE CONCERN.

Mohawk Rubber Company Purchases Stein Double Cushion Tire Plant at Akron.

The Mohawk Rubber Company has been organized at Akron, O., and has purchased the Stein Double Cushion Tire Company's plant and machinery. The new company is organized with a capitalization of $350,000, of which $250,000 is common and $100,000 is 7 per cent. cumulative preferred, redeemable at 110, with accrued interest after Jan. 1, 1916. The plant is located at East Akron, near the factory of the Goodyear Tire & Rubber Company, and consists of a three-acre tract of land, a brick factory in good condition, with railroad switching facilities and free water rights. The capacity of the factory is between 75 and 100 tires a day. The Stein company has discontinued and liquidated its business.

The president of the new company is R. M. Pillmore, who for a number of years was general manager of the Akron Grocery Company, and is at present director of public service of Akron. S. S. Miller is superintendent of the plant. It was he who laid out and built the Buckeye plant of the Kelly-Springfield Tire Company at Akron, and up to a few months ago he was in charge of the manufacturing department of that company. C. W. McLaughlin, formerly assistant cashier of the Diamond Rubber Company, is treasurer, and

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M. E. Mason, secretary and sales manager, was formerly connected with the sales department of Morgan & Wright, which he joined in 1897. During the last two years he was with the central district office of the United States Tire Company. The directors are: C. D. Paxton, Cleveland, O.; J. K. Williams, Akron, well known maker of rubber machinery; F. J. Mishler, Akron, vice president of Citizens Savings & Loan Company; S. S. Miller, Francis Seiberling, C. W. McLaughlin and M. E. Mason, all of Akron. The company intends to produce guaranteed automobile casings and tubes of high quality and new equipment for standard clincher and quick detachable casings has been ordered. The new product will be ready for the market in a few weeks.

PURCHASES DETROIT FACTORY.

Peninsular Lead Works Plant Acquired by Syndicate Interested in Automobile Parts.

K. S. Morgan, representing a syndicate which will manufacture automobile parts, has purchased the three-story solid brick factory at Lieb and Guoin streets, Detroit, of Edward J. Schmidt, who made the sale as president of Traugott Schmidt & Sons. The consideration is said to have been $40,000 cash.

The plant, which has a frontage of 250 feet and a depth of 125 feet, was erected by the Peninsular White Lead Works, and has been successively occupied by the Schmidt company and Keen & Co., maker of automobile parts. Improvements to the property are being made with a view to beginning immediate operations.

FISK RUBBER WINS SUIT.

Thropp Tire Patent Held to Be Invalid by Reason of Anticipation.

The United States court of appeals for the first district, New York City, has rendered an important decision affirming the decree of the district court, which held that the claims of United States patent 822,561 to P. D. Thropp were invalid by reason of anticipation. Suit was brought against the Fisk Rubber Company, Chicopee Falls, Mass., maker of Fisk tires, for infringement of this patent, which it was alleged covered the form of mold used in the manufacture of tire casings by the one-cure wrapped tread process.

This case has been before the courts for nearly four years and the two decisions in favor of the defendant company are of great interest to the tire makers of this country by whom the one-cure wrapped tread process and the apparatus involved in this suit have been used very extensively.

NEW INSURANCE COMPANY.

Connecticut Concern Will Undertake to Assume Risks on Automobiles and Aeroplanes.

The Automobile Insurance Company, Hartford, Conn., has been organized under Connecticut laws with a capital of $2,000,000. The company is said to embody a new idea in indemnity and among its unusual powers will be authority to write policies on aeroplanes and automobiles and to cover them against every hazard, including fire.

The company assumes and revivifies the six-year-old charter of the Manufacturers Fire & Marine Company, which never was organized. Former United States Senator Morgan G. Bulkeley, president of the Aetna Life Insurance Company, secured the old charter. Associated with him will be John H. Hale, public utilities commissioner of Connecticut.

SOUTHERN TIRE PLANT.

Seminole Rubber Company Selects Jacksonville, Fla., Because of Shipping Facilities.

According to plans which the incorporators state are practically completed, Jacksonville, Fla., will have a big industrial plant, employing 500 persons and producing 300 automobile tires a day, together with other automobile accessories in which rubber is used, to be known as the Seminole Rubber Company, a concern with $1,000,000 capital. The company is the first rubber manufacturing firm to be located in the South and the plans provide for the construction of a large building and the actual operation of the plant within 90 days.

George F. Hardy, George H. Lutz and J. J. Weyer are named in the application for charter as the incorporators. The principal inducements that attracted the new concern to Jacksonville are stated to be the immense field in the South for its product, the city's unequalled advantage as a port of entry for the crude rubber from South America and the shipping of the manufactured product by water, and proximity to the raw material from the cotton fields, especially the Sea Island product, which is used extensively in the manufacture of automobile tires.

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NEW AND NOVEL ACCESSORIES THAT APPEAL TO MOTORISTS

Bosch Spark Plug.

The Bosch Magneto Company, New York City, is manufacturing the Bosch spark plug, which is constructed both for motor cars and motorcycles. The insulator is steatite placed in the shell under high pressure, insuring a gas tight construction. The electrodes are a nickel alloy and being knife shaped the spark does not jump across at any particular point, but forms a ribbon of flame between the electrodes, which are three in number. Sooting is prevented as the electrodes are maintained at a high temperature, burning away the lubricant that may gather. The plugs are in various sizes, and are adapted to withstand magneto currents.

Buffington Folding Chair.

C. A. Buffington & Co., Berkshire, N. Y., is manufacturing a folding chair especially designed for motor cars. By a single movement, forcing it backward, the chair collapses into a three-inch space. It weighs but nine pounds, is constructed of a high grade metal and comes regularly in japan finish, although copper or nickel plated designs are made. The seat is upholstered and a suitable back is provided. The height varies from 12 to 18 inches.

Austin Motorcycle Pump.

The Austin motorcycle pump is manufactured by H. K. Austin & Co., 27 Lincoln street, Reading, Mass., and is a patented article. The inlet at the base has a double cup washer on the plunger rod with a long wooden guide plug. The feature of the pump is the flexible coupling, which is so designed that it will fit all types of tire valves. It is applied by slipping over the valve stem and it does not leak. It is easily removed and in addition to saving time, can be utilized where the valve stem threads are damaged. The motorcycle pump is very compact and is guaranteed for two years. The Austin patent flexible coupling is adaptable to all types of tire pumps.

Invincible Tire.

The Invincible Puncture Proof Tire Company, 53 Sabin street, Providence, R. I., not only rebuilds old casings by fitting its tire, but guarantees 3000 miles of service without a puncture or blow-out provided no filler is used other than a standard inner tube and that the air pressure is properly maintained. The Invincible is a French chrome leather covering extending entirely around the tire and down under the bead. The tread is composed of three layers of material. Projecting case hardened steel studs are fitted to the tread proper and flat studs on the sides. Between each layer of leather is a special water proof cement and the parts are vulcanized. The studs prevent skidding and the plies of leather prevent puncturing. The leather is held to be water proof through a special treatment and heating is reduced to a minimum by the practically solid construction. It is also stated that less friction is developed. Blow-outs are prevented, especially at the side walls through the reinforcement of leather cemented to the shoe.

A-1 Metal Polish.

The A-1 metal polish is manufactured by the Chas. H. Rath Company, Inc., Philadelphia, and is distributed by the Bi-Motor Equipment Company, 180 Massachusetts avenue, Boston. It not only imparts a brilliant lustre to the metal on which it is used, but corrosion and rust are removed easily and with but little effort. One of the qualities emphasized with the polish is that the shine is enduring. It comes in quarter, half and one-pint cans, also quart, two-quart and gallon sizes.

Rubes Bulb Horn.

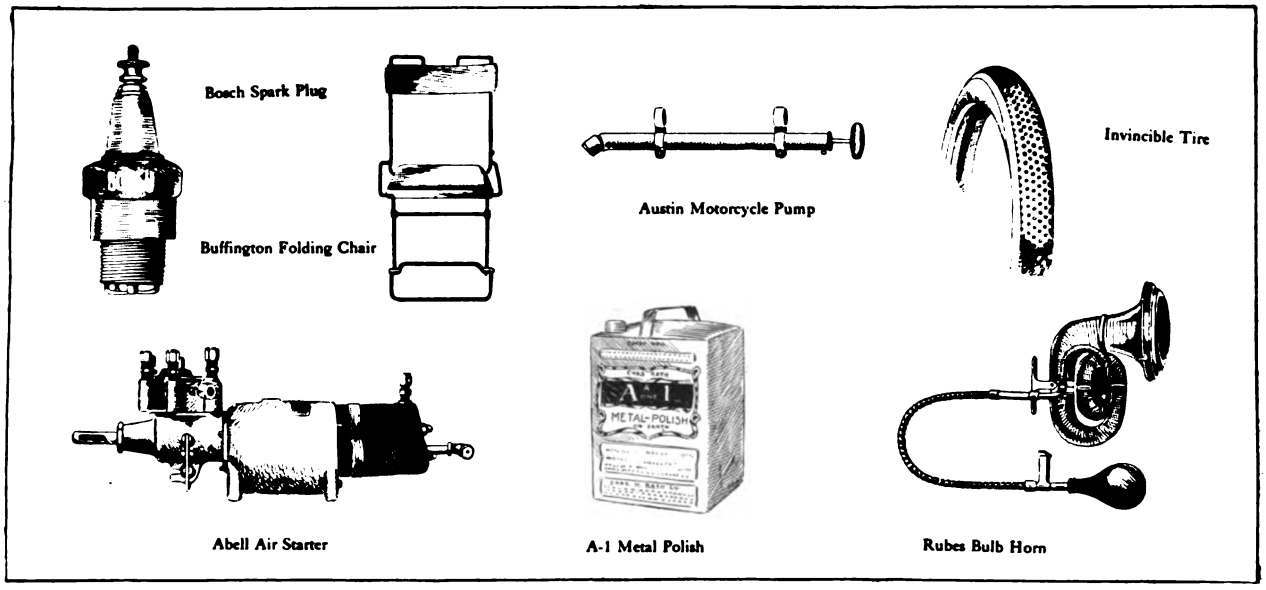
In some cities the laws require the use of a bulb horn as a signal and when touring it is desirable that one of these members be fitted to the car. The Automobile Supply Manufacturing Company, 224 Taaffe Place, Brooklyn, N. Y., is marketing the Rubes bulb horn, which has a clear, penetrating musical sound. The bell is oval, eight inches in height, and option is given on the straight or lyre bracket. The horn comes finished in black enamel or brass with the usual bulb and suitable length of flexible tubing. It is moderately priced.

Lee Zig-Zag Anti-Skid Tires.

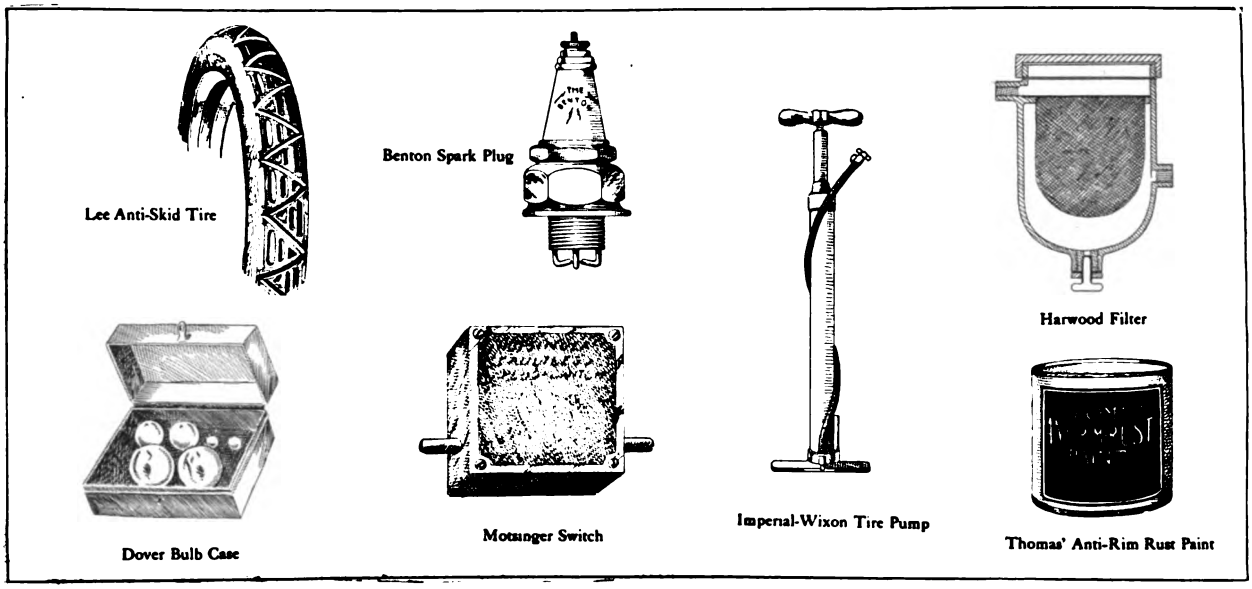
The Lee zig-zag anti-skid tire is the product of the Lee Tire & Rubber Company, Conshohocken, Penn. A series of projections extends across the tread of the shoe and other protuberances are inserted between the zig-zag lines. It is held that the construction prevents skidding and that even after the middle studs are worn down the extreme ends of the zig-zag tread provide efficient traction. The shoe is built with the same high grade material and workmanship as the other products of this company.

Abell Air Starter.

The Abell air motor starter is marketed by the Standard Thermometer Company, 65 Shirley street, Boston. The pump, distributor and automatic clutch are combined and it is stated that it can be fitted to any type of gasoline car or motor. The air is stored in a tank by the pump and when the motor is to be started the fluid is led to a distributor, thence to the proper cylinder, forcing the piston down, much in the same manner as by the explosion of the mixture. A clutch is provided for operating the pump when desired and the equipment includes the necessary valves, connections, pressure gauge, etc.



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Benton Spark Plug.

The Benton spark plug is called the case hardened plug, as the bushing into which the sheet mica insulator is forced is case hardened steel. The mica is spirally wound by a special process and it is stated that it will withstand extreme heats without cracking, etc. The electrodes are a heavy wire, drawn from a special alloy of platinum and nickel, and are held to be non-fusing and non-corroding. The porcelain is imported from Germany. A copper and asbestos gasket is spun on the bushing, making it gas tight when placed in the cylinder. The Benton plug is made in all sizes and types by the L. F. Benton Company, Vergennes, Vt.

Imperial-Wixon Tire Pump.

The Imperial Brass Manufacturing Company, Harrison street and Center avenue, Chicago, is marketing the new Imperial-Wixon triple-compression tire pump. The cylinders are triple, as is the compression, and the pump is of the double-acting type. The air is drawn in and compressed from the large cylinder into the space between the cylinders, and again compressed between other members. The final compression is by means of a check valve, central tube and hose to the tire. The first and third compressions are secured by the down-stroke, while the second is on the up-stroke. The pump is constructed of brass and is held to be very durable and efficient.

Harwood Filter.

C. F. Harwood, 516 Atlantic avenue, Boston, is marketing the Harwood filter, which is incorporated in the fuel line between the tank and the vaporizer. It comprises the conventional chamber in which is placed a removable basket filled with the filtering material. The fluid enters the vessel near the bottom, passes through the filtering element, and out through the top to the carburetor. All dirt, water, etc., falls to the bottom of the filter and may be removed by a petcock. One of the features of the device is that the basket may be removed and cleaned easily by unscrewing the cap. It is moderately priced.

Dover Bulb Case.

Among the new products of the Dover Stamping & Manufacturing Company, Cambridge, Mass., is the Dover bulb case, designed for the carrying of spare electric bulbs. The container is of steel, coated with baked-on enamel, and provision is made for six bulbs—two head, two side and two small lights. The tray is provided with slots into which the sockets set and by turning the lamps they are locked securely. The case is very compact and provision is made for the use of a lock.

Motsinger Switch.

The Motsinger Device Manufacturing Company, Lafayette, Ind., is marketing the Motsinger faultless plug switch, which is a two-way design and very neat and compact. A feature of the switch is that the usual swinging arm is eliminated, the plug being within the switch proper and is moved to right or left positions for contact and centre for neutral. Contact is made between flat phosphor bronze springs and the plug and the latter is so constructed that it cannot slip when in position. The plug is removable and when displaced prevents operation of the switch by cotter pins, wires, etc.

Thomas' Anti-Rim Rust Paint.

Rusty rims not only have a deteriorating effect upon tires, but they make it difficult to remove the shoes, especially if they have not been displaced for some time. The Anti-Rust Paint Company, Akron, O., is marketing a scientifically compounded metallic paint, containing para rubber and graphite, called Thomas' anti-rim rust paint, which prevents the gathering of rust on the rims, etc., and makes the changing of tires an easy task. The preparation is a liquid, easily applied and is very durable. A small sized can contains enough to coat eight rims and the maker states that it is but the work of a few minutes to clean the rims, bolts, etc., and apply the paint.

Planhard Carburetor.

Features of the Planhard carburetor, made by the Planhard Manufacturing Company, 1784 Broadway, New York City, and Kokomo, Ind., are the absence of springs, cams, levers, etc. It is of the concentric type, the float chamber surrounding the mixing chamber, and is designed in such manner that all joints are in a horizontal plane. A quality of the vaporizer is that it may be easily disassembled and replaced. Proper vaporization of the fuel and the operation of mixing it with the air is accomplished by a double concentric air and mixture construction. The fuel nozzle is in the centre and is entirely surrounded by the fixed or constant air tube. The auxiliary air is admitted through a series of ball valves which are seated in holes in an adjustable screw plate at the bottom of the auxiliary air tube. These seats vary in size, but the balls are all of the same size and weight and are lifted from their seats progressively as more air is required, the ball on the largest seat being raised first. This is held to eliminate fluttering and to make for smooth operation of the motor. The spraying nozzle is cup shaped, and when the motor is inoperative this fills automatically with gasoline to within a short distance of the top. This priming device makes for easy starting with the engine cold. The float chamber has a flooding device. Means are provided for adjustment of the air and fuel and these members are easily operated. Greater efficiency from the motor and economy of fuel are among the qualities of the Planhard.

Peck Wheel.

The Peck Wheel Company, 2008 West Jackson boulevard, Chicago, is manufacturing the Peck wheel, which employs an airless tire on a rim designed to yield to the inequalities of the road through a novel utilization of air.

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Each spoke consists of a water and dust proof cylinder, in the centre of which is a piston terminating in a plunger. On each piston is a coil spring, which compresses as the piston plungers move in the cylinder spokes. In this manner the weight of the car and its load is held to be suspended from the upper arch of the wheel in that the operation is such that only the springs in the upper half are compressed. At the same time those in the lower half are relieved of their carrying compression, as the piston plunger passes into the cylinder and is driven against an air chamber at the head of each spoke.

Pyrene Fire Extinguisher.

Many disastrous fires in garages and on the road could have been prevented by extinguishing the blaze in its incipiency. Highly inflammable materials such as gasoline, calcium chloride, etc., when ignited result in a fire that cannot be extinguished with ordinary treatment. Extinguishers for service in the garage or on the machine must be adapted for immediate service and not subject to deterioration through exposure to heat or cold, etc. The Pyrene Manufacturing Company, 1385 Broadway, New York City, is producing the Pyrene fire extinguisher, which is very compact and weighs approximately five pounds. It extinguishes fires by the formation of an elastic non-poisonous blanket which separates the flame from the burning material. It contains neither acid, alkali, salts nor moisture and will not injure any material with which it is brought into contact. The liquid is not maintained under pressure, will not freeze and may be employed on all classes of electrical fires without danger to the user. Pyrene is a double acting hand pump, easily utilized, and the discharge is under the control of the operator at all times. It has been indorsed by insurance companies and a booklet will be mailed free upon request by the Pyrene Company of New England, 176 Federal street, Boston.

J-M Non-Burn Brake Lining.

The J-M non-burn brake lining is marketed by the H. W. Johns-Manville Company, New York City, and among its qualities is that it is impervious to the action of heat generated by friction in service. The lining is composed of asbestos, a very durable mineral, reinforced with brass wires, these being interwoven in each strand. It is held by the maker that water, grease or gasoline has no deteriorating effect upon the material and that it will lock the wheels instantly when the brakes are properly applied. It is made to fit any brake and any friction or transmission clutch. It comes in varying widths and thicknesses to meet individual requirements.

Imperial Tire Carrier and Trunk.

W. W. Winship, 71 Summer street, Boston, is marketing the Imperial tire carrier and trunk, which presents interesting features in that it is not only convenient and neat in appearance, but is water, dust, rattle and theft proof. It comprises a metal frame member which is the trunk proper, and being circular, serves to carry tires of any type or demountable rims. The shoes are slipped over the supporting member and are retained by a specially designed cover which is locked by a small lever. A simple movement of the latter permits of displacing the tires in a very short time. The locking mechanism is concealed from view and the entire construction is simple. The tire covers are noticeable for the ease with which they may be displaced or put on, and no straps, etc., are employed. Two types are produced, one for mounting on the running board, the other at the rear. With the latter provision is made for an electric rear signal in the centre of the cover, which does not interfere with the removal thereof.

Heco Priming Spark Plug.

One of several features of the Heco spark plug, manufactured by the Heinze Electric Company, Lowell, Mass., is that the cylinders may be primed for starting purposes. The priming cup is secured to the top of the main electrode and provision is made for attaching the usual terminal of the secondary cable. The central electrode contains a passage registering with the opening of the priming cup and a quality of the design is that the priming fluid passes directly to the spark gaps, insuring ignition of the charge, even with a weak spark. This makes possible starting under unusual conditions. The plug is not designed for winter service only, as it may be employed for introducing kerosene into the cylinders and for locating missing cylinders. It is constructed with the same care and of the high grade material for which the products of the company are noted.

Monarch Gas Lighter.

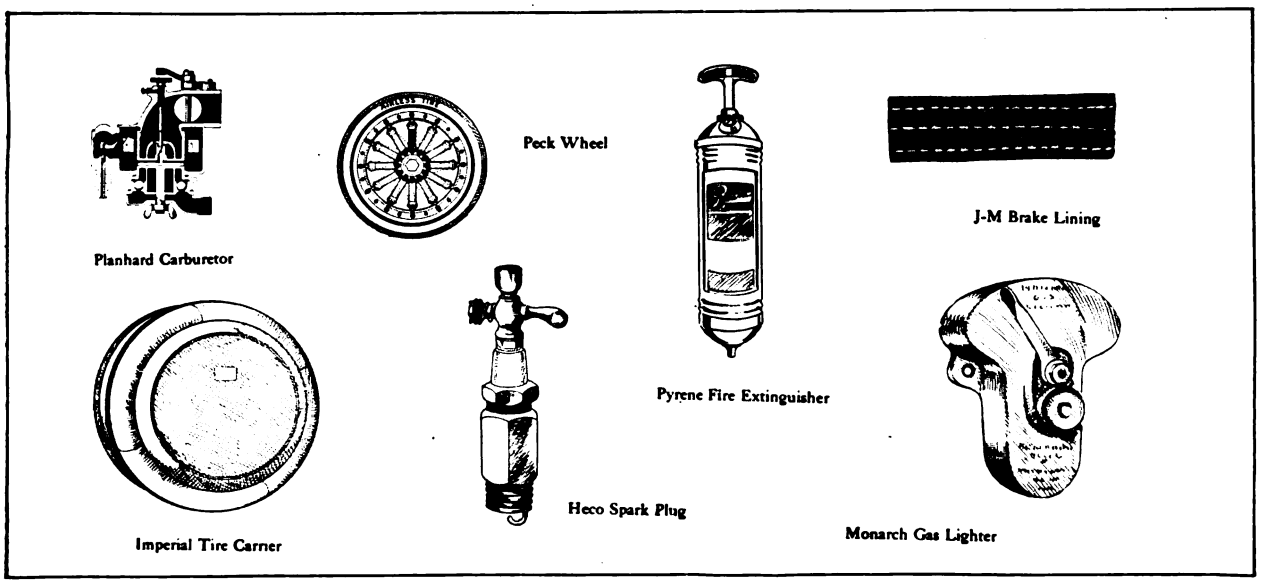
The Monarch gas lighter is designed for motor cars lighted by acetylene and is produced by the Benford Manufacturing Company, Mount Vernon, N. Y. It comprises a compact attachment for the dash, having a lever which is moved to light the lamps. A thumb control valve permits of extinguishing the lights. The pressure is automatically controlled and it is held to make for economy in that gas is not wasted by blowing. The Monarch gas lighter comes complete with Alco burners, wire, brass tubing, instructions, etc.

De Luxe Glass Cleaner.

Joseph J. McGuinness, Waterbury, Conn., is manufacturing the De Luxe glass cleaner and polisher, which is specially adapted for removing deposits from windshields, lenses, mirrors, lamps, etc. The maker states that it will not scratch the surface and does not contain whiting, oils, acids, etc., and that the polish imparted is lasting. The polisher is soaked in water, wrung out and the burlap side applied to the glass.

Korine.

Korine is manufactured by the James-Gray-Kuhn Co., Pittsburg, Penn., and is a carbon remover, which is placed in the cylinders and allowed to remain a few hours. It softens the carbon, which is displaced in the exhaust.



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WITH THE MOTORING INTERESTS ABROAD.

Conditions Governing Proposed International Stock Car Race on Isle of Man—Studying the Fuel Problem in England—Other Foreign News Notes.

LESS than two years ago British motorists were discrediting the "stock car" races held in America. Last year two "standard car" events were held on the Brooklands track. Now comes the announcement of the Royal Automobile Club of an international "stock car" race to be held on the Isle of Man, Thursday, Sept. 25. The chief prize will be a cup to be known as the Tourist trophy.

Entries must be received by the club at the Club House, Pall Mall, London, S. W., before 12 noon, Monday, June 30, and the club reserves the right to refuse any entry without assigning a reason, to limit the number of acceptances as circumstances may require, or to cancel the race if there be less than 20 entries by 12 noon, Saturday, May 31. Entries must be accompanied by the manufacturer's or agent's catalogue, published prior to Feb. 17, 1913, and by an entry fee of £50 ($250) a car prior to May 31 and £75 ($375) after that date. Not more than three cars of similar design may be entered from the same manufacturer. The chief conditions are as follows:

The distance of the race, including controls (if any), shall be eight laps, or about 300 miles. The car completing the course in the shortest time shall be the winner, subject to compliance with the regulations, and the entrant of the car shall, on signing the bond and effecting the insurance required by the club, become holder of the trophy.

The race is for four-cylinder "stock" cars. The bore shall not exceed 90 mm (3.543 inches) nor the stroke 140 mm (5.512 inches).

Subject to these regulations the chassis must be of a standard touring design and construction in every respect, and must be shown in the manufacturer's or agent's catalogue published prior to Feb. 17, 1913. Any car which, in the opinion of the judges, is not a stock car, or which is specially designed for speed (although it may appear in the catalogue as above) will not be permitted to start.

The minimum weight shall be 2000 pounds (17 cwts. 3 qrs. 12 lbs.). This weight is the weight of the vehicle ready for the race; that is to say, as it will compete, including driver and mechanic, fuel, oil, water, tools and other appliances, spare tires or detachable rims or wheels with tires.

The chassis shall conform in all respects to the requirements of the British law. The bonnet and radiator cap must be used. All undershields, valve spring and tappet covers must be used.

The width of the body shall not be less than 40 inches to allow for two seats, measured from the outside. The dashboard shall be rectangular and not less than 40 inches in width, and 20 inches in height, measured from the level of the top of the frame.

All cars must be fitted with standard silencer and exhaust pipe, exactly as usually fitted to the car. An exhaust cut-out, however, may not be fitted, whether it is fitted as standard or not.

A cylindrical tank, with baffle plate or plates, not more than 40 inches in length and of such diameter as may be necessary to carry not less than 30 gallons of fuel, shall be carried. If placed transversely over the rear part of the chassis the whole of the tank shall be above the top of the frame. Either gravity or pressure feed may be used, and entrants may alter their cars in this respect.

The same make and size of carburetor as usually fitted to the car must be used. The adjustment of the carburetor may, however, vary from that usually employed upon the car. The induction pipe must be identical with that usually fitted.

The slope of the steering pillar may be altered to suit the type of body used.

No higher gear ratio may be used than the highest fitted as standard to the type of car entered.

Only wheels of a size specified in the maker's catalogue for the type of car entered may be fitted. Detachable wheels or rims may be used whether usually fitted as a standard or not. Covering discs may not be used. At least two spare tires, or two spare detachable rims or wheels with tires, shall be carried.

Efficient mudguards shall be fitted to front and rear wheels, and shall be flat and set without splay. The steps must be continuous with the mudguards. The width of the front mudguards shall not be less than 10 inches, and of the back mudguards and floorboard not less than eight inches. No part of any mudguard or footboard shall be less than eight inches from the ground when the car is fully loaded, ready for the race. The foremost part of the front mudguards shall not be behind the foremost part of the tires on the front wheels, and the hindmost part of the back mudguards shall not be in front of the hindmost part of the tires on the back wheels.

Shock absorbers may be used.

No means of conveying auxiliary oil to the engine or other parts may be used, such as increasing the size or number of feeds or using a hand pump, unless the latter is a standard fitting. Any oil container must be of the usual size and in the usual position.

The use of auxiliaries to combustion (other than atmospheric air), such as oxygen, acetylene, etc., is prohibited.

There will be one depot under the official supervision of the club, from which competing cars may obtain such spare parts, spare tires, fuel, oil and water, as they require; but such spare parts, spare tires, etc., must be lifted off the counter by the driver and his mechanic without assistance, mechanical or otherwise.

No other replenishment or replacement depots will be allowed, and no spares, fuel, oil or water may be taken up at any part of the course other than at this one depot. Any infringement of this regulation shall render the car liable to disqualification.

Only the driver and his mechanic shall be allowed between the start and finish of the race to effect any repair or replacement, or in any other way assist the car. The driver and his mechanic shall be the only persons on the car during the race.

INTERESTING BODY DESIGN.

One of the Recent British Attempts to Solve Problem of Attractive Lines.

If the British motoring prints reflect the desires of the motorists in Great Britain, there is a very general demand in that country for what is termed a more artistic treatment of the body work on automobiles. Several coach builders have made attempts to solve the problem as presented, but it must be admitted that there is a

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wide diversity of opinion with respect to the designs thus far offered.

An accompanying illustration presents a six-seated sporting body recently produced by Charles Lane & Co., Ltd., 311 Euston road, London, N. W. The chassis is a six-cylinder Mercedes with disc wheels. There appears to have been decided effort to provide everything which might be required on a long trip, but there undoubtedly will be some question as to the means for entrance and egress.

THE FRENCH GRAND PRIX.

Event for Coupe de L'Auto Will Not Be Held Until Later in the Season.

In the revival of the French Grand Prix last year, another event for small cars, termed the race for the Coupe de L'Auto, was held in conjunction therewith. This year it has been decided to hold the latter contest over the Boulogne circuit, Sept. 12. This course will be covered 14 times, making a distance of 452 miles. Already nine entries have been received, these including three Peugeots, to be driven by Boillot, Goux and Zuccarelli; two Delage cars, driven by Balot and Guyot, and four Koechlins.

The Grand Prix will be run over the Picardie circuit, July 12. The cars will start in the following order: Sunbeam, 1, Great Britain; Delage 1, France; Opel, Germany; Mathis, Germany; Excelsior 1, Belgium; Th. Schneider 1, France; Itala 1, Italy; Peugeot 1, France; Sunbeam 2, Great Britain; Delage 2, France; Excelsior 2, Belgium; Th. Schneider 2, France; Itala 2, Italy; Peugeot 2, France; Sunbeam 3, Great Britain; Th. Schneider 3, Germany; Itala 3, Italy; Peugeot 3, France; Sunbeam 4, Great Britain; Th. Schneider 4, Germany.

TESTING MIXED FUELS.

Several Interesting Experiments Have Been Made by Concerns in England.

At least two of the omnibus companies in London are operating cars with mixed fuel. The British Motor Cab Company is using a mixture of 40 per cent. kerosene and 60 per cent. gasoline, while the London General Omnibus Company utilizes a mixture of benzol and kerosene. The former concern says that the only alterations to the carburetor found to be necessary are a slight increase in the size of the jet and an enlargement of the air inlet somewhat. An auxiliary attachment on the dash permits of using gasoline for starting.

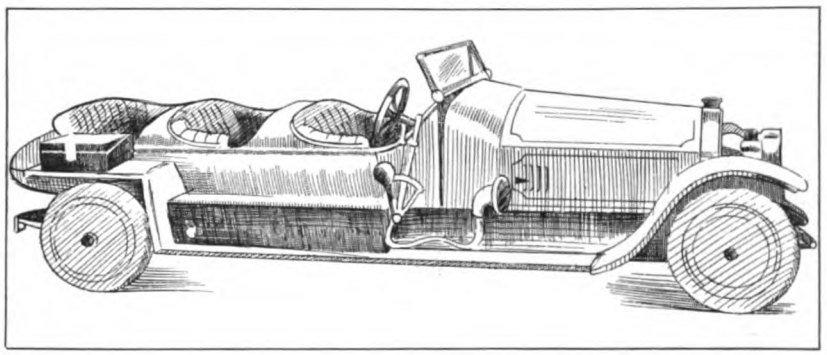
Southern Automobiles, Ltd., Blackheath, London, has been testing a mixture of one-third benzol and two-thirds kerosene with very satisfactory results, as indicated by the following report:

The car on which we conducted this experiment is a 14 horsepower Germain, now seven years old. The engine, although it is in fairly good condition, ought to have new pistons fitted. We have been using the mixture in an ordinary S. U. carburetor without any special vaporizer. We have, however, taken precautions to see that the whole of the jacketing on the carburetor is kept extremely warm, and the long induction pipe which is fitted to this type of car is so arranged as to be well and efficiently warmed.

The only difficulty we have experienced is in starting, and we have found that when the car has been left standing overnight the benzol appeared to separate somewhat from the kerosene. We found we could get over the difficulty by fitting a tap so arranged as to draw a small quantity of benzol from the top of the tank for starting purposes, and after the car has been running, to change the supply over to draw from the lower portion of the tank, as the vibration of running is sufficient to keep the fuel mixed.

With regard to carbon deposit we have never experienced any difficulty in this direction, either with benzol only or the mixture of benzol and kerosene, except in cases where the carburetor was obviously at fault. The normal amount of deposit has proved to be not more than when gasoline has been used.

We have during the last few days been experimenting with a still cruder fuel in the shape of a by-product obtained in the production of naphthaline; this we find mixes with benzol in equal proportions and works quite satisfactorily.



Interesting Body Installation on a Six-Cylinder Mercedes Car, Produced by Charles Lane & Co., of London, England.

In this connection it is interesting to note that a company has been formed in Brussels for the production and introduction of a new motor fuel, known as La Perosine. This is described as consisting of "petroleum free from excess of carbon and constituents detrimental to its combustion." It is held to give off no smoke or deposit, and to require no modification of the carburetor.

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NYBERG IN RUSSIA.

American Car Meets With Decided Success in Military Work in That Country.

Several American machines are being used with decided satisfaction by army officials in Russia. During the official trials of last summer cars made in this country secured awards in competition with the best that are produced on the Continent. Among the successful contestants was the Nyberg Automobile Works, Anderson, Ind., one of its vehicles winning the royal road race.

As a result of this event the machine was purchased by the war department and placed at the disposal of Count Nicholas Kouznetzoff, who is shown at the wheel in an accompanying illustration. The photograph was taken on a military



Count Nicholas Kouznetzoff of the Russian Army at the Wheel on a Nyberg Car Near St. Petersburg.

road, just outside of St. Petersburg, during a recent tour of inspection. Incidentally, it presents a very good idea of the character of the roads in that portion of Russia.

AWARDS IN SWEDISH TRIALS.

Several American Machines Finish Stockholm-Gothenburg Run With Perfect Scores.

Seventeen contestants for the Winter cup and four for the Gothenburg trophy out of a total of 66 in both classes covered the 717 miles of the annual winter trials of the Royal Automobile Club of Sweden, from Stockholm to Gothenburg and return. As a result the work of the committee in arriving at a decision as to the winners of the two chief awards was no easy task, but the following results were announced at the annual dinner of the club last month:

Class 1.

The Winter cup, the Royal Automobile Club gold placque and the Dunlop prize to Hans Ostermann, Minerva. Gold placques to the following perfect score cars: Enderlin, Minerva; Paulmann, Horch; Joerns, Opel; Svensson, Scania-Vabis; Hogman, Hupmobile; Lindstrom, Scania-Vabis; Eck, Pope-Hartford; Huttenberg, F. A. B.; Janek, Fiat; Johnson, Overland; Holmer, Overland; de Mare, Cadillac; Schurmann, Fiat; Johansson, Cadillac; Enander, Mercedes; Thissell, Horch. Special prizes for cars completing without loss of marks, but with variation between schedule and actual running time: Oklund, Opel; Akerman, Hudson; Raaf, Horch.

Class 2.

The Gothenburg cup to G. C. Karlsson, N. A. G. Darling. Gold placques to following perfect score cars: Fogelkvist, Overland; Neilsen, Hupmobile; Westergren, Presto.

NOTES FROM FOREIGN LANDS.

New Zealand claims to have the largest fleet of motor postal vehicles in Australasia. The last horse was sold from the postal department's stable early in December.

During 1912 the Imperial Automobile Club of Germany erected 176 warning signs at dangerous crossings on the roads of that country, 369 signs to indicate level crossings and 672 boards at dangerous turns.

At a meeting of the French Chambre Syndicate de l'Automobile last month it was voted to hold the 1912 Paris Salon in October instead of December, and that its duration be 10 days instead of 16, as formerly.

Part of Lord Kitchener's policy in Egypt is the construction of trunk roads by convict labor. The new Alexandria-Cairo road, 130.5 miles in length, will be opened in the near future with suitable official ceremonies.

Country Life of England has offered a cup valued at $250 for the best electric lighting system to be installed on motor cars. The prize will be awarded by the technical committee of the Royal Automobile Club of Great Britain at a certified trial in the near future.

John Burns, president of the local government board in London, England, has arranged for a series of experiments at the National Physical Laboratory to ascertain how far it may be practicable to frame regulations prohibiting the use of dazzling headlights on automobiles.

A customs circular issued by the Russian ministry of finance provides that automobiles which have been in use and are the property of foreigners entering Russia to reside, or of Russian subjects returning home after a prolonged residence abroad, may be regarded as household effects and admitted free of duty.

A British concern is marketing a reflex mirror for use on horse drawn vehicles. The action was taken because it was suggested that owners of horse wagons often refrained from fitting red lights on account of the expense involved. The mirror is expected to reflect the rays of a motor car headlight and obviate the necessity for the red light.

A wire stretched across the roadway level with the heads of motorists caused the death of Rudolf Plunz and wife while enjoying an evening ride near Berlin recently. Another car following was stopped just in time to avoid a similar fate. Since this accident an attempt at a like outrage was reported from another section of Germany. The authorities have offered a reward of $1125 for the apprehension of those who were responsible.

The department in charge of taxing motoring cars in France has adopted a new formula for this purpose, as follows:

$$P = KnD^2LV$$

in which P represents horsepower, n the number of cylinders, D the bore in centimeters, L the stroke in centimeters, V the revolutions a second, and K one of the following coefficients: Single-cylinder engine, .0002; two-cylinder, .00017; four-cylinder, .00015, and six-cylinder, .00013.

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THE NEW TRIBUNE TOURING MODEL.

ANNOUNCEMENT is made of a new concern of Detroit business men, headed by Louis G. Hupp, which will build a new car to be known as the Tribune. The Tribune Motor Company is located at 807-815 Scotten avenue, Detroit, but it is planned to erect a large factory in the neighborhood of the Ford plant. For the present the company will produce a five-passenger touring car, fully equipped, including electric lighting, but later the line will be augmented by a roadster, limousine and other types. Louis G. Hupp is well known to the industry and associated with him are men of means.

The motor is a Buda of the L head type and the four cylinders have 3.75-inch bore and 5.5-inch stroke, which places it in the long-stroke class. It has a piston displacement of 234 cubic inches and is rated at 35 horsepower at 1500 revolutions a minute. All bearings are ample in size and are easily accessible without dismounting the crankcase. The valves are large and enclosed by removable plates.

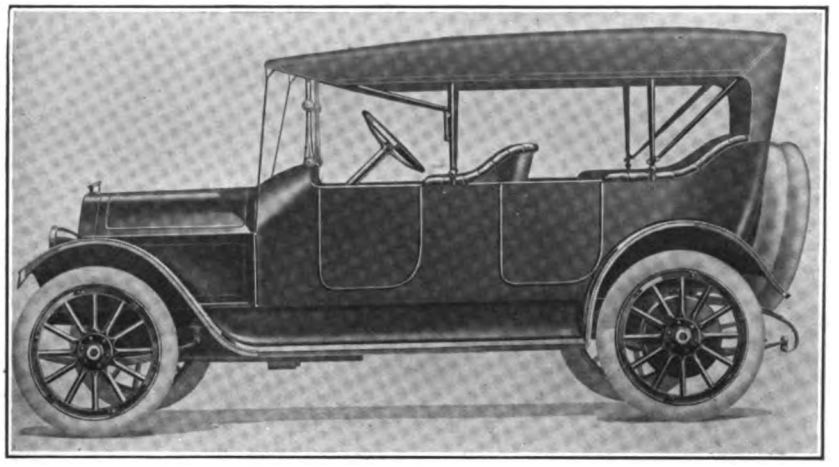
The magneto and water pump are located at the left on brackets cast integral with the upper half of the crankcase, and a Bosch dual type of magneto is fitted. Lubrication is by force feed, the constant splash level system being employed, and the oil reservoir is located in the lower crankcase, which is aluminum. All spring, radius rod and torque arm bolts have grease cups which force the lubricant through a hollow core in the bolt to the wearing surface.

The clutch is a multiple disc, lined with Raybestos, which may be operated in oil or run dry. A Brown-Lipe transmission, providing three speeds forward and reverse, is bolted to the rear of the crankcase through a flange. The gears are of chrome nickel steel, mounted on Timken roller bearings and the ratios provided are: High, 1:1; medium, 1.76:1; low, 3.35:1; reverse, 4.32:1.

Standard Timken front and rear axles are employed, the latter being of the floating type with five-pitch bevel gear and pinion. The driving gear is riveted on the differential, following the usual Timken practise. A grease retainer is provided in the shape of a tube extending from the brakes to a point close to the differential. The bevel gear, pinion and differential are accessible through a removable cap on the housing and the axle shafts are splined.

The steering gear is a Gemmer, located at the left—a worm and gear with ball bearings. The spark and throttle controls are mounted on a 17-inch wheel. The gearshift and emergency brake levers are in the centre. Two sets of brakes are fitted, the service being of the external contracting type actuated by pedal, while the emergency are internal expanding, operated by the conventional lever. Raybestos is employed as a lining.

The front springs are semi-elliptic and rear full elliptic. Both are liberal in size and well supported. The frame is of the usual channel section with single drop and is braced by three cross members. The wheels are second growth hickory fitted with 32 by 3.5-inch non-skid tires.



The New Tribune Five-Passenger Touring Car, to Be Built by a Company Headed by Louis G. Hupp.

The body is well designed and very roomy, the front seat being 41 inches wide, while the space between the dash and cushion is 30 inches. The rear seat is 47 inches wide and ample leg room is provided by a space of 28 inches. The fuel tank has a capacity of 10 gallons, with an eight-gallon emergency tank under the cowl.

The upholstery is deep and comfortable and all trimmings are nickel plated. The top is a four-bow Pantasote with curtains, etc. The equipment is very complete, including windshield, speedometer, robe and foot rail, electric horn, tools, jack, pump, etc. A feature of the lighting system is the absence of the usual side lamps. The headlights are fitted with two sets of bulbs, one being utilized for city driving and the other and larger for country work.

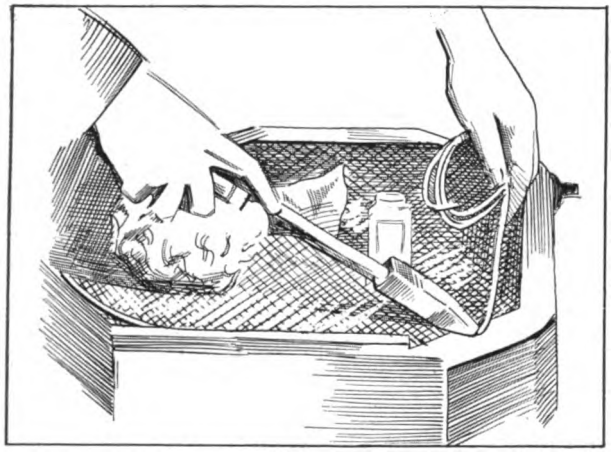
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MECHANICAL NOTES FOR OWNERS.

Proper Treatment of the Circulation System After Removing Anti-Freezing Solution---Care and Adjustment of Magnetos---Valve Repairing Tool.

IT IS now safe to remove the anti-freezing solution from the radiator, but the operation imposes duties upon the motorist other than merely opening the drain cocks, removing the fluid and refilling the cooler with clean water. Few give that attention to the circulation system that it deserves. As much of the efficiency of the motor depends upon the proper radiation of the heat developed by the explosions, care should be taken to maintain the radiator at its maximum efficiency.

It will be surprising to note the color of the anti-freezing solution, especially if it has been in the radiator for any great length of time. It will be seen that the fluid is a brick red in color, which some think is due to rust. It is caused by



When Soldering the Radiator It Should Be Laid Flat on a Smooth Surface to Prevent Injury to Fins.

the use of hard water, which forms a boiler scale and which is deposited in the cooler in the form of a fine, brick colored powder. While radiator makers advise the use of distilled water, the expense and trouble involved are such as to cause the owner not to heed the recommendation.

The circulation system must be cleaned before refilling with fresh water. Before draining off the anti-freezing solution, dissolve as much common washing soda crystals in water as the latter will absorb. Next open the petcocks or drain plugs under the radiator, pump, etc., and after the old fluid has run out close the petcocks. The system is now ready for the soda solution, enough of which should be prepared—five gallons for example, if that is the amount of water employed. Pour the mixture into the radiator and start up the engine, allowing it to operate at a slow speed for a considerable period. If the old solution shows much discoloration it is best to take the car out on the road and run it for a couple of hours to make sure that all the encrustations are loosened.

Next remove the soda solution by opening the petcocks, after which refill with clean water and again run the engine for a few minutes. Remove the water and note its color. If dirty, refill and repeat the operation until the fluid is clear. Another method is to open the petcocks and with the motor running feed fresh water into the radiator, just enough to replace that which is running out at the petcocks.

Before putting away the hose clean the exterior of the cooler. It is just as important that the fins or tubes be kept clean as to remove deposits from the interior. This may be accomplished by using the hose and directing the stream of water from the back of the radiator, not the front. Allow the water to flow slowly at first to loosen all dirt, etc., and it is a good idea to cover up the magneto during the operation. Playing the hose on the front of the cooler is likely to flood the magneto and create trouble.

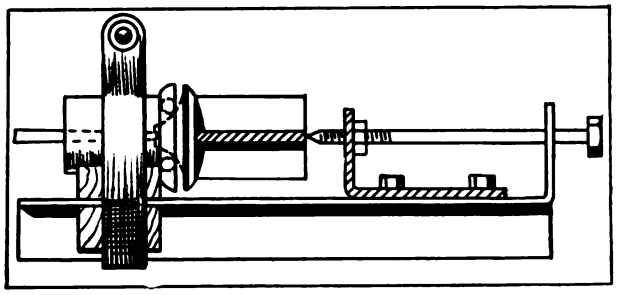
Small leaks may develop that did not show during the winter. If so they should be repaired and unless one is familiar with the work of soldering a cooler it is best to have it done by an expert. However, if the leak is a tiny one, the owner may attempt the repair. The cooler should be laid flat, as shown in an accompanying illustration, and must be handled carefully at all times. In replacing the retaining nuts should not be set up so snugly as to strain the studs.

If the cooler is painted black and the fins are exposed, it will improve its radiating qualities by coating with a black paint, one especially prepared for the work. Do not use other paints as black has greater radiating virtues. The paint employed should be very thin.

If glycerine has been employed in part as an anti-freezing solution, it is an excellent idea to examine the rubber connections to note if the material is in good condition. Sometimes the fabric separates and impedes the flow of the water, creating heating troubles, which are attributed to other sources. If the tubing appears to be de-

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teriorated in any way, throw it away and fit new. If the fan has been removed it should be replaced and the tension of the belt adjusted. Clean and



A Valve Trueing Tool That May Be Constructed Easily and at Slight Expense.

refill the grease cups on the bearings and set up all nuts and bolts.

VALVE REPAIRING TOOL.

After considerable wear valves will require trueing. Usually this work is taken to the expert, although it may be performed successfully by the owner provided he has the proper equipment. As many motorists care for their cars and are handy in constructing devices aiding in the work, the following suggestion for making a valve trueing machine will prove of value.

The device is shown in an accompanying illustration and its bed consists of a piece of three by three-inch angle iron about 20 inches long and .375 inch thick. At one end the webs are cut off, and the end bent up at right angles for about three inches. The fast headstock is made from an old steering pillar ball race taken from a scrapped bicycle or purchased at some bicycle repair shop.

The headstock rests on a wooden block hollowed out to suit the height and diameter of the ball race. The entire headstock is clamped together by a piece of one-inch by .25-inch iron, bent and drilled to take a .375-inch bolt, as shown in the drawing. The tailstock is made up of a piece of .375 by nine-inch flat iron. This is drilled to suit the height of the headstock and is also bent over and tapped to take a .625-inch centre screw, which is fastened down by two three-inch screws.

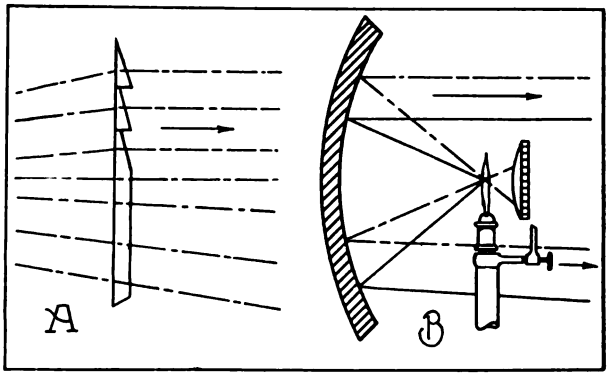
The valve to be trued must have a slot cut in the stem, similar to that used for holding the screw driver when grinding, and should be placed up against the race as shown in the sketch and the back centre screwed up. The balls in the race are retained in position by the use of tallow or hard grease. A bitstock with a screw driver may be employed for rotating the valve, one person doing this work while another trues up the valve with a hand tool which may be made from an old file. A true surface can be cut by this method and the device will accommodate a number of differently sized valves.

ANTI-DAZZLING LENS.

Anti-dazzling devices to remove the dangerous glare of the headlights are beginning to receive attention in this country and at the recent shows two designs for this purpose were exhibited. One is attached to the windshield, while the other comprises a curtain which is utlized when desired for dimming the lights. A well known English lamp maker has produced two improvements for headlights, one of which is said entirely to eliminate the dazzling without decreasing the efficiency of the light. Both are utilized, however, and in an accompanying illustration are shown the devices.

The Anti-Dazlo consists of a built-up lens, by which the upward projection of the rays is substantially prevented within the limit in which the intensity of the light would be such as to produce a glaring effect on the observer. The lens is formed of a number of strips or prisms of glass of properly determined dimensions, disposed horizontally, polished on their upper surfaces and finely ground on the lower. These are cemented together, and the lens is optically ground and polished as required.

The effect of this construction is such that the rays of light which strike obliquely against the internal upper surfaces of the strips or prisms are deflected downward, while those that strike against the lower internal surfaces of the prisms



Eliminating Dazzling Rays of Headlights: A, The Anti-Dazlo Construction, Showing How Upward Rays Are Diverted to Horizontal; B, Dublito Intensifier Which Increases Efficiency of the Flame.

are absorbed. The rays are shown at A. Tests made in a fog demonstrated that the driver of the car could see for a considerable distance by

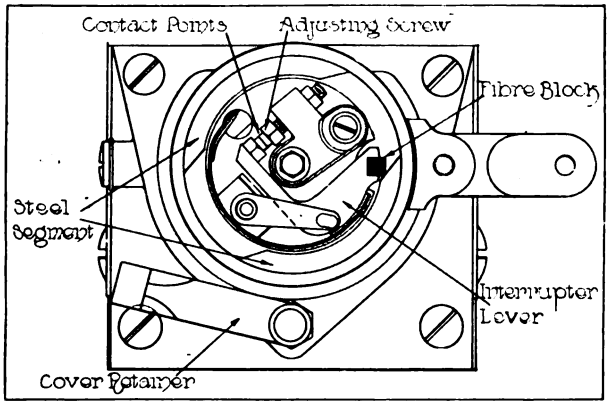
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reason of the fact that he looked over the beam and not through it as with the conventional types of headlights.

Incorporated with the lamp is the Dublito intensifier shown at B, and which is claimed to increase the efficiency of the light by over 50 per cent. It is a small lens mirror or refractor placed in front of the flame so that when looking straight into the lamp the blaze is obscured. The mirror is mounted on a support attached to the bracket retaining the burner, as shown in the sketch, and the rays from the front of the flame fall on the main reflector, thus intensifying the beam thrown therefrom. The result is similar to that obtained when standing between two mirrors, the object being reproduced.

CARE OF THE MAGNETO.

It may be truly said that the magneto is a perfected instrument and this contention is borne



Illustrating Components of Breaker Box of Bosch Magneto.

out when it is considered that thousands are used and give perfect satisfaction. It is rarely a magneto gives trouble and when it does invariably it is because the instructions of the maker are not complied with. Grit and dirt are the greatest enemy of the instrument and when it is so mounted on the power plant that road dust, etc., can find their way to the magneto, it should be protected by a leather or suitable cover. The latter are not expensive and may be purchased at any supply house.

The attention of the writer was called to a magneto by a repairman to whom the car had been brought and the magneto condemned as faulty. The instrument was covered with mud and grease, and the breaker box was fairly plastered with the mixture. Upon removing the cover the trouble was quickly located. The little fibre block set in the interrupter lever was so badly worn that its contact with the segments was not sufficient to cause the platinum points to separate. Consequently the primary current could not be broken, either from the magneto or from the batteries. The cause was manifest. The dirt had worked into the breaker box, depositing an abrasive which gradually cut the fibre, as was indicated by the fibre dust in the box. Upon cleaning the magneto and replacing a new fibre, the instrument was as good as ever.

The components of a Bosch breaker box are shown in an accompanying illustration with the parts marked. By studying their operation one should be able to detect trouble and the information will be of value when on the road. It will be seen that the fibre block is mounted on what is termed the interrupter lever, which also carries a spring for the purpose of keeping the platinum points in contact. The lever being pivotally mounted the points are separable when pressure is applied to the fibre block. The entire construction is attached to the armature shaft and revolves with it. The breaker box housing has two steel segments which may be described as a ring with two pieces cut out. When the lever is in such position that the fibre block is in the cut-out section, the points are together, but when the shaft rotates further, the fibre meets an obstruction and the natural sequence is that it is moved inward. This breaks the contact between the platinum points and a contact is remade when the fibre reaches the second cut-out section between the segments.

One platinum point is fixed, the other is adjustable, and by loosening a lock nut the screw may be moved in or out as required. The proper distance should be about .5 mm and the points should be set with a Bosch wrench, which should accompany each instrument.

It will be seen that it is a simple matter to remove the breaker box cover and by having someone crank the motor slowly it can be determined if the points are separating. If not they should be adjusted. The interior of the breaker box should be kept clean, but not oiled, as any lubricant will swell the fibre and create trouble. Clean out the box with a soft brush, taking care to remove any dust or grit. The same treatment will apply to the distributor. Outside of this work and oiling the bearings according to instructions, there is nothing the novice should do, although if the brush springs have lost their tension they may be stretched.

There is nothing mystifying about a magneto and a little study of its operation will enable the motorist to overcome simple troubles. The latter are generally caused by lack of attention.

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EQUIPPING THE PRIVATE GARAGE.

Part VI.

WITH the tool equipment specified in the previous installments and supplemented by such special members as may be necessary for the car, there is no reason why the overhaul of the machine cannot be successfully completed. There are many owners who install a small lathe operated by electricity or a small gas engine, but these understand the operation of machinery and are as capable of making repairs as the expert. Unless there is considerable metal drilling to be done it would hardly pay to invest in an electric drill, although it could be employed for polishing by fitting a buffing wheel. There are numerous labor saving devices operated by electricity such as tire pumps, etc., but the average owner is satisfied with an ordinary equipment, relying upon the machine shop for difficult work.

Preparing for the Overhaul.

It is customary to partially or completely overhaul the car in the early spring, the amount of work to be done depending upon the age of the machine and the amount of service it has seen since the previous renovation. While a number of owners complete the work during the winter months, there are many whose garages are not heated and who are obliged to wait until warmer weather.

When working about the machine good clothes should not be worn and the best plan is to wear an old suit, over which should be fitted overalls and a jumper. There is a one-piece suit made by the Detroit Overall Company, Detroit, which is constructed of heavy pin denim that may be slipped over the clothing and buttoned snugly, so that the motorist is protected fully, no matter what may be the work. It is closed tightly at the collar and wrists and has four pockets which make for convenience. It has an advantage over overalls and jumpers in that when crawling under a car the one-piece construction does not separate as does the other form. An old suit may be worn, however.

A pair of old leather gloves with the finger tips cut off will protect the hands, especially if the skin is soft, and if a wrench slips one is not so apt to receive a cut or a bruised knuckle. Cotton gloves may be employed, but the leather members are superior.

Value of Boxes.

A number of boxes for nuts, bolts, etc., are necessary and one or more of these members should be large enough to contain parts. By being systematic in the arrangement of the parts the work of reassembly will be greatly facilitated. It is poor practise to dump all the material in one or two large boxes, as considerable time is lost in searching for the desired nut or bolt.

There should be plenty of waste. Old cloths will do, but a can should be located outside of the garage in which the greasy rags should be placed because of the danger from spontaneous combustion. If the equipment does not include a motor washer, a couple of cans with stiff brushes will serve and there should be a supply of gasoline and kerosene for this work. As the fuel tank should be emptied and cleaned in the overhaul of the car, its contents can be utilized.

If the tools have been in service for some time they should be gone over and examined and any damaged members replaced with new or repaired. Cold chisels, drills, etc., may require resharpening and it is possible that some of the files will be badly worn. The list of supplies should be checked up to make sure that needed material is on hand as considerable time will be lost otherwise.

A useful tool for cleaning the chassis is a painter's putty knife, as with it much of the superfluous grease may be displaced from the chassis. It is a good plan to have an old can handy in which the scrapings may be deposited.

A creeper can be made or purchased.

If the equipment does not include a falls and tackle it will be an excellent plan to secure two light pieces of joist about five feet long and by covering each end with cloth they will prevent injuring the body when it is removed on these members. A number of blocks will be decidedly useful in connection with the pieces of joist, especially if the rear system is to be removed for an overhaul.

The method of constructing motor and rear axle stands has been outlined and if these have not been prepared they should be if the overhaul is to include the motor, etc. As previously mentioned, a pair of horses can be utilized, but a motor stand is more convenient.

(To Be Continued.)

Ed. Note—The next installment will deal with the disassembling of the motor car and the various steps will be illustrated by photographs. It is suggested that the owner study thoroughly the instruction book and familiarize himself with the components of the machine. This will be of decided value in the overhaul.

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THE PROBLEM OF GOOD ROADS.

Seventy-five per cent. of the products of this country must pass over the public highways before they can be transported over the railway and water systems. In the face of this assertion, which is based upon the investigations of those best qualified to make deduction, it hardly can be contended that the problem of good roads is one which affects the motorist alone. Yet whenever the subject is broached in legislative circles it is followed by some scheme for securing additional money from automobile owners for highway betterment.

It is contended, whether rightly or wrongly, that the more swiftly moving motor vehicles cause a large share of the damage to existing roads and occasion the necessity for the expenditure of larger and larger sums each year. Leaving aside the merits of this controversy, it must be conceded that the transportation of the future, insofar as the public highways are concerned, will be done by automobile. And since this becomes an economic proposition, in which the entire public is directly or indirectly concerned, it follows that the time must come, sooner or later, when the subject of good roads must receive scientific attention.

Millions have been expended and millions more have been appropriated for the construction and maintenance of permanent ways. Engineers have given the problem serious study and are in a position to make valuable suggestions. But still the results do not appear to be such as might be expected.

It is true that there is much that ought to be done, and perhaps a mistake has been made in trying to do too much. By this is meant that there may have been an attempt to cover too much ground with the funds available, with the result that it has been impossible to build sufficiently well in the first place, and that the demand for additional improvements in other localities has been so insistent that it has been found somewhat difficult to give the new road the attention it deserved following its completion. The present need seems to be for a wiser application of the funds available. The motorist is interested, if only to the extent of being assured that the money he contributes in registration and license fees is utilized to the best advantage.

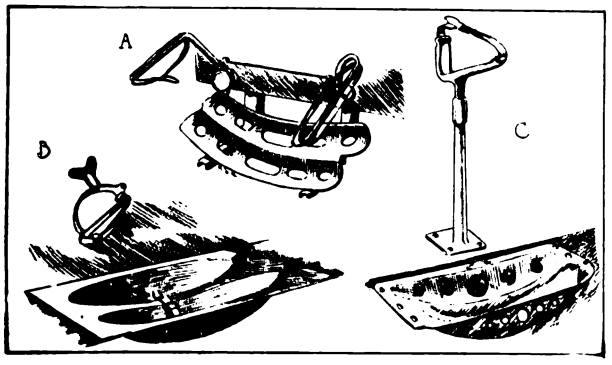
The French manufacturers have decided to hold the Paris Salon in October instead of December, but conditions with respect to the sale and use of motor cars in France are not exactly parallel with those in America. Boston dealers maintain that the time to sell machines is when the people are ready to buy, and insofar as shows in America are concerned Boston still appears to have the best of the argument.

It is understood that the proposed international stock car race on the Isle of Man was organized by the Royal Automobile Club of Great Britain as the result of a suggestion made last November by Hon. Arthur Stanley that a joint race meeting between American and British machines would prove a valuable test of the relative merits of the cars produced in the two countries. The club has issued the challenge in another form than was originally intended, but it will prove of interest to note how it is met by American manufacturers.

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RECENT DEVELOPMENTS IN TIRE HOLDERS.

THOSE who have given the subject of body design more than passing thought cannot help but realize that the changes of the past few



Three Basket Design Tire Carriers: A, at Rear of Chassis on Marion; B, on Right Running Board with Pierce-Arrow; C, in Combination with Upright on National Roadster.

years have resulted in innovations that may be regarded as making for comfort and convenience. Departures from accepted practise have been less pronounced in this country than is true of some of the latest creations abroad, yet there has been a well defined tendency toward a simplification of the care of the machine and a more thorough enjoyment of its possibilities.

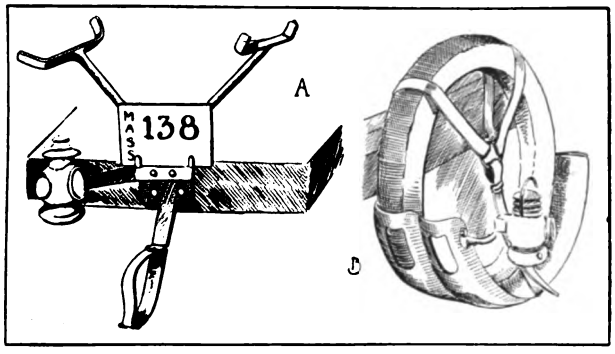
Particular attention is drawn in this instance to the matter of carrying the extra tires. Perhaps the spare wheel might be included, as well, although the use of the demountable wheel, whether of the wood or wire type, hardly has reached that point where it may be regarded as general. Undoubtedly this will afford a further opportunity for the designer within a comparatively short time, especially if wire wheels are to enjoy the wide popularity expected of them by their most ardent advocates. Already there are a few American car builders who are utilizing demountable wood wheels, and one of these has been offering this as standard equipment for at least two seasons.

The tendency toward a clean running board, the fitting of fore doors and the change of the driver's location from the right to the left side of the car have all played their part in bringing about the present arrangement of tire carrying devices. Formerly the tire holders were considered as an accessory, and when they were at first supplied by the car manufacturer it was solely with a view to furnishing an equipment which would meet with the approval of the owner.

The place of attachment was generally at the right side, one of the holders being extended from the dash at the end of a stout rod, another from the side of the front seat at the end of another rod, and the third including a strap on the running board. Inasmuch as the position of the gear shift levers, with the driver at the right, precluded the possibility of utilizing this side of the machine for entrance and egress, apparently it was conceded that the tires might as well be located at this point as anywhere else. But the combination of tires and levers could hardly have been regarded as ideal from an artistic viewpoint, and it had its disadvantages in a practical way in that under some installations at least the top was insufficiently supported.

The fitting of fore doors and the placing of the levers inside the car served to relieve the appearance, and presented the additional advantage of affording opportunity for so locating the supporting fixtures that the tires were maintained somewhat more rigidly. This has been carried a step further by the insertion of a plate carrying suitable indentations in the running board, the design employed on the Pierce-Arrow being an example. This construction has been utilized very liberally abroad, and several concerns in this country have adopted it this year.

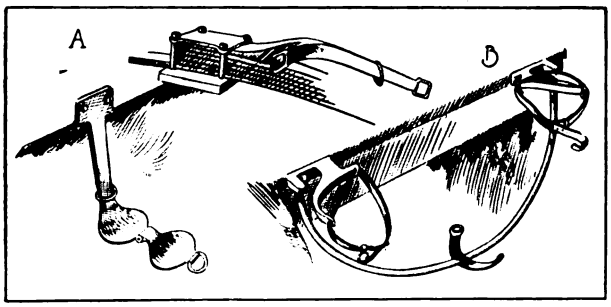
While it would appear that many makers were placing the tire carriers at the rear, a careful analysis of the situation will reveal the fact that by no means all have decided in favor of this proposition. It has been maintained that the rear location was more general with roadsters than touring cars for instance, but this statement is not altogether true either. There still remains a



A, Spider Arrangement Caring for Rear Light at Number Plate on Mercer Roadster; B, Chalmers Basket and Rear Light Attachment.

wide diversity of opinion among designers, and the rear location has not entirely passed the innovation stage.

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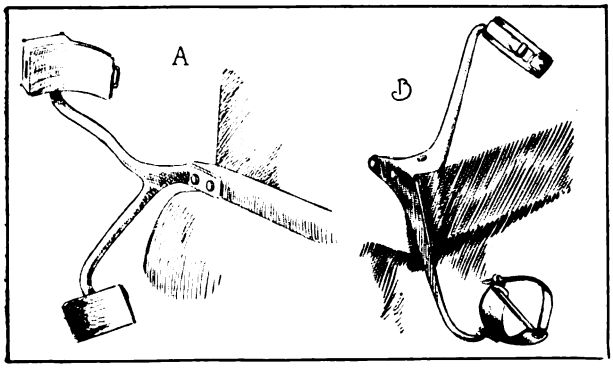


Strap at Spring on Haynes at A; Curved Rod Design on Fiat at B.

One of the arguments in favor of placing the driver at the left is that of affording opportunity for entrance and egress for the passenger directly at the curb. Some car manufacturers who have not cared to adopt the left hand drive have located the levers in the centre, thereby recognizing the desirability of having the side of the machine nearest the curb entirely free of obstructions. Obviously this has made it necessary for the designer to select some other location than the running board for the extra tires.

The object of this discussion is to point out some of the innovations, rather than to make suggestion as to the desirability of adopting either location. It will be noted, however, in the examples selected, that advantage has been taken of the opportunity to place the tire holders upon the chassis components rather than the body, in many instances.

The designer of the National appears to be undecided in the matter. The National is now driven from the left side, and it follows that the tires are carried at the rear, but three separate constructions are offered. That selected for presentation herein utilizes the same basket effect as seen on the Pierce-Arrow, but instead of being located in the running board, the basket is attached to the rear of the chassis frame member, from the top of which extends an upright, bolted



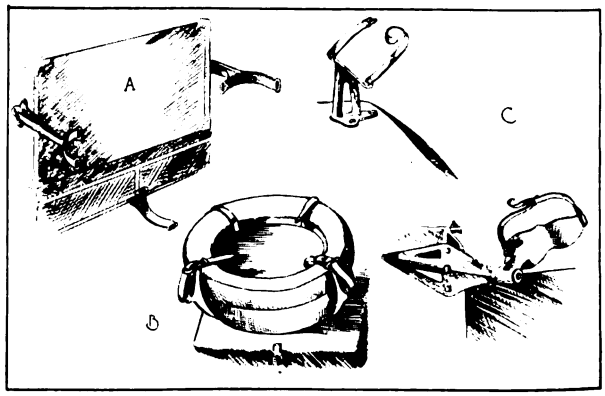
Two-Pronged Carriers at Rear: A, Marmon; B, Columbia-Knight.

at its base, and with a holder and strap at its upper extremity.

The basket idea also is to be found on the Marion, but in this instance the basket portion is carried on a pair of rods which extend below and toward the rear from the chassis frame member, while the upper supporting straps are attached to another set of rods extending upward from the same frame section. In addition, the rear light is so placed that the spare tires completely protect it from damage.

On the Mercer roadster, provision is made for carrying the rear light, license plate and tire holders at the same point at the rear, the tire carrier proper being in the form of a spider rigidly bolted to the chassis frame. Still another application of the basket is found on the Chalmers, also at the rear, and with this the rear light is attached to the outward portion of the basket by a suitable bracket.

The Fiat carrier is of one-piece construction,



Three Neat Attachments on the Roadster Body: A, in Combination with Trunk on Stuts; B, on Rear Deck of Pope-Hartford; C, Rear Deck Arrangement on Cole.

the two side holders being securely bolted to the chassis frame. From these a long curved rod extends below the frame, carrying at its centre a suitable support for the base of the tire. The Haynes offers another decided contrast, in that two brackets extend below the chassis frame, one on either side of the car, while the sides of the tires are held in place by straps attached to a metal bar, virtually forming a portion of the spring pad and bolted with the spring itself.

The Inter-State and the Pullman each make use of three separate brackets bolted to the chassis frame, the centre bracket in each instance extending downward, while the others take a more upright position. While the principle involved is similar, its method of working out is individual with each designer. The Marmon and the Columbia-Knight each have a two-pronged carrier at either side at the rear. In the

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former instance the carrier is bolted on the rear portion of chassis frame member, while in the latter it is bolted at the top and side. The Winton uses two separate brackets at either side at the rear, one of these, the upper, being attached to a chassis side frame member and the other depending from the rear frame member.

But not all of those who favor the rear location make use of the chassis as a means of attachment. It is contended that this arrangement possesses certain advantages, particularly where it is desired that the body work shall be as free as possible from encumbrances. However, the main object of the designer is to consider the comfort and convenience of the occupants of the machine. And it cannot be said that artistic attachments detract in the least from the beauty of the car.

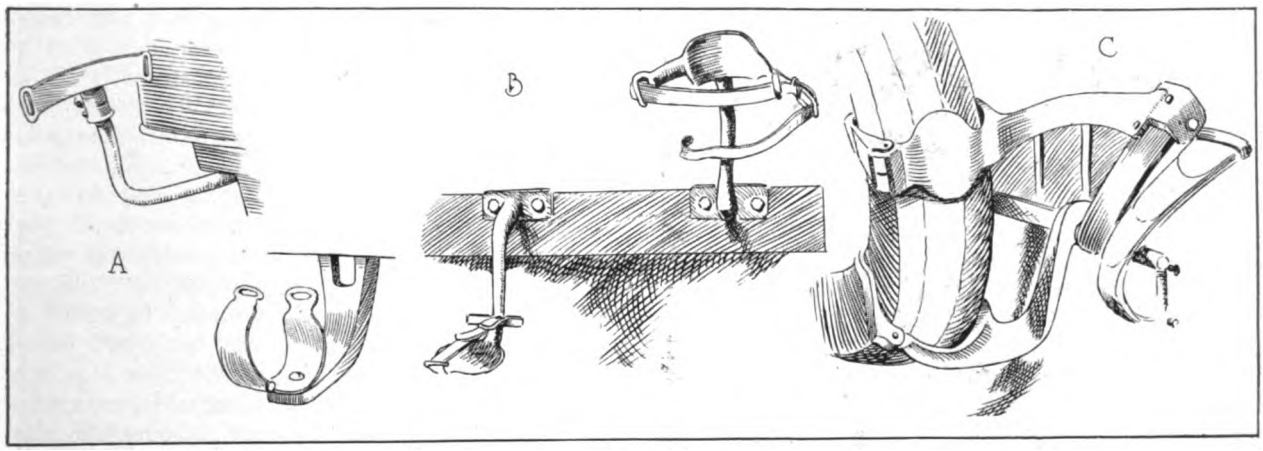
The use of the rear deck on roadsters is now regarded as accepted practise. The example of the Pope-Hartford, cited herein, will indicate one of the many attractive arrangements of this character. The top of the deck serves as well as the cover for a substantial luggage compartment.

The Stutz roadster offers a variation, in that the side holders are securely bolted to the trunk at the rear, while the third holder extends to the rear from a point where the body and chassis meet. The Cole inverts the position of the three holders, the centre member being at the top, in the middle of the rear deck, while the others are bolted to the sides of the body.

Little attempt has been made herein to do more than call attention to some of the most interesting innovations along this line. The list might be extended to include dozens of others. The situation may be regarded as one in which the American designer has sought to present an attractive solution of an interesting problem.

There is little doubt that the matter of body design is to play an even more important part in the history of the industry in the near future. In England there has been an increasing demand for greater attention to the presentation of attractive lines in body work. The recent productions in France and elsewhere on the Continent would seem to indicate that there is a wide diversity of opinion in this regard. It is worthy of note in this connection, however, that there has been a decided attempt to solve the extra tire or, as is more often the case abroad, the spare wheel problem, by utilizing the interior of the car, through an entrance at the rear.

This plan has the advantage of still further clearing the exterior of all superfluities, but there does not appear to be the same opportunity to adopt the practise in this country. The American motorist first of all demands a practical machine, and to fulfill this qualification it must be available for long distance touring. It follows that there is abundant reason for reserving as much space as possible within the car for the storing of luggage. Extra tires or spare wheels must be carried outside, and whether they are to remain on the running boards or are to be located at the rear undoubtedly will depend upon the designer's interpretation of the desires of the prospective purchaser.



Illustrating the Use of Individual Holders Attached to Chassis Frame: A, Pullman; B, Inter-State; C, Winton.

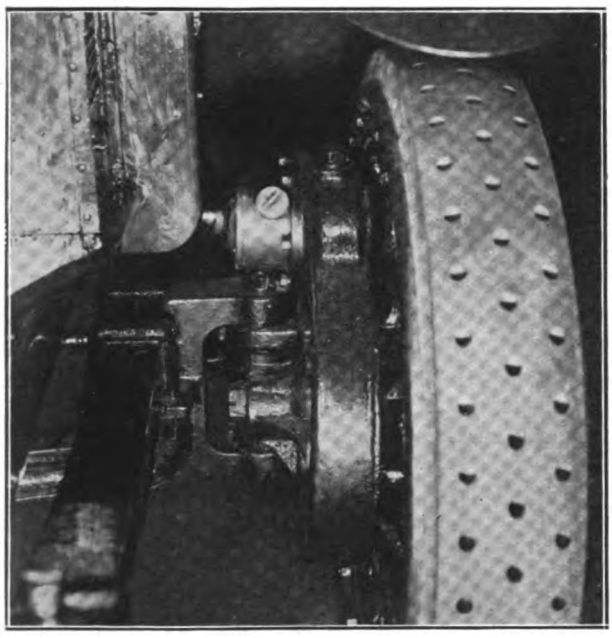
The tour of the Chicago Motor Club to Indianapolis for the annual 500-mile race will be in the nature of a reliability run in competition with the Illinois Athletic Club. The winning team will be awarded a trophy, which will remain with the club for one year. Chairman Herrick of the contest board has appointed E. G. Westlake, referee; E. C. Racey, H. Bosch and L. A. Watts, judges, and John De Long, starter.

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IN THE COMMERCIAL VEHICLE FIELD.

Constructional Features of Walter-Latil Front Drive Trucks, Made in America Under License from French Patentees---News of the Mechanical Transport.

CONSIDERABLE interest attaches to the new Walter-Latil front wheel drive trucks, made by the Walter Motor Truck Company, New York City, which recently acquired the American rights to manufacture under the patents issued by France to Latil Freres. The first machine of this type was produced in France some nine years ago, and the design has long been recognized as one of the standard constructions in Europe. Primarily it comprises a chassis carried on two wheels, which may be coupled to any form of rear equipment, and from which it may be detached conveniently, or it may include an entire



Front Wheel Drive as Applied to Walter-Latil Truck.

vehicle. It is understood that the Walter company contemplates the construction of vehicles in three sizes, which will range from one to five tons.

The claims are made that with about 80 per cent. of the load taken on the rear wheels, and with practically a constant load carried on the front wheels, the machine has unusually easy riding qualities; that the front wheel drive minimizes skidding; that brakes may be used on both front and rear wheels independently or in combination on all four wheels, and that with the chassis construction the entire mechanism is accessible at all times, no matter whether or not the vehicle is loaded. It also is maintained that a smaller engine will afford a satisfactory speed and hill climbing capacity.

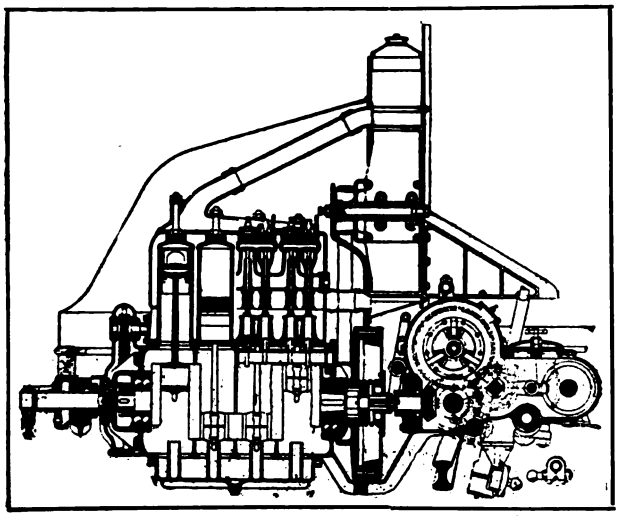
Two types of chassis are built in France, one for vehicles with capacity ranging from one to three tons, and the other for capacities of four and five tons. With either the power transmission is identical, but the other details of construction differ. The sketches herewith present the smaller type.

The engine is a four-cylinder unit, the cylinders being cast en bloc, with bore of 3.35 inches and stroke of 5.5, rated at 18 horsepower. The valves are all arranged on one side. The camshaft is chain driven and is provided with a jockey pulley adjustment. Lubrication is by a combination of the pump and splash systems, the pump taking oil from a sump in the crankcase to a reservoir on the dash, whence it is forced through separate leads to troughs cast in the lower portion of the crankcase into which the big ends dip. Ignition is by Bosch high-tension magneto. Cooling is by thermo-syphon, the radiator being mounted in front of the dash. In addition a fan is carried on a shaft fitted with ball bearings and driven by means of a belt from a pulley cast on the front of the flywheel. In order to make the engine as compact as possible, the crankshaft has no centre bearing, but double ball bearings of ample size are housed at each end of the crankcase and carry the crankshaft. The camshaft also runs on ball bearings.

The change speed gearing and differential are enclosed in one case bolted to the rear of the crankcase, the use of a long clutch shaft and universal joints being eliminated. In this case the leather faced cone clutch slides on a short shaft, which drives the main gearshaft by means of bevel gearing. The main shaft and the layshaft run at right angles to the motor. Four forward speeds and reverse are provided, the high speed being direct to the differential. The speed changes are effected by means of a lever operating in a "tramway," and the drive to the differential is by spur gearing. Both gearshafts run on ball bearings and felt oil retainers are provided wherever necessary.

The drive from the differential to the road wheels is taken through two cardan shafts, each

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Longitudinal Section of Power Transmission System on Walter-Latil Small Type Chassis.

fitted with two universal joints. The joints at the ends of the shafts nearest the wheels are of the ball and socket type, and are enclosed in grease cases. The angle of these two shafts is not great, a feature which is held to make for little loss of power in friction at the joints. In order to allow for variation in the angle of the cardan shafts, the joints nearest the differential gear are made so as to permit considerable end travel. As a precaution against the forks coming out of mesh with the ball joints, springs are inserted between the ends of the shafts and the universal joint boxes.

The ball bearings of the pinions which drive the gears attached to the two front wheels are housed in castings, which also carry stub axles and the arms to which the steering rods are attached. These castings, which serve in some measure as dust covers to the pinions and gears, swivel between the jaws of the main portion of the front axle.

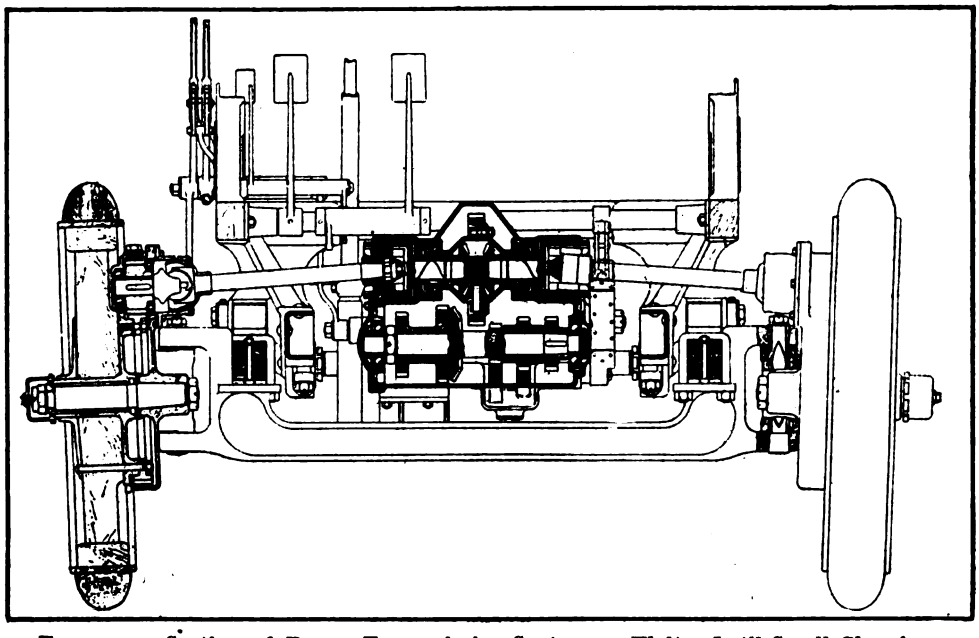
The engine and gears are suspended from three points. Two arms extending downward from the two main longitudinal members are secured to the gearbox, and a bracket attached to the front cross members and terminating in a socket, into which fits a ball secured to the front of the crankcase, carried the motor. The steering gear is of the usual worm and segment type. The foot brake acts upon a drum carried on an extension of the speed gearshaft and takes effect upon the front wheels. A side lever operates band brakes on the rear wheels. When steel tires are utilized at the rear the brakes are arranged to act upon the rims.

TRUCKS IN STRIKE EMERGENCY.

Unusual Demonstration of Economy and Practicability of Mechanical Transport.

Recently the teamsters employed by six coal and lumber dealers in Pawtucket, R. I., inaugurated a strike because their demands were not met. At the end of the first week the men applied for their old jobs, only to find that motor trucks had replaced the horse drawn equipment with four of the concerns.

The experiment is believed to have been the first in America in which mechanical transports have been used in a similar emergency, and as officials of the firms interested or members of their families drove the trucks in each instance, the demonstration was of a character best calculated to warrant definite conclusions, and they were found productive of decided economy, despite the lack of means for loading and unloading.

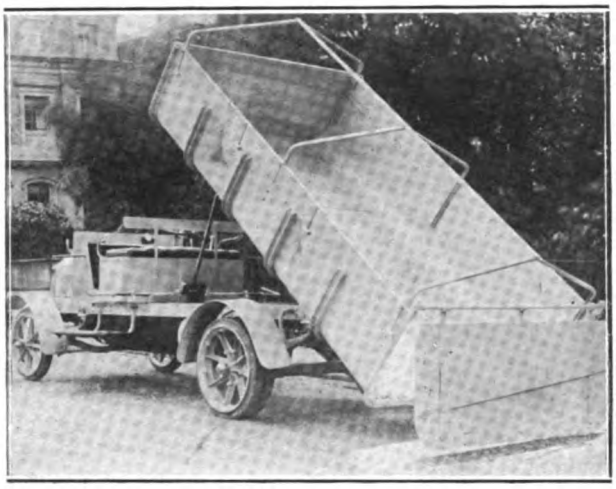


Transverse Section of Power Transmission System on Walter-Latil Small Chassis.

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SOME INTERESTING DUMPING BODIES.

TWO types of tipping bodies as produced by British constructors are presented herewith. Both of these are built for colonial service and



Lacre Steel Dumping Body in Service with Municipal Authorities at Johannesburg, South Africa.

the dumping mechanism is operated by power from the motor.

The Lacre body is of steel and is the product of the Lacre Motor Car Company, Ltd., Letchworth, Hertshire, England. It was built for the city officials of Johannesburg, South Africa, where each of these vehicles replaces 12 Scotch carts and 20 mules in collecting and disposing of refuse.

The chassis is a regulation Lacre four-ton, fitted with a 38 horsepower, four-cylinder, water-cooled motor. For use with this body the frame is shortened a trifle and stiffened at the rear to permit of tipping. The dimensions are: Length, about 12 feet six inches; width, seven feet; depth, two feet nine inches. The rear portion is so arranged that when the vehicle is tipped it opens automatically, and it is held closed by a lever when in normal position. The screw hoist is of the telescopic type and permits the body to be elevated to an angle of 45 degrees.

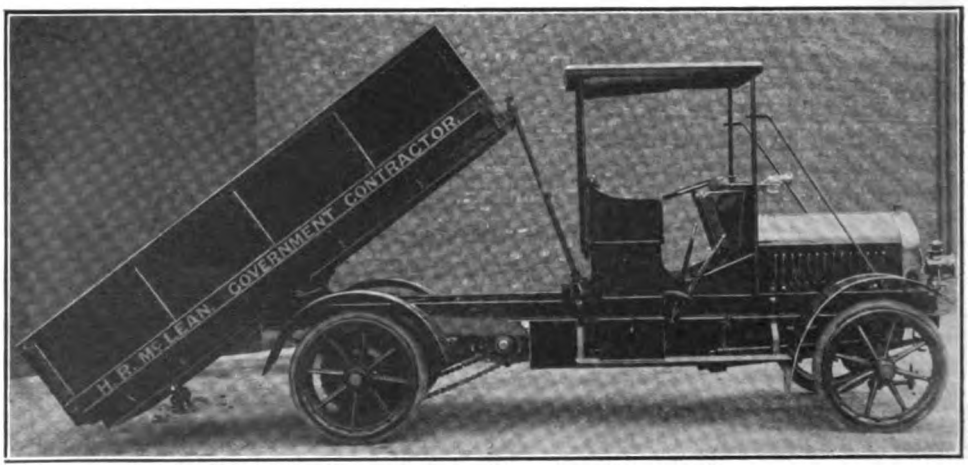
The Albion dumper is made by the Albion Motor Car Company, Ltd., Scotstoun, Glasgow, Scotland, and is constructed to carry a load of three tons. The vehicle shown was delivered to a government contractor on the Island of Trinidad. The dumping mechanism is operated by the motor, a winding drum being fitted at slight extra expense if specified when ordered.

Another feature in connection with this second machine lies in that the company is prepared to furnish a kerosene carburetor upon option. The general principle upon which this vaporizer operates is that the fuel is fed by the usual type of float chamber to a jet and is atomized by the inrushing air. Only a small proportion of the air is taken over the jet, and the rich mixture of air and atomized kerosene is immediately conducted to a chamber having a very large corrugated heated surface, the heating being accomplished by the exhaust gases. The rich gas from this chamber is led to a double-beat mixing valve controlled by a governor, which in conjunction with the speed air valve is held to permit under all conditions of load and speed the correct amount of additional air to enter with the rich vapor to insure the most efficient and economical mixture reaching the engine.

DOW DUAL WHEEL.

A Construction Which Is Held to Make for Material Reduction in Tire Expense.

The Dow Wheel Company, New York City, is demonstrating a dual wheel equipment, the in-



Contractor's Tipping Body on Three-Ton Albion Chassis for Use on Island of Trinidad.

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vention of Alexander Dow, which is expected to make for a material reduction in tire expense. It is further claimed that the system practically eliminates all possibility of skidding. The accompanying illustration shows the equipment as applied to a five-ton Mack truck.

The invention is an adaption of the bogey truck principle. The regular vehicle axle has mounted on the spindles what is known as an equalizing bar, and in the Dow construction this bar is so shaped that at either end is fitted an axle spindle on which is mounted a wheel in the usual manner. But the wheels overlap, the forward member being sufficiently outside that at the rear to insure good clearance. Both wheels are driven from a jackshaft sprocket and a brake operates on each.

The design gives four points of support to the rear axle instead of two, and the change of any one of these greatly reduces the movement of the axle and the consequent spring action is minimized. The tread of the vehicle is increased but an inch or two and the overlap of the wheels gives a distance of perhaps 21 inches with 36-inch wheels between the two lines of support. It is maintained that this construction can be adapted to front wheels should this be desired.

AUTOMOBILES FOR PARCEL POST.

Retiring Postmaster-General Recommends Awarding Contracts for 100 Machines.

One of the last official acts of the retiring Postmaster-General Frank H. Hitchcock before he was succeeded by Albert Burleson, was to sign the recommendation of a special committee awarding contracts for furnishing 100 motor vehicles for the parcel post service. They may be ordered during the fiscal year ending June 30, and are to be distributed throughout the country. The contracts awarded are as follows:

The White Company, five White 1500-pound wagons; Stewart Motor Corporation, 10 Stewart 1500-pound; Kissel Motor Car Company, 10 KisselKar 1500-pound; Durant-Dort Carriage Company, 10 Flint 1600-pound; Louis J. Bergdoll Motor Company, 10 Bergdoll 1500-pound; Atterbury Motor Car Company, 10 Atterbury 1500-pound; Willys-Overland Company, 10 Overland 900-pound; Studebaker Corporation, 20 Studebaker 750 and 1000-pound; C. B. B. Motor Car Company, 10 Modern 1000-pound; Waverley Company, five Waverley electric 1000-pound; Kentucky Wagon Manufacturing Company, five Urban electric 1000-pound; Ward Motor Vehicle Company, five Ward electric 1000-pound; Baker Motor Vehicle Company, five Baker 1000-pound.

WITH MOTOR TRUCKS IN SERVICE.

The H. J. Koehler S. G. Company, New York City, distributor for Koehler machines, recently shipped five of these vehicles to West Africa. It is understood that the purchase was a sample order, and that others are contemplated for use on the veldts.

The first electric wagon used in the Philippines was a G. V., made by the General Vehicle Company, Long Island City, N. Y. This company is now producing 16 machines of differing capacities, which will be sent to the islands in the near future. This consignment will increase the total of G. V. machines in use there to 39.

A three-ton Packard truck, made by the Packard Motor Car Company, Detroit, is employed near Asheville, N. C., in hauling building materials for a new tourist hotel. The mountain stones are loaded on a motor train of 15 wagons, which are hauled by the truck to the site of the structure three miles distant. In this work the Packard is replacing 15 pairs of horses or mules.

A three-ton KisselKar truck, made by the Kissel Motor Car Company, Hartford, Wis., and owned by an express and teaming contractor in Chicago, recently transported a 5500-pound load of household effects from the latter city to Milwaukee, Wis., and returned home in an actual running time for the round trip of 36 hours. The owner of the goods declares he saved between $40 and $50, besides the added advantage of having his goods



Dow Dual Wheel Equipment on Five-Ton Mack Truck.

handled but once at each end of the line. The distance was practically 100 miles, and the roads were rough and snow blocked in places.

A local trucking contractor in San Francisco, Cal., has been utilizing a Knox-Martin tractor, made by the Knox Automobile Company, Springfield, Mass., replacing 10 teams formerly employed in the same work. The results have been so satisfactory that the firm has decided to install vehicles of this type in place of all its horses as fast as this is found practicable.

The Public Service Gas Company of Newark, N. J., has placed a repeat order with the Adams Bros. Company, Findlay, O., for 10 one-ton Adams trucks, which were specially designed for its use. The purchase was the result of a two years' test in which accurate record was kept of the work done by each vehicle and the cost of operation.

The Gramm Motor Truck Company, Lima, O., recently shipped six Gramm trucks to a contracting firm in Manila, Philippine Islands. This make of vehicles has enjoyed splendid success in that section, one concern now operating a fleet of 20 in transporting building materials and supplies over the character of roads to be found on the Island of Luzon.

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MOTORING LAWS AND THEIR ENFORCEMENT.

Troublesome Clause in Michigan Statute Declared Unconstitutional---Movement for Uniform Legislation in New York--Two States Added to List in the West.

MOTORISTS in Michigan have won a signal victory in the decision of the supreme court in the case of Nina L. Dougherty vs. William S. Thomas, in which a clause of the automobile law of 1909 is found to be unconstitutional. Under this act the owner, not the driver, could be held responsible, and the suit in question was brought as the result of an accident which occurred when a garage employee was delivering a machine to its owner. The clause which has been declared unconstitutional, reads as follows:

The owner of a motor vehicle shall be liable for any injury occasioned by the negligent operation by any person of such motor vehicle, whether such negligence consists in violations of the provisions of the statute of this state or in the failure to observe such ordinary care in such operation as the rules of the common law require, but such owner shall not be liable in case such motor vehicle has been stolen.

Justice Stone in commenting upon this section of the law said:

To hold sub-division 3 of section 10 constitutional is to hold a party absolutely liable for the negligent conduct of another, a mere stranger or a willful trespasser, no matter how careful or how free from negligence he himself has been. We think that the result of such a holding would be to take the property of defendant, Thomas, to pay for the wrongful and negligent act of another person, not sustaining to him the relation of servant, agent or employee.

Such a doctrine seems unnatural and repugnant to the provisions of the constitution here invoked. We are forced to the conclusion that the provisions of this subdivision are not a necessary regulation in the exercise of the police power; that in and by its terms the plain provisions of the constitution are violated and the sub-division must be held unconstitutional, and the statutory liability therein asserted done away with.

SITUATION IN NEW YORK.

Tire Dating Bill Goes to Governor, but Others Expected to Remain in Committee.

Although a bill providing for the dating of all automobile tires offered for sale in New York State was killed in committee during the 1912 session of the legislature, it would appear that so much attention was paid to other automobile legislation before the body this year that those interested forgot to watch the tire dating proposition. It was not until the bill had passed both branches of the legislature and was before the governor for his signature, that the industry began to take action. Someone in the commonwealth seems to be anxious that no old tires shall be sold to the consumer, while most of the tire manufacturers claim that tires at least three years old are better than those freshly cured.

The storm of disapproval that met the score of other motoring bills is said to have given the committee the impression that it would be better to let them rest in committee. It may be well for organized motorists in New York not to take anything for granted in this connection, however. Senator Loren H. White has introduced a bill authorizing the governor to appoint a commission of three members to consult with similar commissions from Maine, Vermont, New Hampshire, Massachusetts, Rhode Island, Connecticut, New Jersey, Pennsylvania, Delaware and Maryland with a view to securing uniform automobile laws, licenses and registration fees. This is taken as a further indication that no further legislation will be attempted this session.

SEVEN WORDS LEFT OUT.

An Emergency Exists, but Does Bar Harbor Get the Automobile Tourist?

The history of Bar Harbor, Me., and its attempt to attract the motoring tourist seems far from being a closed book as yet. It will be remembered that some few years ago the Maine legislature passed an act excluding automobiles from the town of Eden, in which Bar Harbor is situated. It has been contended by the permanent residents of the island that the wealthy summer people were responsible for this action.

Last year a special act was passed permitting automobiles on certain streets. This year there was a determined effort to open the whole island to motoring tourists and the bill passed the legislature. In Maine, whenever it is deemed advisable for an act to take effect upon its passage it must carry an emergency clause, and such clause is permitted only in cases "affecting the public peace, health or safety."

Otherwise new laws go into effect 90 days after their approval. Those interested in securing the summer trade did not desire to wait three months. Accordingly the bill went to the governor, and was signed by him, bearing the emergency clause, but neglecting to contain the words,

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"This act shall take effect when approved." The permanent residents of Bar Harbor declare the emergency clause is sufficient, but there has been some talk of securing an injunction if an attempt is made to drive a car onto the island before the 90 days have passed. The emergency clause reads as follows:

Whereas, the summer resort interests of the town of Eden are the principal business interests of that town, and the admission of automobiles thereto other than at the commencement of the summer season would seriously interfere with the conduct of business therein; and, whereas, the interest of the people of the state at large requires that travel by automobile to the village of Bar Harbor, in said town of Eden, be permitted at the commencement of the summer season, provided that such travel is to be permitted at all; and, unless this act is passed as an emergency act it cannot take effect until the middle of the season at Bar Harbor, an emergency therefore exists, and the public health, peace and safety will be conserved by the immediate admission of automobiles to said town.

SKIDDING IN MONTANA.

At Least One Rear Wheel Must Be Fitted with Tire Chain, Etc.

The legislature of Montana has passed the state's first automobile law. In the main the new statute follows closely those which have been in operation in other commonwealths, and non-residents are exempt from its provisions if they have complied with the laws of their own state. The registration fee is $2, and the license fee for a chauffeur the same. The usual provisions for brakes, signalling devices and lights are made, the last named being visible 200 feet, with a red light at the rear, all to be lighted from one hour after sunset to one hour before sunrise. The speed provision is "reasonable and proper." Perhaps the most interesting innovation is found in the following:

Every motor vehicle operated and driven upon the public roads or highways of this state when such public roads or highways are in a wet, slippery or slimy condition, or in such condition that motor vehicles operated and driven thereon slide, skid, slip or have a tendency to get beyond control, shall have fitted upon at least one of the rear tires of such motor vehicle at such time or times, a tire chain or such other contrivance as shall be adequate and sufficient to prevent said motor vehicle from skidding, slipping or sliding, and such as shall not cause any considerable damage to the public road or highway.

UNIVERSAL LIGHTING BILL.

Rhode Island's Proposed Law Follows Closely That Adopted by Massachusetts.

Although the house judiciary committee in Rhode Island has prepared a substitute universal lighting bill which follows closely that in force in Massachusetts, some objection has developed with respect to the clause exempting vehicles when operated where street lights are maintained at intervals of 500 feet. It is maintained that there is quite as much need for horse drawn vehicles to carry lights at such points as any other. The bill would amend chapter 87 of the general laws and reads as follows:

Sec. 16—Every vehicle, when located or operated on any public highway or bridge, shall display one or more lights on said vehicle so placed as to be visible both in the front and the rear during the period from one hour after sunset to one hour before sunrise: Provided, however, that this section shall not apply to any vehicle operated upon any street or highway where street lights are maintained at intervals of 500 feet, or to any vehicle which shall be transporting as its principal freight any commodity that would readily catch fire from the use of a lantern or other lighting device; and provided, further, that this section shall not affect the provisions of sec. 16 of chapter 86 of the general laws relative to motor vehicles.

Sec. 17—Any person in charge of a vehicle on any public highway or bridge and not having a light on such vehicle as provided in the next preceding section who shall refuse when requested by a police officer or constable to give correctly his name and address, shall be guilty of a misdemeanor, and upon conviction thereof shall be fined not exceeding $5.

Sec. 18—Any person violating the provisions of sec. 16 of this chapter shall be fined not more than $20 for each offense.

NON-RESIDENTS IN NEW MEXICO.

Permitted to Operate Their Machines for Period of Sixty Days.

Unlike many of the commonwealths of the Far West the new State of New Mexico has passed a motoring law which provides a graduated system of registration fees. Non-residents are exempt from this provision for a period of 60 days. The fees are as follows: Under 12 horsepower, $2; 12-20, $4; 20-30, $6; 30-40, $8; 40-50, $10; over 50, $12. The law makes the usual provisions for lights, which must be lighted from one-half hour after sunset to one-half hour before sunrise.

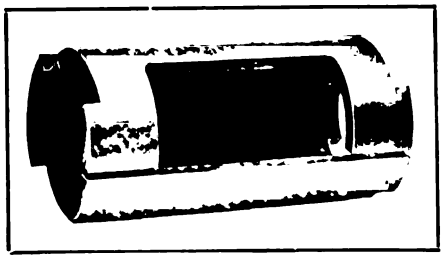
Section 13 provides that whoever operates a motor vehicle while in an intoxicated condition shall be guilty of a misdemeanor. The matter of speed is not covered, except that it must be reduced to at least 15 miles an hour at cross roads, but it may be held to have been considered in the following:

Section 8—No owner of a motor vehicle who shall have obtained a number and registration, as provided in this act, shall be required to obtain any other certificate to use or operate such motor vehicle on any of the public highways of this state, and no motor vehicle shall bear any other number or license other than as provided for in this act. Provided incorporated cities, towns and villages may pass ordinances providing regulations for the operation of motor vehicles, and may require owners residents of such cities, towns and villages to register their state numbers in the office of the city, town or village clerk, but such registration fee shall not exceed 50 cents per annum.

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ELLIOTT ROTARY VALVE ENGINE.

ONE of the strictly new features revealed at the Boston show was the Elliott flexible rotary valve engine, exhibited by the Elliott Motor Engine Company, Waltham, Mass. This is a new concern, the officers being as follows: President, Gilbert R. Elliott; vice president and general manager, Henry N. Schwartz; secretary and treasurer, Frank P. Harris. The motor shown may be regarded somewhat in the nature of an experimental proposition, although the tests to which it has been subjected determined results which indicated that it was thoroughly practical in every way. The company will begin work at once upon the construction of a new engine which will present a decidedly more finished appearance.

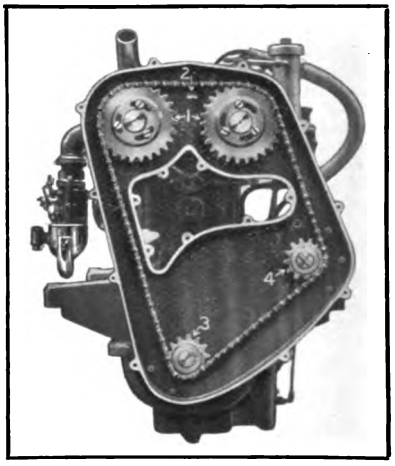


Section of Elliott Valve Cylinder.

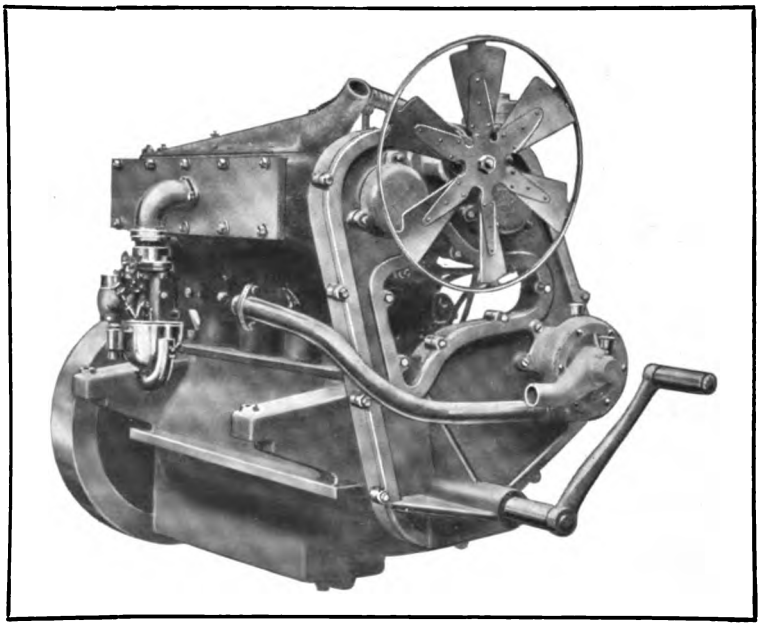
Chief interest centres in the valve, which is in the form of a hollow cylinder. This is constructed in sections, four being utilized for the inlet and four for the exhaust in a four-cylinder engine, and six of each for a six-cylinder motor. It will be noted, from an accompanying illustration, that the sections are recessed at either end, and while all sections are interchangeable, the only care necessary in assembling is to arrange each with proper regard for the timing of the motor.

It also will be noted that there is a slot extending the entire length of the section, this being left for the purpose of allowing for the expansion and contraction of the metal. The port is 1.25 inches wide and three inches long. This registers with a slot in the motor cylinder .375 by .375 inch. The same construction applies to both the inlet and exhaust.

The intake manifold leading from the carburetor brings the mixture to a constricted chamber from which the suction of the piston conveys it to the revolving cylinder, through one or more of these ports. It will be seen that the intake cylinder thus becomes in the nature of a reservoir, from which the gas is distributed to the motor cylinders in proper firing order. The same thing applies to the exhaust cylinder, in that each motor cylinder in turn exhausts into the reservoir thus created, from which the burned gases escape to the exhaust manifold through one or more ports as the cylinder revolves.



Driving Means on Elliott Motor.



Inlet Side of New Elliott Flexible Rotary Valve Engine.

The cycle of operations is the same as with any four-cycle engine. When the No. 1 motor cylinder is drawing in a charge, the port in the revolving valve is registering with the port in the motor cylinder, and one or more ports of the valve are registering with the intake manifold from the carburetor. The suction of the piston not only draws in

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the charge, but causes the mixture to enter the revolving cylinder reservoir at the same time. And the same action takes place as each port registers with its respective port in the motor cylinders.

In the matter of valve lubrication the pump conveys oil to the front of the valve chamber, from which point it flows to a channel underneath the revolving cylinder, which is at all times maintained in a film of oil. It is held that sufficient lubricant is carried in with the mixture to lubricate the engine cylinder walls, etc. It also is pointed out that the slot in the valve section is at all times sealed by the cushion of oil on which the cylinder revolves.

Another illustration presents the driving means, and it will be noted that the chain drives both cylinder valves in the same direction. In the illustration the inlet is at the left and the exhaust at the right. This chain is driven from the crankshaft at 3 and drives the pump at 4 and the fan at 2. It is understood that in future designs the location of the pump will be changed slightly to make for more efficient running of the chain, but the present construction serves to indicate the principle of operation.

The third view presents the completely assembled motor, inlet side, as exhibited at the show. This is a four-cylinder engine with bore of four inches and the stroke of five, giving a rating under the S. A. E. formula of 25.3 horsepower. The piston displacement is 251.3 cubic inches. Under block test this engine is said to have developed 41 horsepower. Further information concerning the design is awaited with interest.

It is the claim of the Ford Motor Company, Detroit, that Ford machines are in use where the sun shines during 24 hours of each day, for shipments have been made to all parts of the world. One day's shipment recently comprised cars billed to the following places: Aden, Arabia; Bangkok, Siam; Batavia, Java; Buenos Aires, Argentina; Colon, Panama; La Guayro, Ciudad Bolivar and Maracaibo, Venezuela; Marango, San Paulo, Popotas and Scerabaya, Brazil; Montevideo, Uruguay; Tampico, Mex.; San Juan, Porto Rico; Santa Clara, Cuba; Tien Tsin, China; Valparaiso, Chili and Yokohama, Japan.

HENDERSON SOLVES PROBLEM.

Will Utilize New Tent on the Indiana Manufacturers' Transcontinental Tour.

One of the chief problems which has confronted those who are making arrangements to take part in the transcontinental tour of the Indiana Automobile Manufacturers' Association from Indianapolis to the Pacific Coast in July, is that of providing sleeping accommodations for the tourists during the 19 nights which they will spend away from the vicinity of hotels. The entries of the Henderson Motor Car Company will be equipped with a tent recently placed in the market and patented by A. W. Eberhardt of the Compac Tent Company, Indianapolis.

The particular feature of this equipment lies in the absence of poles. The tent is made to accommodate two, four and six persons, and is somewhat like a pyramid cut in half. It is made in one piece, the ventilation being accomplished by six windows covered with a gauze netting and protected from the rain by canvas flaps. The tent is opened from both ends by doors that are fastened together with button snaps, and a partition divides it into two private rooms with separate entrances.



Henderson Car and Compact Tent Which Will Take Part in Indiana Manufacturer's Tour to Pacific Coast.

George Schoeneck of Chicago has suggested a non-stop motor run from Chicago to Louisville, Ky., which is being considered by Chicago motorists. The plan, if adopted, will be confined to cars of six cylinders. It will demonstrate, according to Mr. Schoeneck, the absolute dependability and flexibility afforded by machines of that type.

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CORRESPONDENCE WITH THE READER.

Rutenber Motor.

(1509)—Can a distributor be fitted to a Rutenber motor? Kindly forward me the address of the maker of the motor. W. G. R.

Elmwood, Mass., March 25.

As the model of the motor was not mentioned the writer cannot state whether or not a distributor could be fitted easily. If provision is not made for attaching a distributor the expense involved might be considerable. If the design includes a timer shaft, the distributor could be mounted on this member. The address of the maker is the Rutenber Motor Company, Marion, Ind. In writing give number or model of motor.

S. A. E. Horsepower Formula.

(1510)—What is meant by the letters S. A. E. H. P., which appear in your issue for March 10? I notice that a number of cars are fitted with a semi-floating type of rear axle? Are these any better than others? L. G. R.

Detroit, March 23.

The letters S. A. E. are an abbreviation for the Society of Automobile Engineers, which is

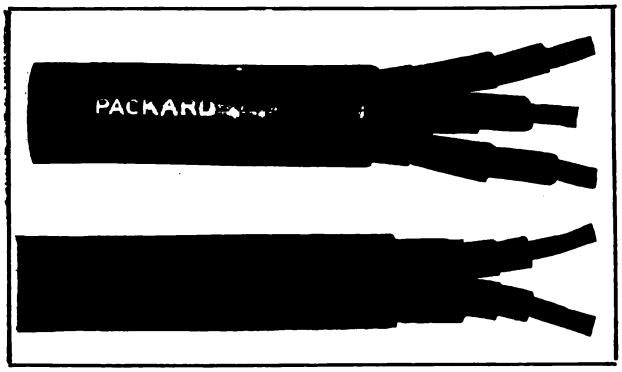


Fig. 1—Two and Three-Strand Cable Utilized for Electric Lighting.

composed of mechanical and electrical engineers connected with and interested in the automobile industry. H. P. represents horsepower and S. A. E. H. P. is the horsepower rating under the formula of the organization, which is as follows: Square of the bore times the number of cylinders, divided by 2.5.

This formula was adopted by the Association of Licensed Automobile Manufacturers, or the A. L. A. M. as it was more popularly known, in May, 1907, following the previous adoption of a similar formula by the Royal Automobile Club of Great Britain. Although the piston speed is not an element of the formula itself, it is based on a piston travel of 1000 feet a minute, it being assumed that the motor with a shorter stroke will make a greater number of revolutions a minute, and that the one with the longer stroke will make a fewer number, relatively.

The action of the A. L. A. M. was based upon the recommendation of its mechanical branch, composed of engineers associated with members of that organization. When this association was succeeded by the Automobile Board of Trade, soon after the so-called Selden patent case was decided adversely by the courts some two years ago, the data in the files of its mechanical branch were turned over to the Society of Automobile Engineers, and the horsepower formula became known as the S. A. E. instead of the A. L. A. M. Formal adoption of the formula was not made by the S. A. E., however, until very recently.

In the matter of rear axles there is a difference of opinion among engineers. Both the semi and full floating types are employed on high grade cars.

Timing Magneto.

(1511)—Will you please give information on timing a magneto? The motor is a four-cylinder unit and fires 1, 3, 4, 2. H. T. SCHAETZLE.

New Vienna, Ia., April 1.

The installation of a magneto and timing of same with the motor firing 1, 3, 4, 2, was described and illustrated in the issue for Feb. 25. The subject of proper lead with diagram was discussed in the issue for Dec. 25.

Lighting Cable.

(1512)—In your issue for March 10, in the lighting story, mention was made of a two-strand cable and of its advantages. What is a two-strand wire and why is it better than any other form? How is the insulation put on? INTERESTED.

Mystic, Conn., April 5.

A two-strand cable comprises two wires, each of which is insulated and both enclosed by other insulation. The construction is shown at Fig. 1 and it will be seen that each wire is fully protected. The advantage of the twin-strand is that in installing there is but one wire to handle and the double insulation affords greater protection. Triple-strand wires also are manufactured, as will be noted by the illustration.

The insulation is applied by special machinery. The Packard Electric Company, Warren, O., maker of Packard cable, puts one braid on each individual conductor and these braids are of special color, etc. Each one is treated by passing four or five times, depending on the size, through a special process in which is applied a flexible film. The braids are then put together and twisted into a round section and the spaces filled with jute twine. A double braid is next placed over the outside and given a special treatment.

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This seals the rubber insulation against the deteriorating influences of heat and grease. The final covering is a double braid of tough thread,



Fig. 2—Showing the Construction of a Four-Cycle, Four-Cylinder Crankshaft.

which acts as a protective tubing, over which may be placed bushings where the cable passes through a channel frame or over a sharp edge.

Four vs. Six-Cylinder Crankshafts.

(1513)—I have a four-cylinder motor which I thought could be converted into a six-cylinder. I can easily secure the two extra cylinders, but am told that I would need a new crankshaft and camshaft, and that the expense involved would be too much to warrant the change. What is the difference between the crankshaft of a four and a six and why is not the plan practical?

SUBSCRIBER.

Houston, Tex., March 23.

The plan suggested would not be advisable because of the work and expense involved. It would require a new crankshaft, camshaft, crankcase, gears, etc., to say nothing of a larger radiator.

The difference between a four and six-cylinder motor is considerable. With the former type two pistons, connecting rods and cranks are always moving up at the same time that the other two are moving down, the impulses to the crankshaft created by the explosions being so timed that each cylinder is at all times one stroke of the cycle behind its predecessor. By referring to Fig. 2, which depicts a four-cylinder crankshaft, it will be noted that the two end cranks are located at the ends of the shaft and the two middle ones at exactly the opposite side, or at an angle of 180 degrees with them.

It should be borne in mind that there are four separate operations in the cycle, and that each requires a stroke. They are: Intake or suction, compression, firing and exhaust. For instance, when the first cylinder is exploding, the second is compressing, the third is drawing in its charge and the fourth is exhausting. The firing order may be 1, 2, 4, 3, or 1, 3, 4, 2.

With a six-cylinder motor the cylinders fire at intervals of 120 degrees of crank angle, and 60 degrees before the end of the power stroke of any one cylinder the next cylinder commences its power stroke. There are thus six periods of 60 degrees each during each cycle or two revolutions of the crankshaft when two cylinders are developing power. During half the time the motor is running two cylinders are doing useful work, two are drawing gas and two are exhausting. This is termed overlapping of the strokes and accounts for the flexibility of the six-cylinder unit.

The position of the crankthrows of a six-cylinder crankshaft is shown at Fig. 3, the upper view making clear the degrees of angularity. The lower illustrates a crankshaft with the connecting rods. It will be seen that the firing order will be decidedly at variance with that of a four-cylinder unit and as the operation of opening and closing the valves is accomplished by cams their action must conform to the firing order of the motor. Not only would a number of mechanical changes be necessary, but the motor would require a six-cylinder magneto, timer or distributor, as four-cylinder units would not be applicable for the reasons above mentioned. It should be much more satisfactory and cheaper to purchase a complete power plant.

Piston Displacement and Horsepower.

(1514)—Kindly explain why it is that some cars have a greater piston displacement, although rated at the same horsepower. We have a Ford car and find that the piston displacement is smaller than other makes, therefore we are interested. How is it that the Oakland motor with 19.6 horsepower has so much power in pulling a heavy car? Does the piston displacement have anything to do with the power of a car? We enclose a list of cars taken from your valuable publication. F. D. B.

Fort Dodge, Ia., March 21.

There has been a growing tendency among manufacturers to increase the piston displacement of motors during the past three years. In many instances the increase is due to lengthening the stroke without enlarging the bore. It should

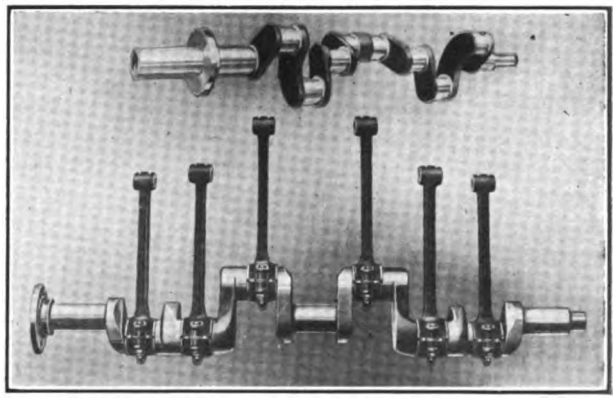


Fig. 3—Illustrating Crankshafts of Six-Cylinder Motors, the Lower View Outlining the Relative Positions of the Connecting Rods.

be remembered that the S. A. E. horsepower rating is based upon the bore, not the stroke, and that a four-cylinder motor having a four-inch

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bore and stroke, for example, is rated at 25.6 horsepower. Similarly one having the same bore, but a stroke of five is classified as having 25.6 horsepower, although its piston displacement is greater. This is shown in the table submitted in which the Ford having a 3.75-inch bore and four-inch stroke is rated at 22.5 horsepower and as having a piston displacement of 176.7 cubic inches. The Nyberg has a similar bore, but the stroke is 5.25 inches and its piston displacement is 231.9. A study of the specifications published in the issue of The Automobile Journal for March 10 will reveal the varying horsepower of motors, although the bore is the same.

Regarding the statement that the Oakland with 19.6 horsepower has so much power in pulling a car it may be stated that two different makes of motors having the same bore and stroke may differ in the energy developed because of the design. There are a number of factors to be considered, such as the size of the valves, compression, scavenging, muffler, etc. The design of the other components of the car would also be a factor.

The horsepower of a motor is not determined by the piston displacement, although there are advocates of the plan. As previously stated there are a number of factors to be taken into consideration, although with all conditions equal it is only reasonable to assume that a motor having a greater piston displacement will develop more power because of the larger amount of fuel that can be impressed into a cylinder during the suction stroke.

Repairing Magneto.

(1515)—Will you kindly answer the following in your correspondence with the reader: I have a high-tension magneto made by Jacobson & Brandow, Pittsfield, Mass. Has that company sold out and if so to whom? Where could I have the fields recharged? A SUBSCRIBER.
Albany, N. Y., March 20.

The J & B Manufacturing Company, Pittsfield, Mass., which is understood to have succeeded Jacobson & Brandow, advises that the instrument referred to was not made by it. The company states, however, that it is in a position to make any repairs to the magneto mentioned.

Valve Timing.

(1516)—I have a 1912 four-cylinder Herreshoff car and wish to check up the valve timing as the adjustments of the valve lifters appear to differ and the space between the tappets and stems vary. As the flywheel is enclosed what method should I pursue? INFORMATION.
Binghamton, N. Y., April 3.

When it is not possible to check up the valve timing by the marks on the flywheel, the pistons will have to be utilized. Secure a piece of stout wire, a bicycle spoke for example, of a diameter sufficiently small to move easily through the opening of a petcock. Open all of the petcocks to relieve the compression, and it would be well to remove the spark plugs also.

The No. 1 cylinder, that nearest the radiator, will be the handiest for checking up the timing. Insert the wire rod through the petcock and crank the motor slowly until the wire descends. Continue to rotate the starting crank until the rod completes its downward movement and is about to ascend. Now mark the wire with a file, then again crank the motor until the rod attains its topmost position, and make another mark. These indentations will indicate the piston travel of the stroke. Check up the marks by repeating the operation to make sure they are correct.

Having determined the top and lower dead centres it is an easy matter to check up the timing. Next calibrate the rod with the file and a rule. The timing of the intake valve is as follows: Inlet opens .015625 inch late; that is, the piston descends that amount on the intake stroke before the valve lifts. The intake valve closes 3.40625 inches late, starting up on the compression stroke before closing. Measure off from the bottom of the rod, 3.40625 inches, which represents the point at which the piston should be when the intake valve closes.

Insert rod with piston at top dead centre and rotate crankshaft until the mark representing .015625 inch registers with the top of the petcock. This is the opening of the intake valve and the adjustment of the valve mechanism should be changed if the valve opens late or early. Now rotate the flywheel until the rod drops to the second mark, the closing of the intake, and correct any errors. Each intake valve should be checked in a similar manner, performing the work carefully.

Having retimed the intake valves the exhaust members can be gone over. The exhaust valves close .03125 inch after the top dead centre and open 3.28125 inches from dead centre on the downward stroke. Each valve should be checked separately to obtain the best results. There is a special timing rod marketed for the work, but by exercising caution a wire may be utilized successfully.

The Nyberg four-cylinder racing machine, made by the Nyberg Automobile Works, Anderson, Ind., which Harry Endicott will pilot in all important dirt track events during 1913, was completed at the factory a few days ago and is now undergoing severe road tests.

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FEATURES OF E-C DEMOUNTABLE WHEELS.

WHILE the American production of wire wheels of the modern type is of comparatively recent origin, it is significant that a number of new designs have been placed in the market. During the Chicago show, the E-C Sales Company of that city presented its E-C demountable wheels, one of these being of wire and the other of wood. It may be held that one of the possibilities arising from the present agitation of the wire wheel situation is that of a wider application of the demountable feature to wood members. As is more or less well known the Rambler has been fitting demountable wood wheels for the past two seasons, at least, and the list has been increased somewhat this year.

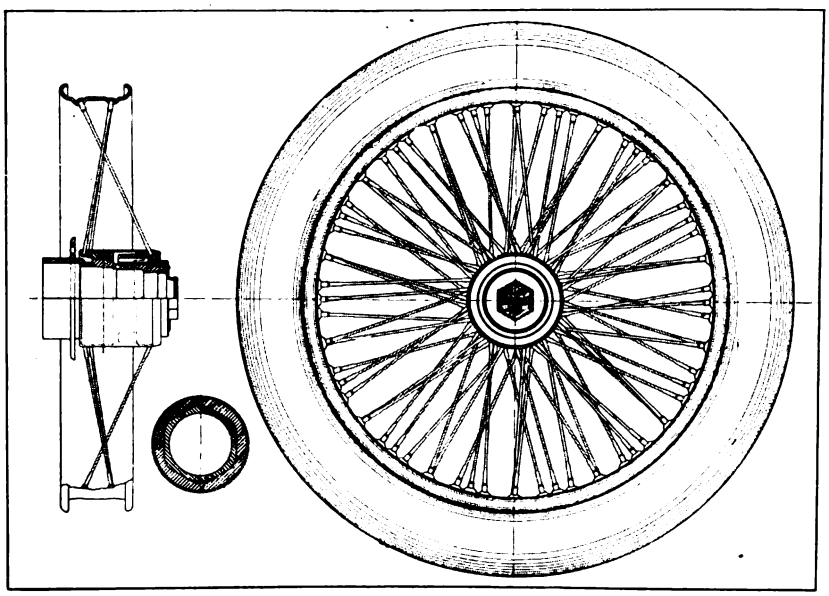
The construction of the E-C wire wheel is with two rows of spokes interlaced from the outer end of the hub to the inner edge of the rim and vice versa, presenting what is maintained by the maker to be a perfect truss with the use of only two rows of spokes. An accompanying sketch sets forth this detail in cross section as well as a side view of the wheel. An advantage claimed for this arrangement is that each row takes its correct share of the load.

The particular feature of the design is the use of an irregular taper drive, which is held by the inventor to be the only known method of eliminating both radial and lateral lost motion simultaneously. This form of drive is accomplished by the use of a hub, which is not circular in cross section, but is hexagonal with rounded corners. The wheel itself is made with an inner hub, which is supplied with internal locking means, and it is maintained that the direction of drive does not affect this locking mechanism, thereby making each wheel interchangeable with respect to the side of the car upon which it is fitted. It is further stated that there are no projections on the protected locking mechanism to be damaged if the hub is hit.

The wheel is attached and demounted through a special coarse thread of large diameter, which cannot be crossed, it is stated. Once the wheel is in place the whole assembly is held in position by a specially designed locking ring, for the tightening or loosening of which the demounting wrench or spanner is utilized, and it is maintained that the wheel cannot be left unlocked inadvertently.

The construction is such that the hub cap may be removed without demounting the wheel, and it is maintained that when the wheel is used with full floating types of axles the shafts also may be withdrawn without disturbing the assembly. The maker claims it is readily adaptable to any of the standard makes of axles without changing either the bearings or the tread of the car.

The E-C demountable wood wheel operates on the same principle as the wire member, and presents in addition to the other features that of less expense. It demounts at a convenient working height from the ground and at a machined joint, which is held to assure a true running wheel at all times.



Sketch Showing General View and Cross Section of E-C Wire Wheel.

W. J. Morgan, a pioneer contest promoter, has applied for a sanction to the contest board of the American Automobile Association for the promotion of the West Hudson and Catskill scenic tour, which, in addition to being a pleasure trip, will be an endurance, reliability, hill climb and fuel economy contest. The run will be of two days' duration and will be held May 14 and 15. The route will be announced later.

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AVIATION IN AMERICA AND ABROAD.

EUROPEAN aviators appear to be devoting attention to the creation of new world's passenger carrying records. This is in line with the expressed demand in England and on the Continent for the development of the so-called touring aeroplane. It is suggested that by far too much attention has been paid to the matter of speed, although it is admitted that one point of unassailable superiority in the aeroplane is its ability to surpass all other means of transportation in this regard.

An accompanying table sets forth some of the new records established since the first of the year, in comparison with those which were in force at the end of 1912, wherever this is possible. While marks up to and including 250 kilometers were recorded in the class for speed according to distance—aviator and one passenger, previous to Jan. 1, those for 300, 350 and 400 kilometers are entirely new. Guillaux was unable to lower Legagneux's figures. There was no mark for altitude—pilot and six passengers, previous to that made by Faller, Jan. 4.

RECENT WORLD'S PASSENGER CARRYING AVIATION RECORDS.

Altitude—Pilot and Three Passengers.

Date	Place	Aviator	Machine	Feet
Sept. 27*..	Berlin, Ger.	Sablating	125 Bomhard-Pfeil	3673
Feb. 12...	Etampes, Fr.	Chevillard	80 H. Farman	4429

Altitude—Pilot and Four Passengers.

Dec. 23*..	St. Job, Bel.	Verchaeve	80 H. Farman	1955
Feb. 8....	Etampes, Fr.	Gougenheim	80 H. Farman	2467
Feb. 10...	Etampes, Fr.	Gougenheim	80 H. Farman	3674

Altitude—Pilot and Six Passengers.

Jan. 4....	Mulhausen, Ger.	Faller	Aviatik	984
Feb. 27...	Chartes, Fr.	Frantz	Savay	2034

Duration—Pilot and Five Passengers.

				Time
Jan. 26*..	Douai, Fr.	Molla	70 Sommer	1:05:48.2
Feb. 16...	Mulhausen, Ger.	Faller	Aviatik	1:10:17.0

Speed According to Distance—Pilot and One Passenger.

				Kilos	Time
Feb. 11...	Etampes, Fr.	Guillaux	60 Clement-Bayard	300	3:04:05
Feb. 11....	Etampes, Fr.	Guillaux	60 Clement-Bayard	350	3:34:46
Feb. 11....	Etampes, Fr.	Guillaux	60 Clement-Bayard	400	4:04:04

*1912.

The Aero Club de France has definitely decided to hold the fifth race for the Gordon-Bennett international cup at Betheny, near Rheims, France, during an international meet scheduled for Sept. 26-28. Thus far challenges have been received from America, Great Britain and Belgium. Each country is entitled to three representatives.

The first race for this award was held at Rheims in August, 1909, and was won by Glenn H. Curtiss of America with a Curtiss biplane. The second was flown at Belmont Park, Long Island, in September, 1910, Claude Grahame-White of England being the winner with a Bleriot monoplane. The third was at Eastchurch, England, in July, 1911, when Charles Terres Weyman of America secured the prize with a Nieuport monoplane. The fourth was held at Chicago, in September, 1912, Jules Vedrines of France winning with a Deperdussin monoplane.

As a further evidence of the interest in the hydraeroplane, it is announced that Mortimer Singer has placed at the disposal of the Royal Aero Club of Great Britain a $2500 prize for an hydraeroplane competition among all-British machines. The prize will be awarded to the first machine carrying a pilot and passenger, which makes six out-and-home flights of five miles, starting from land, attaining an altitude of 1500 feet, alighting on the water, arising from the water and coming back to land.

In France the Aero Club de France is busily engaged in working out the details for two competitions for hydraeroplanes. One of these will be for a new Gordon-Bennett trophy, valued at 50,000 francs, while the other will be for a like sum in trophies and cash offered by the minister of marine. The latter comprises a distance test of 250 sea miles and a speed test over 100 sea miles. There also will be special tests for navigability, gliding, rising and alighting. The machines are to be divided into two classes, those for use on coastwise flights and those for use on the open sea.

Upon his recent return from abroad, after spending five weeks in Germany and France at the termination of the actions brought by the Wright Company against alleged infringements of the Wright patents, Orville Wright announced that he was at work on improvements in hydraeroplanes. "The present hydraeroplane is all right for smooth water," he is quoted as saying, "but there must be improvements for rough water and on these we are working."

Harry M. Jones of Providence, R. I., not only has the distinction of being the first aviator to alight on Boston Common, but he is the first to fly over New York City by moonlight. This lat-

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est feat was accomplished about midnight, March 22-23, the machine being a Burgess-Wright biplane. Jones, it will be remembered, started from Boston in January on the first aerial delivery of parcel post. His midnight flight over New York City marked the completion of that trip, although the mail had been shipped to its destination by train some time previously.

Aviation engineers do not look with favor upon the plan of flying over cities, whether the flight be by daylight or moonlight. Several state legislatures have before them bills regulating the use of aeroplanes with special reference to this feature. For the most part these have the hearty support of the aviators themselves. The Massachusetts legislature has prepared a bill, in which Earl L. Ovington and Harry N. Atwood, two well known aviators, had a share. Among its provisions are the following:

No person shall operate an air machine of any kind unless licensed to do so by the state highway commission, except with a licensed air pilot, and then for a distance not exceeding 500 miles. All such licenses so granted shall expire on the last day of the year in which they are issued, and may be revoked at any time by the commission.

The license fee shall be $5, but no fee shall be charged for the issuance of a new license to a person whose license is about to expire. No license shall be granted until the applicant has passed a satisfactory examination by written replies to interrogatories by the commission, and of a flight to be made under the direction of an expert employed for the purpose by the commission.

The questions put to the applicant shall include a test of his familiarity with such laws of the commonwealth as may be applicable to the operation of air machines. No person shall receive a license until he has proved to the satisfaction of the commission that he has flown not less than 100 miles in some standard type machine.

No air machine shall be used except for the purpose of experimentation, and then only upon or over the experimenter's own premises, until it has been inspected by the experts employed for the purpose by the commission and registered. The fee for registering a machine shall be $10. The registration number shall be painted on the underwing in letters readable at a height of 500 feet. No air machine shall be used for carrying passengers for hire until a special registration for that purpose has been obtained.

No machine shall be piloted over any ships or other craft at an altitude of less than 100 feet higher than the top of the highest mast, and an altitude of at least 200 feet shall be obtained before passing over any craft.

No air machine shall fly over a city at an altitude of less than 3000 feet, or over any town containing less than 1000 people except at an altitude of at least 500 feet, or over any town containing more than 5000 people except at an altitude of 1000 feet, or over an assemblage of people exceeding 100 in number at an altitude of less than 500 feet, or over isolated dwellings at less than an altitude of 200 feet, or over horses at less than 200 feet, or over driving horses or oxen at an altitude of less than 300 feet.

No missiles or other article shall be dropped from an air machine except with special permission of the commission. Air machines shall not land in highways or public parks. Violations shall be punished by fine of $25 to $500, or by imprisonment for not less than one month.

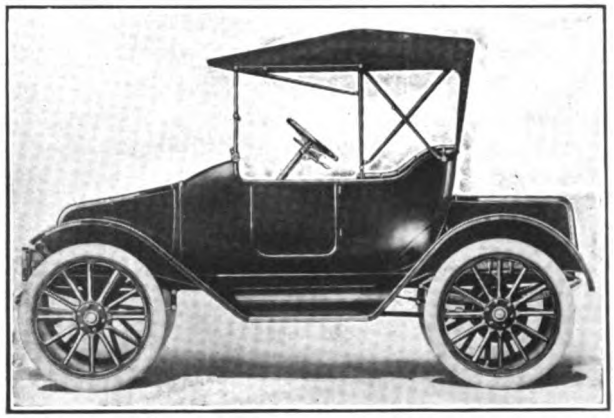
It shall be the duty of every city in the commonwealth to provide apparatus for determining the altitude and registration number of any air machine passing over the city.

M. Perreyon of France claims a new world's altitude record of 19,868 feet, made with a Bleriot monoplane at Buc, France, March 11. The previous mark was held by Roland Garros also of France, who drove his Morane-Saulnier monoplane to an altitude of 18,378 feet at Tunis, Africa, Dec. 11, 1912. The new record, if accepted by the Federation Aeronautique Internationale, will return the honor to the Bleriot, which held the mark at 16,405 feet after Garros' flight in a machine of that make Sept. 6, 1912, and lost it to Legagneux in a Morane-Saulnier, who reached an altitude of 17,880, Sept. 17, 1912.

NEW ROADSTER MODEL.

Baker Motor Vehicle Company Announces Addition to the Baker Electric Line.

In an effort to supply what is regarded as an electric machine which will make its appeal to business men and others, the Baker Motor Vehicle Company, Cleveland, O., has added a Baker electric roadster, which is supplied with either wheel or lever steering mechanism at the option of the purchaser. An accompanying illustration presents the attractive lines, and it may be stated that the construction in every way conforms to the standard set by this company.



New Roadster Model Added to the Baker Electric Line.

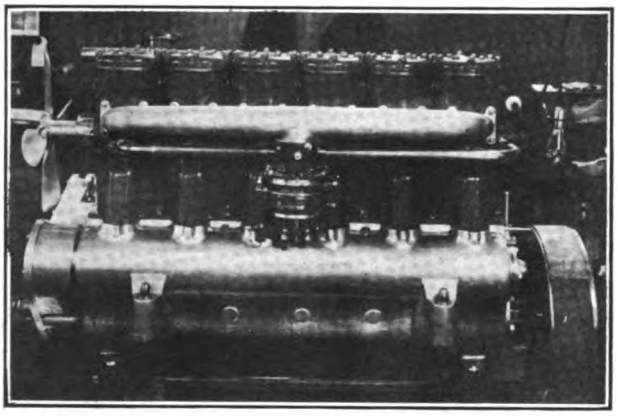
The battery equipment consists of a 32-cell, 11 M. V. Hycap-Exide, made by the Electric Storage Battery Company, Philadelphia, and other fittings include a Tuto horn, made by the Dean Electric Company, Elyria, O.; complete set of lamps, side curtains, Weston volt-ammeter, shaft odometer, rain vision windshield, special electric pneumatic tires, best quality mohair collapsible top, etc. The wheelbase is 88 inches and the tread 50. The standard finish is blue with blue upholstery, but special painting may be had upon order, without charge, upon 30 days' advance notice.

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K-D SIX-CYLINDER CAR.

One of the Really New Features at the Recent Automobile Show in Boston.

Last year one of the features of the Boston automobile show was the new K-D motor, de-



Six-Cylinder Disc Valve Motor Utilized in K-D Car.

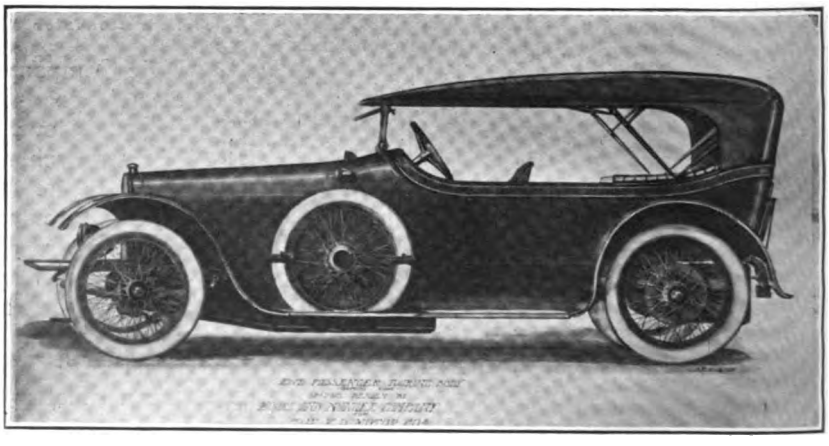
signed by Miss Margaret Knight of South Framingham, Mass. Briefly described, this was a four-cylinder, sleeve valve engine, in which two half-sleeves were made to perform the necessary functions for intake and exhaust. Subsequently, Miss Knight and Mrs. Davidson, who was associated with her in placing the motor in the market, organized the K-D Motor Company, which is understood to have acquired a plant near Boston.

This year the K-D motor was again one of the features of the display, but the engine was shown in six-cylinder form. In addition there was at this stand a chassis frame, surmounted by a completely equipped body, and announcement was made that the company was prepared to take orders for K-D cars to be delivered in September. Accompanying illustrations present the motor and the car as shown.

The motor does not differ materially from its predecessor, at least in principle. It is a six-cylinder unit, and some changes have been made in its general design and appearance, but the method of operation is essentially the same. And while the motor was of interest in itself, the design of the car was sufficient to hold the attention of those who visited the booth.

It is the work of Moore & Munger, Brookline, Mass., and has a decidedly distinctive appearance. In some respects it follows foreign lines to a certain extent. Examination of the illustration will indicate that the only entrance to the car is through the door leading to the tonneau proper. The individual front seats are separated by a liberal passage, and both are set at a decidedly comfortable angle. The cowl dash fully protects the occupants in every way. The rear compartment is fitted with every convenience for easy riding and the inlaid cases on either side serve to give an additional touch of refinement.

The exterior presents low, sweeping lines, merging at the dash and hood, which slope into each other in a pleasing manner. A hooded ventilator immediately in front of the dash, and the side lights, which are partially concealed, blend well with the remainder of the design. The extra Rudge-Whitworth wire wheel is carried in suitable brackets at the side, indentations in the running board being provided for two of these members if desired.



K-D Touring Model Revealed at Boston Show—Body by Moore & Munger and Chassis by Miss Margaret Knight.

According to statistics compiled by the office of public roads at Washington, D. C., the State of Rhode Island leads all others in the percentage of roads that have been improved. Not less than 49.1 per cent. were improved. Massachusetts is second with 49 per cent. and Indiana follows with 36.7 per cent. Next in order come Ohio, Connecticut, New Jersey, Kentucky, Vermont and California, the latter having 17.87 per cent. The states of Wisconsin, New York, Maryland, Utah, Tennessee, South Carolina, Maine and Michigan range from 16 to 10 per cent. North Dakota, which has only .23 per cent., is at the foot of the list.

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WANTS TRAFFIC CENSUS.

Good Roads Board of American Automobile Association Advocates Definite Plan.

That the failure of many roads to stand up under the traffic is due, not as many persons suppose, to inferior materials and workmanship, but to the lack of preliminary information as to the traffic the road was expected to stand, is the argument presented by the national good roads board of American Automobile Association. As a result, it is maintained that roads have been built which would have lasted for years under other conditions, but are now in ruins, due to the absence of data which the engineering profession in any other branch of work would consider essential.

This board advocates the taking of a road traffic census, following somewhat the lines laid down by the state highway commission in Massachusetts. It is contended that at first, in view of the changes in traffic and traffic conditions, which are being made rapidly and constantly, census should be taken at least four times a year, last at least a week at each period and cover the principal roads entering every city in the state. After a few years it is held that the establishment of practical standards, from which estimates could be made, would obviate the necessity for frequent countings. The board believes that the saving which would be effected in road construction would be such as to make the expense of the census seem trivial.

In this connection it is of interest to note a quotation from the Engineering Record of March 15 on this subject, as follows:

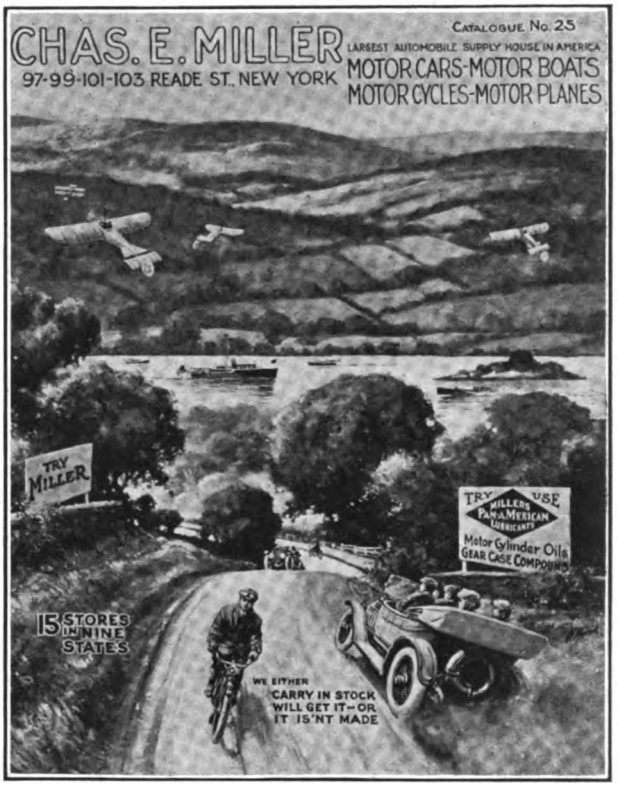
Without knowing the wear a road has there is absolutely no way of telling whether it is good or bad; only a careful traffic census can determine this. Roads too costly have been constructed in some places; in other places roads unsuited to the traffic have been built. In view of this well known fact it is evident that a traffic census is an essential to economy in nearly all road building. Imagine a bridge designer making plans for a structure without anything more than a rough guess whether it was to be used by steam railways or trolley cars, and we have an idea of the absurdity of proceeding with road building without traffic data.

MILLER'S ANNUAL CATALOGUE.

Attractive Cover Design Adequately Forecasts Nature of Its Contents.

The 25th annual catalogue issued by Chas. E. Miller, 97-103 Reade street, New York City, still further accentuates the pioneer position occupied by this house in the automobile accessory field. This edition will be ready for distribution about April 10. A reproduction of the front cover is presented herewith, and it will be conceded that it is one of the most artistic yet developed by that concern. The appearance thereon of the automobile, motorcycle, motor boat and aeroplane, indicates in a striking manner the nature of the accessories carried in stock.

The year 1913 marks a new departure, in that the policy of the house has been extended to include delivery of goods to any part of the United States by freight, express or parcel post. Although 15 branch stores are maintained in New York City, Brooklyn, Buffalo and Albany, N. Y.; Boston and Springfield, Mass.; Hartford, Conn.;



Presenting the Cover Design on Chas. E. Miller's Annual Catalogue.

Detroit, Mich.; Cleveland, O.; Philadelphia, Penn.; Atlanta, Ga.; New Orleans, La., and Newark, N. J., in addition to the main headquarters, this plan virtually places the immense Miller service in direct reach of all. The catalogue is complete in every respect, Miller's position as manufacturer, jobber, importer and exporter, being somewhat novel in the industry.

Joseph H. Weeks, chairman of the good roads committee of the Pennsylvania Motor Federation, recently appeared at Pittsburg and urged the motorists to unite in asking the legislature to pass the bond issue of $50,000,000 for good roads.

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THE REPAIR SHOP AND THE GARAGE.

Features of New Daimler Carburetor Having Seven Jets and Six Distinct Air Passages---Adjusting Lighting Dynamos and Locating Grounds.

ANNOUNCEMENT is made of a new Daimler carburetor, an English design, which presents interesting features in that there are seven jets supplied with gasoline at a constant level from the conventional type of float chamber. A part sectional sketch of the vaporizer is shown at Fig. 1 and it will be noted that six of the jets are arranged in a circle with the seventh in the centre. The last named jet is utilized for starting and when the motor is operating at a slow rate of speed. Its opening is adjustable by a taper needle valve much in the same manner as with American carburetors, although with the Daimler provision is made for locking the adjustment by means of a nut. This prevents jarring loose of the low speed adjustment or tampering with it.

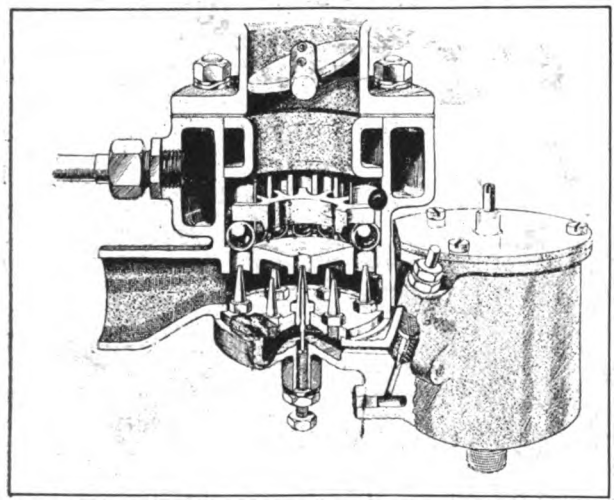


Fig. 1—Sectional Sketch of Daimler Seven-Jet Carburetor, Making for a Flexible Motor.

The main supply of gasoline from the float chamber to the fuel space below the multiple jets is also variable as to the quantity which can pass by another needle valve, adjustable in a similar manner as the starting needle member. The carburetor illustrated is designed for six-cylinder motors, and the needle is held off its seat normally by a spring, but is depressed by a contact lever, not shown in the drawing, which can be connected to the throttle lever or operated from the dash or other point convenient to the driver.

The arrangement of the six concentric jets is shown at Fig. 2 A and the utilization of the steel balls is similar to that employed by a well known make of American carburetor. The tip of each of the six jets in the Daimler is in its own choke tube, which is normally closed by a steel ball, this being lifted from its seat by the suction of the piston. There are also six air passages arranged alternately with the chokes, and each of these has a ball to close it normally. A bottom view of the choke tubes and air passages with their balls, and showing their arrangement in relation to the position of the central jet choke, is presented at Fig. 2 B.

Resting on all except one of the 12 steel balls is a spider weight with 11 arms, the 12th being represented by a gap past which one of the balls may be lifted by the initial increase of suction as the throttle is opened. In other words, when the motor is operating on the central jet and the throttle is opened one each of the balls covering a jet and choke tube has a lead over the others in responding to the increased suction. The remaining balls are lifted subsequently, but before they can rise the weight of the spider must be overcome to a greater or less extent. Each ball has a groove of its own, so that when it is lifted it must rise vertically, and when it falls it drops directly back on its seating.

The mixture from each of the jets and air passages combines immediately it leaves the various choke tubes, and passes up to the butterfly valve throttle placed across the induction pipe just above a hollow distance piece, which prevents the balls rising above the top of their respective grooves.

The carburetor is hot water jacketed at a point above the normal position of the balls, as shown in the drawings. The float chamber and fuel chamber carrying the jets may be removed easily when desired by disconnecting the feed pipe and slacking two wing nuts on hinged bolts. The advantage claimed for the carburetor is its quick response to varying positions of the throttle.

DYNAMO CLUTCH ADJUSTMENT.

It is only natural to assume that the owner of a car fitted with electric lighting and motor starting systems will turn to the garage repairman when trouble is experienced with the equipment. But it is possible that the owner may tamper

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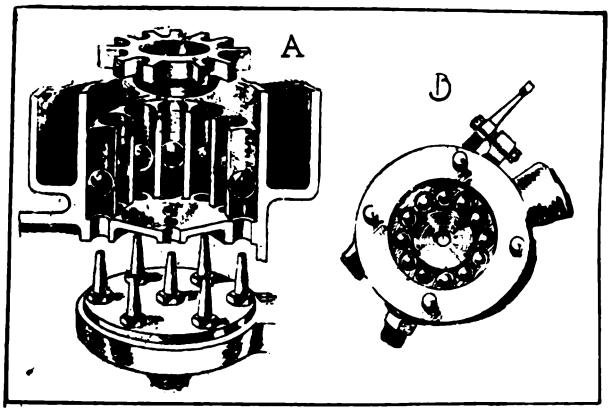


Fig. 2—Daimler Carburetor: A, Showing the Steel Balls Raised Above Their Seatings and the Spider Weight; B, Bottom View of Choke Tubes and Air Passages Covered by the Steel Balls.

with the adjustments in an endeavor to secure maximum efficiency from the lamps when these members are at fault or have been replaced and not focussed properly.

Some lighting systems provide for regulating the output of the dynamo, among which is the Gray & Davis, fitted to a large number of 1913 models. Although it should not give trouble, it is possible through tampering by the owner that the output of the generator may be altered.

Before arriving at the conclusion that the dynamo is at fault the wiring should be examined thoroughly. Grounds occur when any two wires of opposite polarity come in contact with any conductive material and are indicated by the lights appearing to go out, although really glowing very faintly. One of this type will very soon discharge the battery.

The best method for testing is by utilizing a voltmeter. Disconnect and remove the battery from the car. Connect one side of the battery to the frame and the other to one wire of the voltmeter. Next touch with the free wire of the voltmeter each terminal of the junction box. If any deflection is noted, it indicates a ground. Disconnect each wire from the junction box, repeating the aboye test as each is displaced.

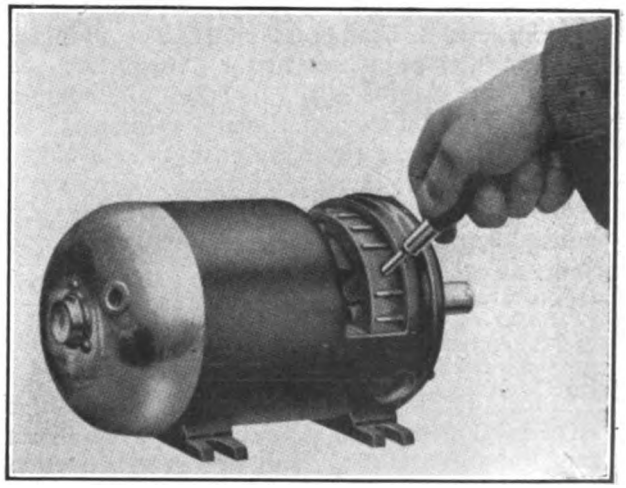
It is best to disconnect wires marked "to lower terminal of ammeter" and "to series dynamo." If the junction box then shows a ground, the trouble is in the lamp wires, and can be located by tracing the defective wire its entire length. If the ground is indicated when touching the wires leading from the junction box to the ammeter and dynamo, disconnect them at the ammeter and dynamo and repeat the voltage test. In this way, proceeding from terminal to terminal, the defective connection or worn place in the wire can be located without difficulty.

A slight ground may be due to the ground connection having such high resistance that only a small amount of current is lost. This is indicated by the battery not holding its charge and in some instances being entirely discharged over night. This trouble is first noticed when the lights seem to be dim at low car speeds, but brighten as the dynamo cuts in.

If, upon the conclusion of all tests it is shown that the dynamo is not giving its designed output, the clutch may be adjusted. This is accomplished by removing the outside cover and revolving the governor inside the shell until the opening in the shoe marked with a notch coincides with the drill hole in the shell. To increase the driving force of the clutch; that is, to augment the output of the dynamo, the screw is turned to the right. A screw driver .1875 inch wide is best adapted for the work. The method of adjusting the clutch is shown in an accompanying illustration. The governor action is very sensitive, and a full turn of the screw driver will make a considerable difference in the output of the dynamo. If not familiar with the operation of the dynamo, it is best to study the maker's instruction book, which should accompany each equipment.

SOFTENING CAST IRON.

To soften cast iron for drilling, heat the part to a cherry red, and have it lie level in the fire. Then with the tongs put on a piece of brimstone, a little smaller in size than the hole to be drilled. This softens the iron entirely through. Let the piece remain in the fire until cooled. It will then be ready to work and soft enough to drill.

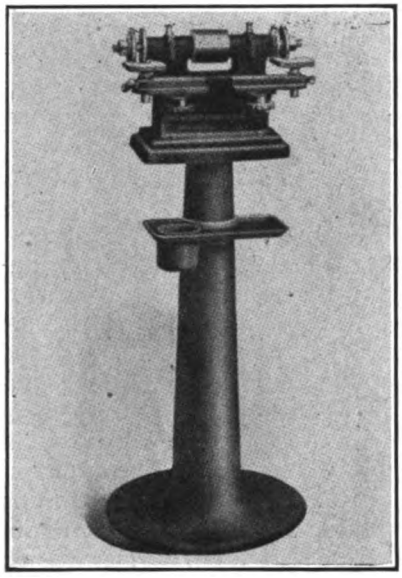


Showing Method of Adjusting Clutch of the Gray & Davis Lighting Dynamo.

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GARAGE AND REPAIR SHOP EQUIPMENT.

ABRASIVE wheels, even for rough grinding, should be substantially mounted to render them safe, as well as to perform satisfactory work. Emery wheels are essential to the equipment of a well appointed repair shop and they should run true if good results are to be obtained. The Webster & Perks Tool Company, Springfield, O., specializes in grinding and polishing machinery and in an accompanying illustration is presented a No. ¾ floor grinder, which is one of its many products.



Webster & Perks Grinder.

The steel spindle is 16.75 inches long and the diameter of the spindle between bearings is .875 inch, that between the flanges, .75 inch. The bearings are four inches long and the distance between the wheel is 12 inches. The diameter of the flanges is 3.5 inches. The pulley has a diameter and face of three inches and will swing wheels 10 inches in diameter by one-inch face and smaller. The height from the floor to the centre of the spindle is 41 inches and the top plate, where the head bolts on, is 9.5 by 13 inches. The diameter of column at the floor is 17 inches and the net weight is 175 pounds. The countershaft driving pulley is 12 inches in diameter by 2.25-inch face and tight or loose pulleys have a five-inch and 2.25-inch face. The net weight is 50 pounds. Complete details of its grinding machinery will be forwarded upon request by the company.

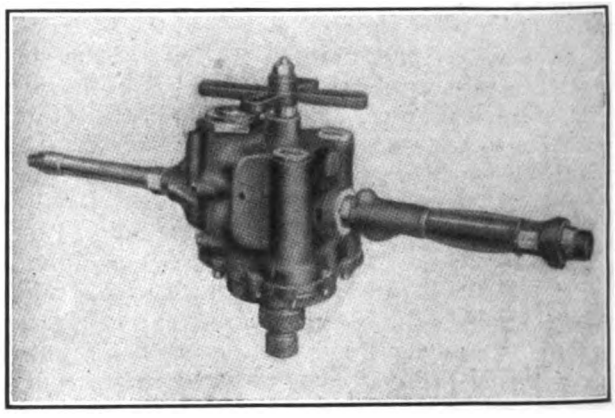
LITTLE DAVID PNEUMATIC DRILL.

Little David pneumatic drills are manufactured by the Ingersoll-Rand Company, 11 Broadway, New York City, and are designed to be operated by compressed air. That shown in an accompanying illustration is the No. 2, adapted for medium drilling, reaming, tapping, etc., and is fitted with a No. 3 Morse taper socket and .6875-inch square tap socket. Simplicity and interchangeability of parts are features emphasized in the tool, also convenience in handling and control.

The motor or engine is of the angular, four-cylinder, single-acting, reciprocating type, each pair of pistons being attached to opposite throws of a double crankshaft, each acting in balance, insuring smooth running. The drill is built reversible, but may be made non-reversible by simply inserting a small pin in a hole provided in the throttle handle. The valve action is such that there is no compression of exhaust, no matter which way the drill is operating.

The valves are geared to the crankshaft through the medium of a spindle gear and live air is admitted to the pistons alternately through two valves, one set of pistons being under compression while the other two are exhausting. The air enters a port in the throttle handle and travels to two ports. As the crankshaft revolves it in turn rotates the main gear to which the valves are geared and connects ports permitting the air to pass into a cylinder. Both cylinders take air for 120 degrees of the stroke. The piston also uncovers an exhaust slot in the side of the cylinder, allowing the drill to exhaust directly to the atmosphere.

High grade material and workmanship are incorporated and the crankshaft rotates in F. & S. ball bearings of liberal size. The spindle is provided with a thrust bearing interposed between



Little David Pneumatic Drill Which Is Held to Possess Many Advantages.

the shell and feed spindle. It is machined to receive standard Morse taper shanks and is threaded on the end so that chucks or other special at-

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tachments can be utilized. An ejector pin is provided with the feed screw attachment for ejecting twist drills, reamers, etc., from the spindle by screwing the feed screw down to the lowest point. The feed nut centre serves as a supplementary feed, giving a considerably longer feed than with ordinary drills.

Two handles are provided, one containing the throttle valve and air hose connection, the other being a plain or dead handle. The latter is arranged for supplying lubricant to the drill. The maker points out that the ribbed design of the throttle sleeve is better suited for its particular function than knurled sleeves, as slipping of the operator's hand is prevented by eliminating grease, dirt, etc. The shell is so designed that the entire motor apparatus is assembled or disassembled through the crankcase by the removal of the cover. The company will forward a booklet on its drills upon application.

Following the practise of previous years, accessory makers are to offer special prizes for drivers of cars utilizing their product in the 500-mile international sweepstake race on the Indianapolis motor speedway, Memorial Day. The Bosch Magneto Company, New York City, will make three awards, conditional upon the use of Bosch ignition, these being as follows: To the winning driver, $500; driver of the second car, $300; third car, $200.

To encourage visits by the engineering classes of the large universities, the sales department of the Lozier Motor Company, Detroit, has issued invitations to the more important colleges throughout the country for a visit of inspection to the Lozier factory at Detroit. Acceptances already have been received from several universities in the vicinity of Detroit.

FORMULAE AND USEFUL MECHANICAL TABLES.

Decimal Equivalents of Millimeters.

The accompanying table of decimal equivalents of millimeters and fractions thereof will be of service when the metric measurement is utilized.

Leather and Iron Cement.

To face a cast iron pulley with leather apply acetic acid to the face of the pulley with a brush, which will roughen it by rusting. When dry apply a cement made of one pound of fish glue and half a pound of common glue, melted in a mixture of alcohol and water. The leather should be placed on the pulley and dried under pressure.

Removing Rust from Nickel.

Rust may be removed from nickel by smearing the parts with grease and allowing it to remain several days. If the rust be not deep it will come away with the grease when the latter is removed by a cloth dipped in ammonia. If the rust be very deep, apply a diluted solution of hydrochloric acid, taking care that it does not touch the metal. Wash and polish in the usual manner.

Testing Steel and Iron.

Nitric acid will produce a black spot on steel, the darker the spot the harder the steel. Iron, on the contrary, remains bright if touched with nitric acid. Good steel in its soft state has a curved fracture and a uniform gray lustre; in its hard state it is a dull, silvery uniform white. Cracks, threads or sparkling particles denote poor quality. Good steel will not bear a white heat without falling to pieces, and will crumble under the hammer at a bright, red heat, while at a mild red heat, it may be drawn out under the hammer to a fine point.

Aluminum Solder.

An aluminum solder may be prepared from 50.03 parts zinc, 47.99 parts tin, 1.76 parts aluminum and .22 parts phosphorus. The phosphorus should be added to the other materials in the following manner: Take a piece of one-inch gas piping, about 12 inches long, and screw a cap on at one end. A tin plug may be utilized to close the other opening. The phosphorus should be dried between blotting paper and exposed to the air as little as possible. Remove the cap from the tubing, drop in the phosphorus and replace the cap. The tinned end of the pipe is next dropped into molten tin, the heat of which will be sufficient to melt the plug, and the phosphorus will be mixed with the molten metal without danger. The zinc and aluminum can then be added until the whole forms an alloy. The prosphorus acts as a flux, and consequently, no sal ammoniac or spirits will be required when making a joint. An ordinary copper bit should be utilized.

mm.	Inches.	mm.	Inches.	mm.	Inches.	mm.	Inches.
1/100	=.00039	33/100	=.01299	64/100	=.02520	95/100	=.03740
2/100	=.00079	34/100	=.01339	65/100	=.02559	96/100	=.03780
3/100	=.00118	35/100	=.01378	66/100	=.02598	97/100	=.03819
4/100	=.00157	36/100	=.01417	67/100	=.02638	98/100	=.03858
5/100	=.00197	37/100	=.01457	68/100	=.02677	99/100	=.03898
6/100	=.00236	38/100	=.01496	69/100	=.02717	1	=.03937
7/100	=.00276	39/100	=.01535	70/100	=.02756	2	=.07874
8/100	=.00315	40/100	=.01575	71/100	=.02795	3	=.11811
9/100	=.00354	41/100	=.01614	72/100	=.02835	4	=.15748
10/100	=.00394	42/100	=.01654	73/100	=.02874	5	=.19685
11/100	=.00433	43/100	=.01693	74/100	=.02913	6	=.23622
12/100	=.00472	44/100	=.01732	75/100	=.02953	7	=.27559
13/100	=.00512	45/100	=.01772	76/100	=.02992	8	=.31496
14/100	=.00551	46/100	=.01811	77/100	=.03032	9	=.35433
15/100	=.00591	47/100	=.01850	78/100	=.03071	10	=.39370
16/100	=.00630	48/100	=.01890	79/100	=.03110	11	=.43307
17/100	=.00669	49/100	=.01929	80/100	=.03150	12	=.47244
18/100	=.00709	50/100	=.01969	81/100	=.03189	13	=.51181
19/100	=.00748	51/100	=.02008	82/100	=.03228	14	=.55118
20/100	=.00787	52/100	=.02047	83/100	=.03268	15	=.59055
21/100	=.00827	53/100	=.02087	84/100	=.03307	16	=.62992
22/100	=.00866	54/100	=.02126	85/100	=.03346	17	=.66929
23/100	=.00906	55/100	=.02165	86/100	=.03386	18	=.70866
24/100	=.00945	56/100	=.02205	87/100	=.03425	19	=.74803
25/100	=.00984	57/100	=.02244	88/100	=.03465	20	=.78740
26/100	=.01024	58/100	=.02283	89/100	=.03504	21	=.82677
27/100	=.01063	59/100	=.02323	90/100	=.03543	22	=.86614
28/100	=.01102	60/100	=.02362	91/100	=.03583	23	=.90551
29/100	=.01142	61/100	=.02402	92/100	=.03622	24	=.94488
30/100	=.01181	62/100	=.02441	93/100	=.03661	25	=.98425
31/100	=.01220	63/100	=.02480	94/100	=.03701	26	=1.02362
32/100	=.01260						

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CATARACT TIRE POLICY.

Careful Study of Production Problem Results in Improved Manufacturing Methods.

In view of the rapid development of the automobile industry, it is not surprising that it has taken much time and experimentation to produce equipment that may be regarded as perfected in every respect. This applies particularly to the matter of tires, which have been considered by many motorists as presenting the chief source of expense in the operation of a car. Tire manufacturers have realized this and have devoted a large amount of effort in solving some of the peculiar problems arising in this field. William J. B. Hackett, sales manager of the Cataract Rubber Company, with main office at Boston, factory at Wooster, O., and branches in a number of the larger cities, calls attention to some of the improvements in manufacture adopted by his concern, which should prove of decided interest to the owner. Mr. Hackett calls special attention to the composition of the product as well as the methods used in curing, etc. He writes as follows:



William J. B. Hackett, Sales Manager, Cataract Rubber Company.

The Cataract Rubber Company is using the highest grade of longest staple Sea Island cotton fabric produced in this country, and under several tests on a fabric testing machine it shows a minimum breaking strength of 430 pounds. Coupled with this fact, the weave is such that the rubber friction adheres to the minute perforations with a grip obtainable in no other way. We use more rubber between our fabric, resulting in more resiliency and prolonging the life of the tire where the strain is the greatest.

The system of mold equipment used by our concern produces a real live steam cured tire, as the mold ring extends about one-third of the way above the bead, exposing the entire tread surface to the steam. This also eliminates all possibility of fabric troubles, such as mold pinching, separation of the plies and buckling of fabrics.

In building up the tire it is carefully calipered at each stage of the construction. Therefore, when our final wrapping of the tread is completed we have a casing ready for insertion in the vulcanizer that is symmetrically perfect. As the mold rings in this system weigh about 40 pounds complete, all possibility of injury from weight during the curing process is avoided.

The Cataract Rubber Company guarantees its casings for 4000 miles and issues a signed certificate with each. We are pleased to state, however, that we have hundreds of users averaging better than 5000 miles on such cars as the Pierce-Arrow, Lozier, Simplex and Alco.

Our company is producing two types of inner tubes. One is a heavy, substantial red tube with a larger percentage of pure gum than usual. This is what we call the "come back." That is, it assumes its natural size after it has been inflated a month or two. We recommend this tube for high powered cars doing severe duty. The Cataract gray tube comprises what is known as a floating stock gum tube, having 90 per cent. of pure gum and making for resiliency and long life. It is our experience that this type outwears three casings.

Beginning with 50 tires a day the company will reach an output of 100 shortly, and it will not surprise the writer to see this increased to 500 a day within a year. In connection with our pneumatic production, we have, in the Cataract diagonal block truck tire, the solution most needed from the standpoint of economy and service in commercial vehicles. These are guaranteed for 10,000 miles and have shown over 12,000 miles on a three-ton Packard rear wheel. The truck is owned by the Adams Express Company and operated in New York City.

WOULD ORGANIZE BUYERS.

H. E. Gilman Has Plans for a National Association of Purchasing Agents.

The following communication is submitted by H. E. Gilman, now with the Marathon Motor Works, Nashville, Tenn., maker of Marathon cars. He believes there is opportunity for the organization of the buyers in the industry and his letter is self-explanatory.

About three years ago—when residing in the East—I conceived the idea of the formation of "The Buyer's Club of America" and carried this project almost to the point of incorporation, but when I left and went to the Middle West to reside, temporarily, gave up the idea.

At the time I endeavored to promote this scheme I wrote several hundred letters to leading buyers of the country, and practically every reply received showed that the scheme was met with great enthusiasm; in fact, a great number of buyers congratulated me on taking the initiative to bring together those affiliated with the buying interests of this country. It is manifest that the benefits to be derived are manifold.

It would be my idea to have the headquarters of this club either in New York or Chicago; using the top floor of some hotel centrally located, fitting it up in the most modern way and having everything connected with it up-to-the-minute. The object of this club would be—tersely speaking—to bring closer together those connected with the purchasing end of our organizations. There would undoubtedly be a mutual helpfulness resulting.

There is no such organization in existence today, and if the traffic men, engineers and men of other vocations of life can maintain a club, why cannot we purchasing agents do the same thing? Anybody connected with the metal industry would be eligible to membership. This organization, when once perfected, will not only be national, but will be international in its scope.

At the time I originally thought of this idea the Iron Age gave me an editorial, and numerous letters, both foreign and domestic, were written me on the subject, showing that great interest was manifested. What I want you to do is to give me a small space in your editorial columns and request any purchasing agent who might read the article to communicate with me direct, in care of the Marathon Motor Works, Nashville, Tenn., and I would be most pleased to receive your comments and criticisms pro and con on this subject.

I have the by-laws drawn up and the certificate of incorporation ready to be executed.

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IN THE REALM OF THE MOTORCYCLIST.

Arrangements Practically Completed for Fourth of July Classic Road Races Over Elgin Circuit---Items of Interest to Rider, Manufacturer and Dealer.

CONSIDERABLE interest attaches to the arrangements for the long distance classic motorcycle road races over the Elgin speedway course, Elgin, Ill., July 4. Entry blanks are now being distributed by R. R. Hill of the Chicago Motorcycle Club, 3518 Ellis avenue, Chicago, and the lists will close May 15, although post entries will be received at a fee of $25 a machine until June 15. The regular entry fee is $10 a machine. It is understood that opportunity may be had to secure a position even after June 15 upon payment of $100 a machine. The conditions are:

The contest will be divided into two classes, one for professionals and the other for amateurs. The distance for the professional class will be 250 miles, and for the amateurs 175. Both events will be run at the same time. The engine limit in each case will be the same, 61 cubic inches piston displacement. Only 1912 or 1913 models of any make will be eligible for competition. Factory entries will be limited to teams of four, and the right is reserved to reject any entry.

The prizes will be: Professional class—First, $500 cash; second, $250; third, $100. Amateur class—First, merchandise to the value of $250; second, value $125; third, value $75.

Motordrome Racing Circuit.

Motorcycle racing in Detroit will start May 14 or 21, depending upon the completion of the new quarter-mile motordrome now in course of construction on Jefferson avenue, opposite the factory of the Hudson Motor Car Company. The concern back of the venture has become incorporated with a capital of $20,000 and is known as the Detroit Motordrome & Amusement Company. Those interested are: E. H. White, A. J. Bath, E. R. Martin and John A. Wilson.

Racing will be carried on during the entire season from May until late in the fall, Wednesday, Saturday and Sunday evenings of each week, with occasional Saturday afternoon meets. These will form a part of the circuit championship races of the American League of motorcycle tracks or motordromes, of which that city is a member. A well organized team to represent Detroit will be formed to be composed largely of Detroit riders, probably including John Clarke, who made a sensation last year by his fast riding. Of the five tracks composing the circuit, the St. Louis, Cleveland and Chicago motordromes are all ready for racing. Work has started on the Cincinnati track, which will be located at Lagoon park, Ludlow, Ky., on the opposite side of the Ohio river, and it soon will be in condition.



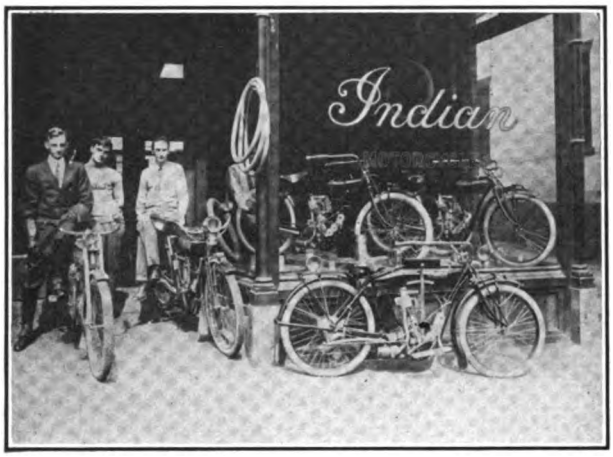
Group of Flying Merkel and Thor Riders in Front of the Merkel-Thor Agency Conducted by Finch & Hayes in Hartford, Conn.

New Clubs Recently Affiliated.

Following are the new F. A. M. affiliated motorcycle clubs, as reported by Secretary G. B. Gibson, Westboro, Mass.: Freeport, Ill., 19 members, secretary, Joseph Kegel, 44 South Galena avenue; Newburg, N. Y., 17 members, secretary, L. Levy, 7 Water street; Malta Motorcycle Club, Buffalo, N. Y., 14 members, secretary, Will-

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iam J. Korn, 7 Oak street; West Philadelphia, Penn., 24 members, secretary, R. D. Cummins, 1031 Belmont avenue; Ashland, O., 16 members,



Indian Agency Maintained by Motorcycle Supply Company, Pawtucket, R. I.

secretary, George A. Swartz, 819 College boulevard, Ashland.

Will Distribute Flying Merkels.

The Miami Cycle & Manufacturing Company, Middletown, O., maker of Flying Merkel motorcycles, has appointed the following distributors: B. B. Millison, Steubenville, O.; Standard Auto Company, Coshocton, O.; K. I. Konvalinka, Mason City, Ia.; W. F. Martin, Washington Courthouse, O.; A. Buckham, Edmonton, Can.; Behrens & Bushnell, Ivoryton, Conn.; R. W. Snipes, Americus, Ga.; Hesse Motor Company, Leavenworth, Kan.; Charles Sackett, Keene, N. H.; W. W. Cooper & Co., Ashland, O.; Miller & Co., Bradford, O.; J. P. Wolf, York, Penn.

Los Angeles "Sunset Ramble."

The Los Angeles Motorcycle Club, Los Angeles, Cal., is preparing plans for its 10 days "Sunset ramble," which will take the place of the annual endurance run. There will be numerous divisions, each in charge of a competent lieutenant, and at the end of each day's run a banquet and entertainment will be held. The distance to be covered during the 10 days will be 853 miles, through the mountains and along the seashore. The itinerary for the trip will be as follows: Los Angeles to Santa Barbara, San Luis Obispo, Hanford, Merced, San Jose, Paso Robles, Pisneo Beach, Santa Barbara and return to Los Angeles. S. H. McCulloh, secretary of the Los Angeles club, 449 West Jefferson street, that city, can furnish information to all inquirers. The ramble is open to motorcycle riders throughout the country.

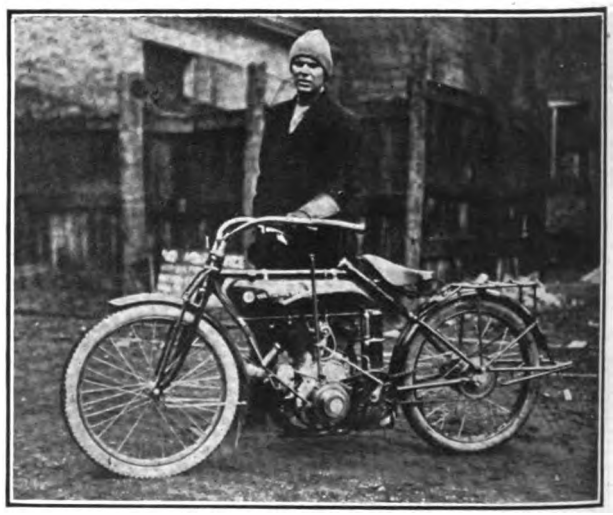
Motorcyclists Guard President Wilson.

Among the many precedents that have been discarded by President Wilson is that under which former presidents have carried a uniformed aid with them in the automobile. President Wilson has substituted two motorcycle officers and will be guarded by them hereafter in his drives about Washington. The change was made the day after the inauguration. Greater personal safety is held to be assured as the motorcycle officers can watch both sides of the street, whereas the uniformed guard who rode in the automobile could see but one side easily. And in case pursuit is necessary no dependence is placed on the automobile.

Promotion for Mershon.

C. R. Mershon, who has been travelling over the entire country in the capacity of service man for the Miami Cycle & Manufacturing Company, Middletown, O., in the interest of Flying Merkel motorcycles, has been called in from the road to become final inspector and chief of the inspection department. He now has under him about 25 testers and every machine that leaves the Flying Merkel factory will be thoroughly tested on the road before being shipped.

Mershon has had an interesting experience in the motorcycle field. He is a native of Iowa and graduated from the bicycle business. He has visited every state in the Union and began selling Merkels in 1901 on the Pacific Coast. For three years he was on the Kansas City police force, and



C. R. Mershon as Travelling Representative for Flying Merkel Motorcycles.

besides riding a machine on his tour of duty had complete charge of the department's 38 motorcycles. He left the police force to take the trav-

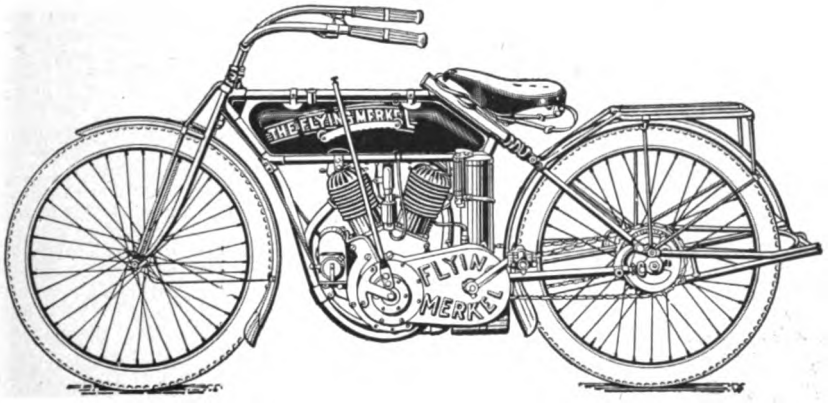
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1913 1913

THE FLYING MERKEL

MOTORCYCLES BICYCLES

The Prize-Winning "YELLOW JACKET" Model



THE ONLY SELF-STARTING, TWO SPEED ADJUSTABLE SPRING FRAME MOTORCYCLE IN THE WORLD

The Real Sensation at All the Big Shows

Years Ahead of the Nearest Competitor

EASY TERMS TO ANYONE IN NEW ENGLAND

Any make machine in any condition taken in trade. 150 second-hand machines of every make from $25 up. All second-hand machines are overhauled and guaranteed for one year. Sold on two weeks' free trial.

The Flying Merkel Bicycle with coaster brake at $25 is a wonderful value. Terms $10 on delivery, then $1 per week.

Some Good New England Territory Still Open

BEAUTIFUL ART CATALOGUE JUST OUT

AGENTS
BOYD MOTOR CO.
29 Stanhope Street,
Boston, Mass.

MFRS.
MIAMI CYCLE & MFG. CO.
731 Hanover Street,
Middletown, Ohio.

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elling position from which he has been promoted because of his indefatigable efforts on the road.

Motorcycles in South Africa.

Three years ago, motorcycles were used very little in Port Elizabeth and vicinity, in Cape Province, South Africa. There has been a decided change and these vehicles are now to be seen everywhere. There are now in Port Elizabeth 75 machines, of which probably 25 have side car attachments. An enthusiastic motorcycle club has been formed and several race meetings have been held recently.

Seeks Dr. Thornley's Place.

P. I. McIntyre of Cleveland, O., has announced his candidacy for the chairmanship of the F. A. M. competition committee, to succeed Dr. J. P. Thornley, the present incumbent. Mr. McIntyre was formerly a bicycle rider and is now



Claude E. Crout, Hyde Park, Mass., and His Eagle Twin.

a promoter of wrestling and boxing matches in Cleveland. He is president of the Cleveland Aerie of Eagles and names as references Francis Connery, city clerk; Philip McKenna, city solicitor; Thomas McHale, auditor of the Brunswick-Balke-Collender Company, and Thomas M. Cannon, high chief ranger of the Catholic Order of Foresters, all of Chicago.

Motorcycles in the Navy.

While the motorcycle is becoming well known for its usefulness in the United States army, it has also made some progress in the navy. It is impossible, of course, for the naval officers to spin over the deep, but with a keen anticipation of motorcycling possibilities while in port, several of the officers on the United States battleship Wyoming carry machines aboardship. When they are in port the motorcycles are removed from the special lockers in which they are stored, swung to a lighter by an electric crane and taken ashore. The officers thus have an opportunity to secure a more intimate view of the many countries which they visit.

Pleased with His Eagle.

Claude E. Crout of Hyde Park, Mass., rides an Eagle, made by the American Motor Company, Brockton, Mass., and he is so well pleased with his mount that he finds it impossible to express himself except in rhyme. Under the title of "The Eagle's Flight" Crout contributes the following:

When you see a rider go by
With a satisfied look in his eye,
With a silent exhaust
Running smooth as a ghost
It's an Eagle.

Then to catch him, you try with your might,
But he always is just out of sight,
You tinkered, and my! how you swore,
But the other guy always had more
On his Eagle.

'Round the bend with a swoop and a tear,
But you find that nothing is there
But a whirl in the dust
And the sound of the rush
Of the Eagle.

There's a hill right ahead that you know
Makes most of the boys go quite slow,
But somehow the hill
Was not the same pill
For the Eagle.

You arrive at the top with disgust
Seeing only a hole in the dust.
Well, it's no use to kick
If you made the wrong pick.
Get an Eagle.

That Stolen Merkel.

Recently The Automobile Journal called attention to the loss of a six horsepower Flying Merkel twin, with V type motor, bearing the factory number 3988, but neglected to state that when stolen the machine carried a Michigan license No. 2185 for 1912, and was the property of R. K. McCotter, Rochester, Mich. The Federation of American Motorcyclists pays a reward of $25 for the return of a stolen machine.

Hoover Organizes Ball Company.

L. J. Hoover, formerly manager of the Flanders Manufacturing Company's ball department, who purchased the ball machinery and the finished and unfinished stock of the receiver, will move his purchases to Ann Arbor, Mich., about June 1, when the new Hoover brick and concrete factory will be completed and ready for occupancy by the Hoover Steel Ball Company, which Mr. Hoover has organized. Associated with him are Frank Smith and C. E. Bowling, who have been engaged in the business for the past 15 years. Mr. Hoover has engaged in the ball making industry for 19 years, having at one time been

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superintendent of the Standard Roller Bearing Company and later one of the organizers of the Grant-Hoover Company.

Club Notes, Here and There.

The riders of Morgan Park, Ill., recently organized a motorcycle club, with a membership of 26 at the start, and plans are being laid for endurance runs and other competitions.

Northeast Baltimore, Md., now has a rider's organization which will be known as the Broadway Motorcycle Club, with headquarters at 1401 Broadway. The club has 10 members and the officers are: President, George W. Lowery; vice president, Harry Nickels; secretary and treasurer, William Johnson; captain, P. Allard.

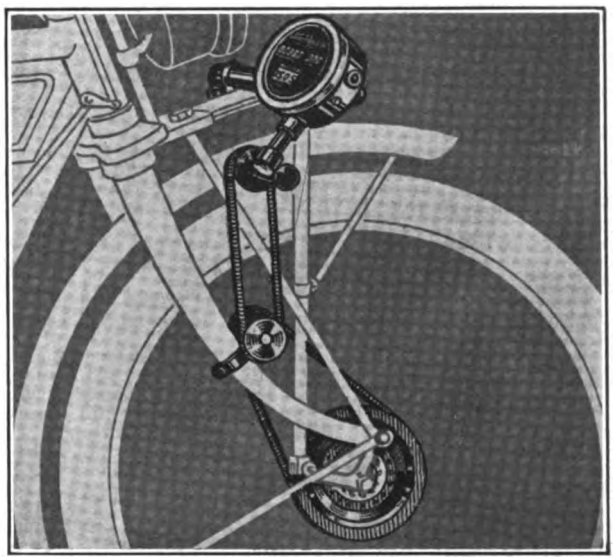
The Blue Island Motorcycle Club, Blue Island, Ill., has elected the following officers: President, B. Souerbier; vice president, George Robb; secretary-treasurer, E. P. Bauch; captain, W. Koenecke; directors, Charles Habich and William Jebens.

The Yale Motorcycle Club of Chicago has established club rooms at 1444 Hudson avenue.

A club has been formed at Dodge City, Kan., which has become affiliated with the F. A. M.

New Stewart Motorcycle Speedometer.

The Stewart-Warner Speedometer Corporation, 1826-1852 Diversey boulevard, Chicago, is presenting a new motorcycle speedometer of the magnetic type. The feature of the instrument is the provision made for the drive. As will be noted from the accompanying illustraton this consists of a two-belt arrangement, which is held to eliminate all possibility of vibration from jolts or jars. The front wheel driving pulley is solid steel, nickel finished, and the transmission pulleys are fibre. It is maintained that the belts grip



New Magnetic Type Stewart Motorcycle Speedometer with Two-Belt Drive.

the grooves in the pulleys and cannot slip.

The instrument is patterned directly from the automobile speedometer and is made on the same automatic machinery by the same skilled and experienced workmen. The dial is jet black, and the speed and odometer dials are pure white, so that the large figures can be read easily at a glance. The speed dial is operated by a polished steel magnet. The three-inch dial face also carries a Stewart odometer with a season register of 100,000 miles and a trip register with a capacity for 100 miles and repeat. The latter may be reset to any mile or any tenth of a mile, without disturbing the record of the season register in any manner. Full information will be furnished upon application to the home office of the company or any of its many branches in the principal cities.

INDIAN RIDERS

Cold weather is here. Motor turns over hard. Very hard work to get started. A little kerosene or gasoline injected into cylinder head will remedy this at once. A priming cup is needed in top of cylinder head as it takes too much time to take out spark plug each time. Indian riders, send at once for a finely made and finished priming cup to fit top of cylinder head of your Indian. Price, postpaid, $1 each. Money refunded if you are not satisfied.

B. A. SWENSON 522 Broad St., Cor. Blackstone St., Providence, R.I.

1913 F. N. SHAFT-DRIVE MOTORCYCLES.

Lightweight Single, with Two-Speed Gear $275
Only Machine Built With Handle Bar Control of Clutch.
Four-Cylinder $300
With Handle Bar Control of Clutch $350
Two-Speed Gear, Extra $50
Equipment includes two brakes, footrests if desired, compound spring fork, combined luggage carrier and stand.

American F. N. Company, Boston, Mass.

Branch—415 Trumbull St., Hartford, Ct.

JOIN THE F. A. M.

which is the National Organization fostering the interests of motorcyclists along legislative and other lines. Cut this out, mail it, and you will get the reasons.

E. M. ESTABROOK
Chairman Membership Committee Federation American Motorcyclists,
BANGOR, MAINE.

Please send me the F. A. M. Booklet and all information interesting to prospective members.

Name .....

Address .....

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WITH THE MANUFACTURER AND DEALER.

The following concerns have been incorporated recently to manufacture or deal in motor cars, accessories, etc.:

Auto Adjunct Company, Melrose, Mass.; A. W. Eldredge, E. J. Sanderson, J. E. Knapp.

Paige-Detroit Auto Company, Little Rock, Ark.; $10,000; J. F. Jones, W. M. Rankin, W. M. Lewis.

Motor Oil & Gas Company, Tulsa, Okla.; $10,000; J. W. Hocker, John Rose, C. S. Walker.

Hobart Manufacturing Company, Troy, O.; motor driven machinery, purchasing assets of Hobart Electric Manufacturing Company; $1,600,000; H. L. Johnston, W. E. Bowyer, E. E. Edgar, W. W. Cope, J. M. Spencer, J. S. Combs.

Henschel Tire & Rubber Company, Inc., New York City; $10,000; Rudolph Henschel, Anna Henschel, William A. Wollman.

American Manufacturing & Distributing Company, Louisville, Ky.; automobile supplies; Harry L. Archey, P. H. Block, H. B. Morrow.

Peerless Tire Company, Inc., New York City; $15,000; Michael Schiavone, George P. Calenda, Louis Schiavone.

Motor Coach Company, Inc., New York City; $500,000; automobiles, motor car hearses and burial coaches; Samuel Richenthal, Elbert R. Benyunes, Herman Miller.

Associated Auto Mechanics, Inc., New York City, $100,000; automobile parts, etc.; H. Barnes, C. Tichsnor, W. J. Hoover.

Motor Sales Company, Fort Wayne, Ind.; $10,000; automobiles, supplies, accessories; Carl J. Weber, William J. Ross, William H. Bensman, Thomas M. Connell, Charles Galex, W. H. Hess.

Harbar Auto Heater Company, Augusta, Me.; $300,000; to construct, operate, market and deal in all kinds of motor vehicle attachments and accessories; R. S. Buzzell, L. J. Coleman.

Washington Street Garage Company, Green Bay, Wis.; $10,000; K. E. Fosha, L. R. Larson, F. L. Fosha.

Auto Service Company, Uniontown, Penn.; $5000; C. W. Johnson, Fred A. Close, F. B. Hess, R. M. Campbell, Max Hannan, E. G. Snyder, J. C. Donahue, G. T. Lewis, D. D. Haroder, A. E. Corns.

Stafford Illuminated Auto Lamp & Number Company, Chicago; $50,000; to make automobile accessories; F. S. Stafford, W. Doran, F. W. Schaub.

Norwalk Motor Car Company of New York, New York City; $35,000; P. Lyndon Bryce, Alfred L. Kirby, Edward S. Murphy.

Shepherd Auto Company, Inc., New York City; $5000; Irving R. Shepherd, Fannie R. Shepherd, Joseph A. Shepherd.

WITH THE MANUFACTURERS.

The Allen Wrench & Tool Company, Providence, R. I., has closed a contract with W. A. Bryte, 788 Mission street, San Francisco, Cal., manufacturers' agent. Mr. Bryte will handle the Allen friction wrench in all the western territory, including the Pacific Coast region.

The Standard Roller Bearing Company, Philadelphia, Penn., maker of steel, brass and bronze balls, ball and roller bearings and axles and steel castings, has opened an office in the State Life building, Indianapolis, Ind., in charge of L. M. Watkin, Jr. Owing to the big demand for the company's product it was found necessary to divide the territory formerly covered by the Chicago office.

The American Motors Company, Indianapolis, Ind., maker of American cars, at a meeting of its stockholders, re-elected the entire board of directors and also the following officers: General manager and chairman of directors, V. A. Longaker; president, J. I. Handley; vice president, D. S. Menasco; treasurer, J. D. Bright.

R. B. Tracy, western manager of the Michelin Tire Company, Milltown, N. J., has opened a new branch at 1106 Hennepin street, Minneapolis, Minn. This branch will care for the territory of North and South Dakota, Minnesota and Northern Wisconsin.

The Henderson Motor Car Company, Indianapolis, Ind., maker of Henderson cars, announces the appointment of Harry W. Doherty as northwest district manager with headquarters at Tacoma, Wash. Mr. Doherty enjoys a wide acquaintance in trade circles.

Treasurer A. R. Erskine of the Studebaker Corporation, Detroit, maker of Studebaker cars, announces the appointment of Charles D. Fleming as assistant to the treasurer.

H. W. Miller has been added to the sales organization of the Lozier Motor Company, Detroit, maker of Lozier cars. Mr. Miller was formerly connected with the sales department of the Studebaker Corporation, Detroit, maker of Studebaker machines, under Paul Smith, now sales manager of the Lozier company.

Charles de Fremineville, technical director of Panhard & Levassor, maker of the first car produced in France, the Panhard, is at present visiting the American automobile industry as the guest of President R. D. Chapin of the Hudson Motor Car Company, Detroit, maker of Hudson cars.

Harvey M. Briggs has succeeded Otto R. Bieler as engineer of the Lord Baltimore Motor Car Company, Baltimore, Md., builder of Lord Baltimore trucks.

William R. McCulla has taken a position with the Packard Motor Car Company, Detroit, maker of Packard cars and trucks, as assistant research engineer. Mr. McCulla has had a wide experience in the automobile industry.

Harold D. Bornstein, well known in Boston and New England as a member of the staff of the Boston branch of the Velie Motor Vehicle Company, Moline, Ill., maker of the Velie line, has joined the Boston sales force of the Premier Motor Car Company, Indianapolis, Ind., maker of Premier machines.

C. W. Thompson, Rochester, N. Y., formerly New York state distributor for the Cutting Motor Car Company, Jackson, Mich., maker of Cutting cars, has become identified with the Keeton Motor Company, Detroit, maker of Keeton automobiles, as sales representative for New York State.

The Coronet Manufacturing Company, Wade building, Cleveland, O., has taken over the manufacture and sale of the Coronet hub mile recorder, which, it was announced several months ago, was made by the Servis Recorder Company of the same city. The Service travel recorder which the Servis Recorder Company has been marketing for the past two years is still controlled by that company. Both concerns are now entirely distinct, neither having an interest in the other or its products.

The Stewart Motor Corporation, Buffalo, N. Y., maker of Stewart light delivery trucks, has appointed the following additional agents: Ontario Motor Car Company, Toronto and Ottawa, Can.; E. L. Jordan, Auburn, Me.

The Palmer & Singer Manufacturing Company, New York City, maker of Palmer-Singer cars, has closed contracts for the following agencies: Harry A. Clapp, Boston, Mass.; Mason's Garage, Newburg, N. Y.; Mechaley Auto Company, Stamford, Conn.; Maritime Motor Car Company, Vancouver, B. C.; W. P. Lathrop, Louisville, Ky.; Boye & Emmes Auto Company, Cincinnati, O.; Southern Tier Motor Company, Elmira, N. Y.

The Brown Commercial Car Company, Peru, Ind., maker of Brown trucks, has designated the following distributors: Engles Motor Company, Newark, N. J.; J. Fred Wilcox & Co., Joliet, Ill.; F. B. Price, Elizabeth, N. J.; South Brooklyn Auto & Livery Sales Company, Brooklyn, N. Y.; Norwalk Motor Car Company, New York City; Brown Car Corporation, New York City; Ritter Automobile Company, Madison, Wis.

Ernest C. Cox, formerly connected with the Texaco Oil Company as sales manager, has been appointed manager of the eastern sales and service branch of the Findeisen & Kropf Manufacturing Company at 1902 Broadway, New York City, and will conserve the best interests of the Rayfield carburetor, made by that concern.

Gerald H. Murphy has severed his connection with the Splitdorf Electrical Company, Newark, N. J., maker of Splitdorf magnetos. As assistant treasurer for C. F. Splitdorf, Inc., for seven years, Mr. Murphy was known throughout the executive departments of the automobile industry. He announces no plans for the future.

A. J. Diefenderfer has been appointed manager of the New York branch of the Lozier Motor Company, Detroit, maker of Lozier pleasure cars. He was formerly assistant manager under W. J. Mead, whom he succeeds.

The Packard Motor Car Company, Detroit, Mich., has placed a number of Packard combination ambulances and patrol wagons with the police department in that city. An accompanying illustration shows a portion of the fleet, concerning which the department officials express themselves as thoroughly satisfied in every particular. It

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has been found that these machines make a decided saving over the use of horse drawn vehicles.

The Torbensen Gear & Axle Company, Newark, N. J., maker of internal gear drive truck axles, has concluded arrangements with Brandenburg & Co., New York, Chicago and Detroit, to act as general sales agent and direct factory representative of the company's product.

Harry S. Houpt has resigned as general sales manager of the automobile department of the American Locomotive Company, New York City, maker of Alco cars and trucks. He has been in failing health and has gone South for a vacation.

GARAGE AND DEALER.

The Hollander Motor Company, Boston, has closed a contract for the Boston agency of the Cartercar machines, made by the Cartercar Company, Pontiac, Mich. The acquirement of the exclusive rights to sell this car in this field means a greatly increased volume of business for that firm.

The Topp Garage, 134 Cortland avenue, Syracuse, N. Y., has established a first class service station in connection with its business and is enjoying a prosperous trade. Ignition and carburetion is made a specialty and expert and prompt service is given.

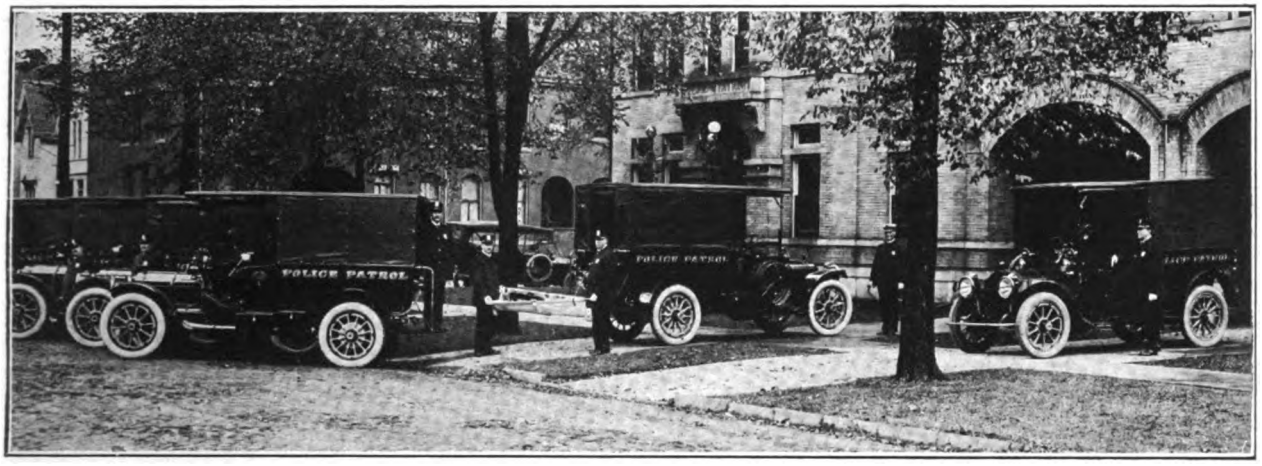
Snyder Bros., proprietor of the garage on East End avenue, Beaver, Penn., has enlarged the building and added a modern repair shop. The concern is agent for Detroiter and Marathon are the machines for which agencies have been secured. The president and general manager is J. G. Weihaupt; vice president, George W. Weihaupt; secretary and treasurer, J. S. Arenz; head salesman, S. Bovee.

The Auto Accessories Company, Ft. Wayne, Ind., has been formed by J. M. Cramer, formerly manager of the Fort Wayne-Auburn Automobile Company. The new company will operate a wholesale automobile business and also a vulcanizing plant.

G. W. Jones, until recently general manager of the United Motors Des Moines Company, has secured a controlling interest in the Moyer Auto Company, Des Moines, Ia., which has the state agencies for the K-R-I-T and Hudson cars. W. E. Moyer, who went to New Mexico for his health, sold his business only a few days before his death.

The Maykel Automobile Company of Worcester, Mass., has been formed with a capital stock of $12,500, and has occupied a garage on Vine street, formerly occupied by the Worcester Automobile Company. The officers are: President and treasurer, Mitchell K. Maykel; clerk, Maurice L. Kats. With Anthony Massad these form the board of directors.

The Hagerstown Garage Company, Hagerstown, Md., has sold to the Maryland Garage Company all its materials and possessions in the building on West Franklin street and has taken an office in another building, where M. I. Patterson will look after the Pullman and Regal agencies. The new company is composed of Dr.



A Portion of the Fleet of Packard Combination Ambulances and Patrol Wagons in Service with the Detroit Police Department.

Overland cars, made by the Willys-Overland Company, Toledo, O.

The Auto Parts & Repair Company has leased a portion of the Atlas Motor Car Company's former factory at Springfield, Mass., recently purchased by the Victor Sporting Goods Company, and will have a full stock of parts for the repair of Atlas cars, as well as those of other makes. P. A. Williams, Jr., formerly of the Atlas company, is manager, and Walter Parker is superintendent.

John W. Paddon, formerly of the Paddon Motor Company, Boston, who has been at Portland, Ore., for the past year, has returned to Boston to engage in the second hand car business, selling pleasure and commercial vehicles. Temporary quarters have been secured at 293 Northampton street. Negotiations are being made for the construction of a garage capable of housing 75 machines.

The Motor Parts Company, 185-187 Columbus avenue, Boston, has been appointed distributor for the products of the Bosch Magneto Company, New York City, maker of Bosch magnetos. A complete stock of magnetos, spare parts, spark plugs and other Bosch products will be carried in stock. F. W. Wilkening will be in charge of the Boston store, which is a branch of the Motor Parts Company of Philadelphia, Penn.

The Arenz-Weihaupt Auto Company has been formed at La Crosse, Wis., the Weihaupt blacksmith shops being remodelled into a first class garage and repair shop. The

R. G. Stevenson, David Stockslager and other prominent business men.

B. D. Springs & Co., a well known firm of Charlotte, N. C., was recently dissolved, when B. D. Springs purchased the holdings of his active partner, E. T. Stenerson, and also of Eli B. Springs, a silent partner. Mr. Stenerson has purchased the Charlotte Motor Car Company and will have entire charge of that concern. E. B. Springs, who also was a silent partner in that company, has retired.

The Holsman Sales Company, Des Moines, Ia., has been organized and closed contracts for the State of Iowa for the King machine, made by the King Motor Car Company, Detroit.

The Union Automobile Company, Wheeling, W. Va., is a new concern organized to handle the Abbott-Detroit cars, made by the Abbott Motor Company, Detroit. William F. Shaffer, secretary and treasurer of the Packers Motor Truck Company of the same city, was one of the organizers. Others were A. C. Shaffer, George P. Folmar, Albert M. Schenk.

The Brookes Auto Company, Steubenville, O., has purchased the Automobile & Motor Boat Company of that city, which has been placed in charge of O. L. Marquert, who will have the agencies of the Cadillac pleasure car and the Kelly-Springfield and Chase trucks. The new owner will add the Studebaker and Michigan cars, besides the Lippard-Stewart trucks.

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RECENT PATENTS.

Anti-Skid Device, Frank Young, Newark, N. J., No. 1,056,081. The combination of a vehicle wheel, with a rigid collar and a set of chains, each chain being provided with a ring on one end, through which the other end is passed to form a loop embracing the tire. The chain is secured to the loop member, which is designed to hold it taut.

Sprocket Gearing, George M. Webster, Fort Dodge, Ia., No. 1,056,236. The combination of a pair of wheels each having a series of long teeth, and a series of shorter teeth forming sockets alternating with the long teeth for the reception of the long teeth on the opposite wheel, a chain on each wheel passing over the long teeth, as sprockets, and the long teeth passing through the chain when engaging the complementary sockets.

Coin Control for Vehicles, Alexander P. Browne, Cambridge, Mass., No. 1,056,147. An apparatus for automatically controlling the operation of a motor propelled vehicle by a sparking or other operating circuit provided with a closable gap, means operated by the vehicle axle for opening said gap after said vehicle has travelled a predetermined distance, and means for giving an alarm shortly before such distance has been travelled.

Automatic Centring Chuck, Ellis M. Mead, Western Springs, Ill., assignor to the Miehle Printing Press & Manufacturing Company, Chicago, No. 1,056,435. It comprises a chuck, a rotary body, a plurality of cams mounted thereon in a circle about a central space to rotate in a plane parallel to the plane of rotation of the body, and centrifugally actuated means to rotate the cams in unison.

Horn, Amedee Couesnon, Paris, France, No. 1,056,265. A hand operated horn for vehicles, comprising an air bulb, a reed, a pipe connecting with said reed, a flywheel, a pump driven by the flywheel, a pipe adapted to convey air from the pump to the first named pipe, a portion of the second named pipe adapted to be spaced from it, said first named pipe constituting an air duct from said bulb to said reed.

Storage Battery Lamp, Charles B. Bartley, Pittsburg, Penn., assignor by direct and mesne assignments to George F. Rylands, Charlerol, Penn., No. 1,056,393. It comprises a casing having a battery and lamp compartment and a separating partition, a battery, a lamp in circuit therewith, an insulating bar provided with a plug opening, and a switch device entirely within the interior of the casing and covered by said bar.

Wheel, James A. Lowe, North Branch, N. J., No. 1,056,107. A wheel comprising a rim, a hub and several sets of spring actuated double toggles connecting the rim and the hub. Each pair of toggles consists of two pairs of links, the outer pair being pivotally connected to the rim and the inner pair to the hub and to the members of the outer pair intermediate their ends, and bars or plate springs having their inner ends connected with the free ends of the outer pair of links.

Battery Plate Separator, Herbert E. Pratt, New York City, assignor to the Gould Storage Battery Company of the same city, No. 1,056,299. It comprises separating means for storage battery plates, embracing a separating sheet of material pervious to the electrolyte, and a sheet on each side of said pervious sheet, said last mentioned sheets being perforated and substantially impervious to the electrolyte, and secured together at their side edges about the pervious sheet.

Vehicle Jack, Hosea S. Tuttle, Minneapolis, Minn., No. 1,056,235. A jack for automobiles or other vehicles, comprising a pair of pivotally mounted arms pivoted at one end and positioned to engage the axle of a motor car outside the body thereof. Links are pivotally connected with said arms at a point removed from the free ends thereof and having a portion of said links extending beyond the arms, said links being a part of a toggle for moving the arms about their pivots, and means for operating the toggle.

Valve Controlling Mechanism, Joseph Lawrence Edland, Bloomfield, N. J., assignor to Herman Jules Koehler, East Orange, N. J., No. 1,056,518. It comprises a conduit having a plurality of outlets, valves controlling said outlets, a series of spring connections within said conduit, one for each valve, said connections tending to hold all of said valves in predetermined positions, a rock shaft formed with a pair of projections for receiving one end of each of said springs whereby the tension of the springs is varied as the rock shaft is moved.

Hose Clamp, Sidney J. Linton, Groveland, N. Y., No. 1,056,188. The clamp comprises a flexible band having a pair of hinged sections, one of which has an opening therein and the other being provided with a reduced portion adapted to pass through the said opening to form a complete loop around the article to be clamped, the loop engaging the article throughout in a plane perpendicular to its longitudinal axis, a yoke having a transverse recess engaging the hinge between the sections, and means for holding the yoke in engagement with the ends of the band.

COMING EVENTS.

April.

April 5-12—Show, Pittsburg, Penn.
April 14-16—Motor truck trials, Chicago, Ill.
April 16-17—Race meet, Taylor, Tex.

May.

May 5-8—Motor truck trials, Washington, D. C.
May 14-15—Scenic tour, West Hudson and Catskills, N. Y.
May 26-June 13—American visit, British engineers.
May 30—500-mile race, Indianapolis, Ind.
May 30—Inter-Club run, Chicago, Ill.

June.

June 19—Algonquin hill climb, Chicago, Ill.
June 25-28—Non-stop day and night run, Chicago-Boston.

July.

July 1—Manufacturers' tour, Indianapolis-San Francisco.
July 4—Track meet, Taylor, Tex.
July 4-6—Road race, Tacoma, Wash.
July 27-28—Road races, Tacoma, Wash.

August.

Aug. 30-Sept. 6—Reliability tour, Chicago, Ill.

September.

Sept. 1—200-mile race, Columbus, O.

November.

Nov. 24—Vanderbilt Cup race, Savannah, Ga.
Nov. 26—Grand Prize race, Savannah, Ga.

FOREIGN.

April.

April 5-20—Show, Marseilles, France.
April 20-May 1—Show, Prague, Bohemia.
April 26-May 11—Show, Turin, Italy.
April 27—Hill climb, Limonest, France.

May.

May 1-15—Agricultural motor tractor show, Avignon, France.
May 1-31—Show, Barcelona, Spain.
May 7-21—Show, St. Petersburg, Russia.
May 8-12—De la Sarthe race meet, Le Mans, France.
May 11-12—Targa Florio race, Sicily.

June.

June 4- 6—Tourist Trophy race, Isle of Man, England.
June 10-16—Alpine trials, Vienna, Austria.
June 23-28—International road congress, London, England.

July.

July 1-16—Plowing competition, Winnipeg, Manitoba.
July 12—Grand Prix race, Amiens, France.
July 19-20—Grand Prix race, Belgium.

August.

August 10—Hill climb, Mount Ventoux, France.
August 15—Hill climb, Tonale, Italy.

September.

September 28—Hill climb, Mont Verdun, France.

NEW BOOKS RECEIVED.

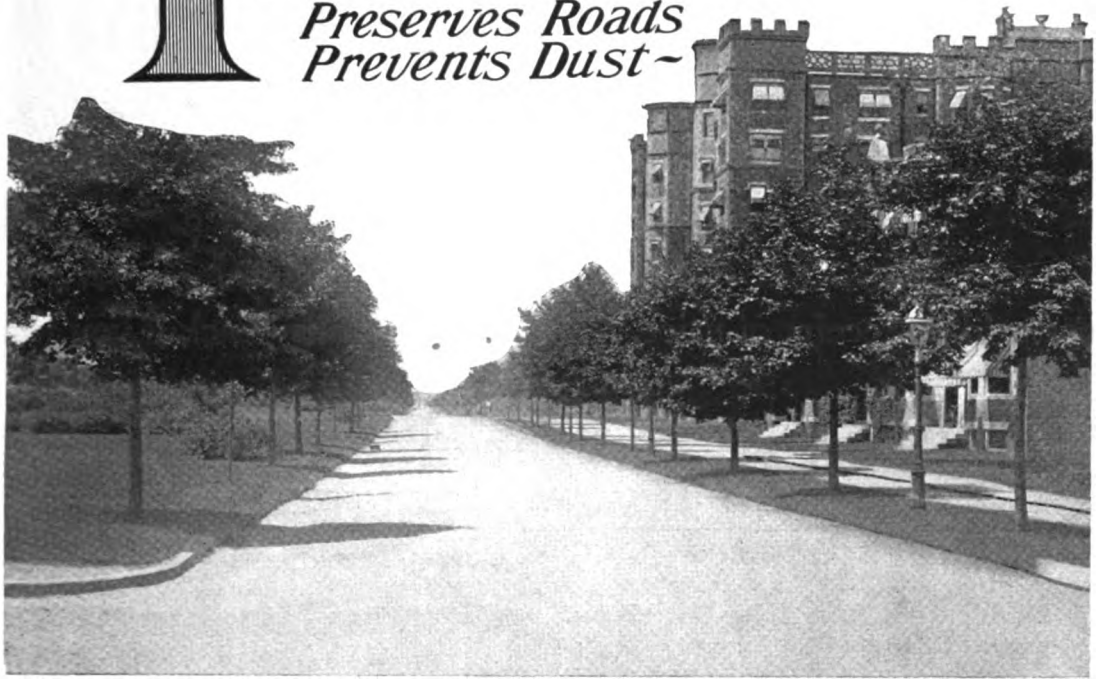
Bearing Friction and Its Elimination—Published by the engineering department of the New Departure Manufacturing Company, Bristol, Conn. Explains why balls are superior friction reducers and how their correct application insures maximum conservation of energy. Illustrated.

Eagle Marine Engines—The Standard Company, Torrington, Conn. Catalogue of marine types of motors, ignition specialties, etc. Illustrated.

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Tarvia

Preserves Roads
Prevents Dust



River Parkway, Cambridge, Mass.

Cambridge's Experience with Tarvia

CAMBRIDGE, MASS., is another Tarvia town. Many of its roads have been built during the last five years with "Tarvia X" or treated with "Tarvia B". The streets of Cambridge carry an enormous automobile traffic and the problem of maintaining adequate road surfaces was a serious one.

During 1912 eight of the leading thoroughfares which had been built with "Tarvia X" received surface treatments with "Tarvia B" at a cost of 2¾c. per square yard.

The Superintendent of Streets of Cambridge reports "This treatment not only preserves the surface of the road from raveling, but renders the street dustless to a large extent. It has been found to be the most economical way to care for tar bound macadam."

In later years it will be found that additional annual treatments with "Tarvia B" will cost less each year. Westfield, N. J., for instance, found that roads which had been built with Tarvia, cost as little as 1¾c. per yard per year to maintain with "Tarvia B".

Towns which experiment with Tarvia get the habit and in time settle down to its use as a matter of consistent policy. By this means they reduce their road costs and at the same time give greater satisfaction to the citizens.

Tarvia is a special combination of refined tars especially prepared for road use. It forms a tough, plastic matrix about the stone, and prevents erosion and attrition. It is not a palliative but a cure. It does not *suppress* dust so much as prevent the attrition which *creates* dust. Booklet on request.

BARRETT MANUFACTURING COMPANY

New York Chicago Philadelphia Boston St. Louis Kansas City Cleveland
Cincinnati Minneapolis Pittsburgh Seattle Corey, Ala.

THE PATERSON MFG. CO., Ltd.:—Montreal, Toronto, Winnipeg, Vancouver, St. John, N. B., Halifax, N. S.

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Save 10 to 30 Per Cent. of Your Fuel Consumption and Increase Your Power

Prevent Back-Fire

WOLF GASOLINE MIXERS DO THIS

No moving parts to loosen. No screens to clog.
Inserted in intake manifold.

Prices up to 1 1-2"---$1.50 1 9-16" to 2"---$2.00

Special for Ford Model T, $1.00

Sent postpaid on receipt of price. Money back if you want it.

Agents Wanted

Approved Auto Specialties Company

1731-37 BROADWAY, NEW YORK

HOLD THEIR FIRST SHOW.

Dealers in Maritime Provinces Enjoy Good Business at Display in St. John.

For the first time in the history of the Maritime Provinces of Canada the public had opportunity to compare the merits of the automobiles, accessories, etc., represented in that section, at the first annual Maritime motor show in Queen's rink, St. John, N. B., March 31-April 5. In every respect the display was in keeping with the importance of the event, the Provisional Good Roads Association and the New Brunswick Automobile Association uniting with the dealers in bringing to the attention of the visitors the benefits accruing from motoring in all its phases.

The exhibition was under the able management of E. M. Wilcox, who has had abundant experience in conducting displays of like character in Ottawa, Montreal and Toronto. The visitors came from all sections of the district and seemed keenly alive to the possibilities afforded by automobiles, motor trucks and good roads. There is little doubt that the event will have material bearing upon the shaping of future policies throughout the provinces, and numerous sales were recorded.

Among those who took advantage of the opportunity to make display were the following, most of whom are located in St. John:

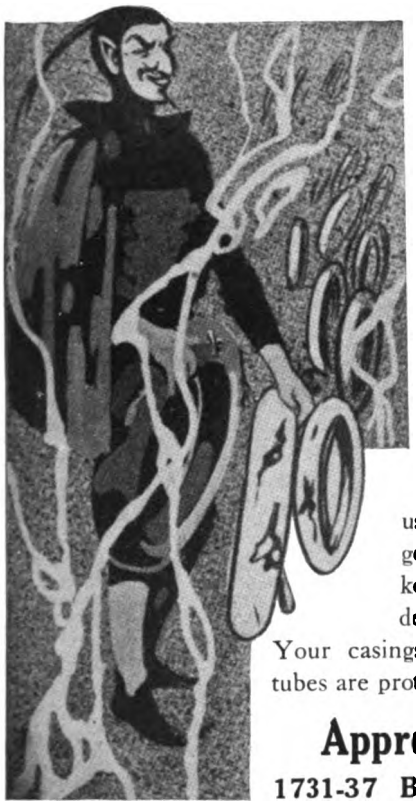
Cars—Maritime Motor Car Company, Ltd., Maritime; J. A. Pugsley & Co., Ltd., Russell, Reo, Ford, Gramm trucks; Motor Sales Company, Mitchell, Knox trucks and fire apparatus; New Brunswick Motor Car Company, Cadillac, Studebaker; Amherst Garage Company, K-R-I-T; L. M. Trask Company, Ltd., Brockville Atlas; Oakland Motor Car Company, Ltd., Oakland; Knox & Woodley, Metz; Tudhope Motor Car Company, Tudhope.

Sundries—L. M. Trask Company, Ltd., boats and engines; T. McAvity & Sons, Ltd., tools; Canada Cement Company, Ltd., road materials; Hassam Paving Company, Ltd., road materials; K. & S. Tire Company, tires; Elliott & Co., motorcycles; S. F. Bowser Company, Ltd., storage systems; Canada Tire Filler Company, tire filler; Zip Company, puncture preventative; Canadian Oil Companies, Ltd., lubricants; Canadian Fairbanks Morse Company, general line of accessories.

The American Automobile Association has established a branch headquarters in the Riggs building, Washington, D. C.

That automobile tires are not parts of automobile wheels and are, therefore, not subject to the duties levied upon the latter at importation is the decision of the United States general appraisers. This decision is contrary to the ruling of Collector Loeb of the port of New York, who held that tires and wheels, as assembled articles, were dutiable at 45 per cent. ad valorem.

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Don't let your old tires go to the Devil use GOODMAN TIRE SHIELDS

Every self-respecting tire on the market is guaranteed to give 3500 miles of service. This means that there is sufficient rubber and fabric in its structure to stand the friction generated by 3500 miles of road service, but it doesn't cover blowouts and punctures, and that's just the reason why you can claim nothing on this guarantee.

You can make this guarantee as good as a government bond and multiply your mileage by using GOODMAN TIRE SHIELDS. You can get every ounce of wear out of your new tires, and keep your old ones still in use by using these wonderful anti-puncture, blowout and friction proof shields. Your casings need only to furnish a wearing surface if your tubes are protected by GOODMAN TIRE SHIELDS.



Approved Auto Specialties Company

1731-37 Broadway : : : : NEW YORK

Abbott-Detroit

"The demand of the day is that an organisation shall be judged by its product and not by what it claims for itself." Keep this in mind when you examine the 1913 models of the Abbott-Detroit.

Advance Catalog on Request.

ABBOTT MOTOR CO.

141 Waterloo St. "Built for Permanence" — Detroit, Mich. "Guaranteed for Life"

Sold by all Leading Dealers or Parcels Post

$3.00



O-TAK-A

THE TIRE REMOVER

that should be in every car. It acts on the rim, the ring, the tire, and helps take them off and put them on again.

O-TAK-A FACTORY, Le Roy, N. Y.

BRETZ COMPANY

F & S Ball Bearings

250 West Fifty-fourth, New York

Jericho ONE TONE Horn

Jericho (One-Tone) and Jubilee (Chime-Tone) are leaders in sales and popularity. Over 100,000 now in use.

B-Line Guns and McKae Blitz Spark Plugs are best.

THE RANDALL-FAICHNEY CO., Boston, Mass.

Mosler Spit Fire Plugs ARE THE BEST

A. R. MOSLER & CO., P. O. BOX "M" MT. VERNON, N. Y.

SUBSCRIBE FOR

THE MOTOR TRUCK

12 ISSUES $1.00

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The only oil ever made especially and exclusively for the lubrication of automobile transmission gears.

i-O-C GEAR OIL

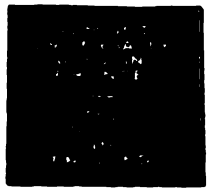
"Puts Noisy Gears to Sleep"

¶ It works where the whole power of the engine is concentrated—in the transmission gears.

¶ It works better than—
ANY Grease
ANY Dope
ANY Compound—or
ANY form of Gear Lubricant ever put on the market.

Write for Prices and Descriptive Matter

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Lessees of CHARLES F. KELLOM & CO.
80 Broad Street, New York
New England Branch
284 Columbus Avenue, Boston, Mass.
WASHINGTON PHILADELPHIA

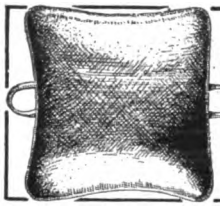


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Main Office and Factory
210 S. 17th Street, Philadelphia.
Other Branches
Boston, 222 Eliot St. Pawtucket, 41 Dexter St.
New York, Buffalo, Baltimore,
Chicago, Pittsburg, Washington,

TEXACO MOTOR OIL

K-R-I-T

Five Passenger Touring Car, Fully Equipped - $900
Foredoor Roadster, Fully Equipped - - - $900
Underslung Roadster, Fully Equipped - - $1000
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K-R-I-T MOTOR CAR CO. Dept. N, DETROIT



Motorists Ride Comfortably
Shock-Absorbing Cushions
eliminate all strains and back aches and make your long rides perfectly enjoyable. A trial will convince you. Take up very little room in the car. Covered with genuine Spanish leather in brown, green or red. $3.50 post paid anywhere in the United States.
WILLIAM LEAVENS & CO., Manufacturers
32 CANAL STREET BOSTON, MASS.

Polarine Best Oil Handiest Car
Standard Oil Co. of New York



Send for Proposition on
HAWTHORNE FOUR CYLINDER PUMP
HAWTHORNE MFG. CO., Inc.,
29 Spruce St. Bridgeport, Conn.

F. SHIRLEY BOYD
903 Boylston St. Boston, Mass.
Dorian Demountable Rims.
Supplementary Spiral Springs. R. I. V. Ball Bearings.

CATARACT TIRE SERVICE
THE 10% OVERWEIGHT TIRES
Guaranteed for 4000 Miles Service
Measured by Mileage, the Cheapest Shoes Ever Made. Clincher and Quick Detachable, Plain and Break-Skid Treads, Regular and Metric Sizes, for All Standard Rims.
THE CATARACT RUBBER COMPANY
Boston, New York, Providence. Factory: WOOSTER, O.

1893
HAYNES
1913
America's First Car—after twenty years of continuous successful manufacturing—*Still Its Foremost.* Wide Line of Models.
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The Shock Absorbers Which Save Your Car and Tires.
Nothing to Wear, Adjust or Require Attention.
They Take The "Sting" Out of Rough Roads.
Try Them At Our Expense For 30 Days.

Seven Years Of Success.

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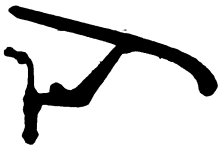
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Saved Annually by Use of Sager Bumpers.
Don't Wait for a "Smash-up" to Buy Protection.

DO IT NOW.

PRICES $6.00 to $27.50. Liberal Discounts.

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Used Almost Exclusively On High Grade Cars.

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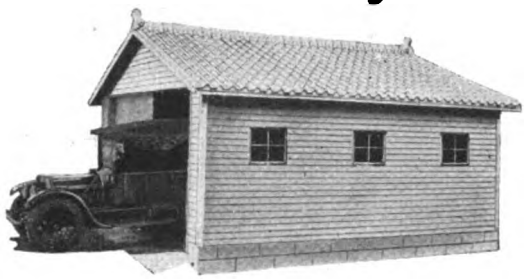


Clamped on Bumpers of Distinction. 30 Models. Attached in 10 Minutes.
FORD SPECIAL, CLAMPED ON, $10.

J. H. SAGER CO.

271 South Avenue, Rochester, N. Y.

$92.50—Our Price for 30 Days!



We now offer the Edwards "Steelcote" Garage (1913 model) for $92.50. But to protect ourselves from advancing prices of steel, we set a time limit. We guarantee this record price for 30 days only.

Edwards Fireproof Garage

An artistic, fireproof steel structure for private use. Gives absolute protection from sneak thieves, joy riders, fire, lightning, accidents, carelessness, etc. Saves $20 to $30 monthly in garage rent. Saves **time, work, worry and trouble.** Comes ready to set up. All parts cut and fitted. Simple, complete directions furnished. Absolutely rust-proof. Joints and seams permanently tight. Locks securely. Prompt, safe delivery and satisfaction guaranteed. Postal sent today brings new 56-page illustrated Garage Book **by return mail.** (107)

The Edwards Manufacturing Company
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"The Brake Lining of Quality"
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MULTIBESTOS

unsurpassed for the jobber or car owner. Efficient, Reliable, Profitable. Manufactured complete in our Factory. The Lining you will use because the *quality* is *right*. *Send for book, "Safe Within the Grip of Multibestos."*

Standard Woven Fabric Co., Worcester, Mass.
New York, 237 Lafayette St. Chicago, 1430 Michigan Blvd.
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The Easiest Riding Car in the World

MARMON

Thoroughly expressive of the highest development of automobile design, materials and construction.

NEW SERIES MARMON "32" $2850 to $4100
THE MARMON SIX $5000 to $6350

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New England Dealers for

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Pleasure Car and Motor Truck Wheels

Eberly & Orris Wheels Are Built of Carefully Selected Bone-Dry Timber, With High Class Facilities by Expert Mechanics.

Pleasure Car or Truck Equipment Made to Any Specification and in Any Quantity.

Can Supply Any Requirement. Catalog and Price List at request.

Auto and Truck Wheels Repaired and Returned Same Day

THE EBERLY & ORRIS MFG. CO.,
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Automobile Specialties and Carburetion Experts

GEORGE SUMNER, Inc.
1841-43 Broadway, NEW YORK.

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"There's Where YOU Are Wise!

That Other Fellow is a Menace to Everyone's Safety"

Nine-tenths of all automobile accidents are caused by skidding and by foolish dependence on rubber alone. In these days of crowded streets and congested traffic, the motorist who does not take precaution to guard against every possibility of disaster is ***next to criminal.***

"The ever-present danger that is quite as much of a terror to the experienced driver as it is to the novice is **skidding.** There is nothing that makes a man lose his nerve so thoroughly or dread a repetition of the experience so keenly as a bad skid that ends in a broken wheel against a curb, or that makes matters far worse by 'side-swiping' a moving trolley car. To feel the car start to slide from under you, aiming directly at the nearest obstruction, despite all manipulations of the wheel and brakes---well, once is too often."

Weed Anti-Skid Chains

VS.

Slipshod Traffic

Traffic policeman, by the hundreds, interviewed in all the large cities throughout the country, express the unanimous opinion that their work would be greatly reduced; that nearly all **skidding accidents would be eliminated** if motorists would take the precaution of always carrying WEED CHAINS, and putting them on when the roads and pavements are wet, slippery and uncertain, or covered with snow.

Some of these **guardians of public safety** go so far as to say that the time is not far off when State Legislatures will **make the use of WEED CHAINS compulsory,** for the protection of life and property.

Make Safety Yours

Take no chances. Fully equip your own car with WEED CHAINS and **insist,** for your own protection, that other drivers do the same.

On the Rear Tires

they afford perfect traction and adequate brake control.

On the Front Tires

they act as ladders to enable the front wheels to easily climb out of mud-ruts, car tracks and all uneven places in pavements or roads, always insuring absolute steering control, eliminating all chance of the front wheel skid.

If you haven't a set of **WEED CHAINS,** or if you have a pair for the rear tires only, **get a full equipment now.** Delay is dangerous. Stop at your dealers today and **WEED CHAIN** your car to safety.

For Sale by all Reputable Dealers

WEED CHAIN TIRE GRIP CO.

28 Moore Street New York

Dover Soap Economizer



Saves over one-third soap consumption

Dover Electric Light Bulb Case

Safe and Very Compact



Send for 1913 Catalogue

DOVER SAVAL MEASURE AND FUNNEL



With Automatic Shut-Off Prevents Overflowing Oil Tank

DOVER STAMPING & MFG. CO., Cambridge, Mass.



DECARBONIZER

Chemically removes carbon from cylinders, pistons, rings and valves

INCREASES POWER 20 PER CENT.

Volatilizes carbon, in which form it passes out thru exhaust; injury to metal impossible. Agents wanted in certain localities. Sample quart can $1.50. Write today for particulars.

MILWAUKEE AUTO SPECIALTY COMPANY
128 Second St., Milwaukee, Wis.

STOCK CHAMPION **INTERNATIONAL CHAMPION**

National

Improved Series V---Five Models, $2750---$3400

NATIONAL MOTOR VEHICLE CO.,
138 E. 22nd St., Indianapolis, Indiana

Jackson

No Hill Too Steep
No Sand Too Deep

OLYMPIC - 4 cylinders		$1500
MAJESTIC - 4 cylinders		$1975
SULTANIC - 6 cylinders		$2500

JACKSON AUTOMOBILE CO., 1203 East Main St. Jackson, Mich.

Firestone TIRES

Most Miles Per Dollar

Boston Branch, 145 Columbus Avenue
THE FIRESTONE TIRE & RUBBER CO., AKRON, O.
"America's Largest Exclusive Tire and Rim Makers"

Pyrene FIRE EXTINGUISHER

FOR YOUR AUTO OR GARAGE

A few shots of Pyrene, even if directed through the radiator, will put out the most stubborn fire—so quickly that it will surprise you.

Write for Booklet

PYRENE COMPANY OF NEW ENGLAND
176 Federal Street, Boston, Mass.

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Bosch Plugs



As Good As Bosch Magnetos

THERE'S a difference between results obtained from any spark plug and the right spark plug, one possessing every refinement of manufacture, every result that extensive investigation could produce, nothing omitted—nothing neglected.

Why experiment when you buy? The mere selection of the Bosch Plug gives you the best plug, the plug which by universal selection of men who know is renowned as the right plug. Buy Bosch Plugs only.

$1.00 each from your dealer or direct

Write today for "Locating the Spark Plug."
It tells you all you should know about plugs.

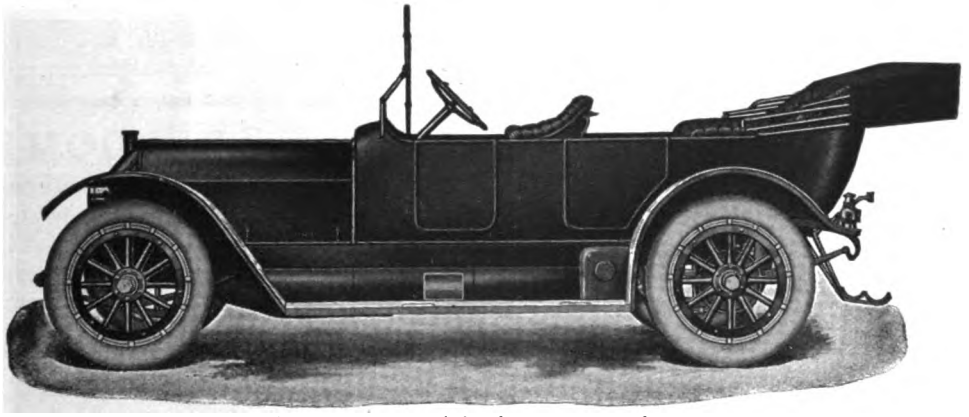
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Knox

Designed and built in accordance with the most approved American and European practice.



A distinctive model of exceptional merit.

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Ask for "KNOX KNOWLEDGE."

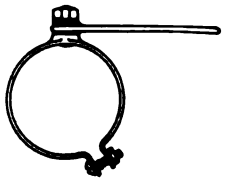
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Get Your Gasoline at Half Price by Using the M&M Economizer!



STEERING WHEEL CONTROL

The M&M Economizer **Is Positively Guaranteed** to save from 40 to 50% of gasoline, and increase the **Speed and Power** 20% with less gasoline, and less carbon. It is the only known carburetor adjuster on the market, and can be used for priming the engine. Do not throw your old carburetor away until you have applied our device. **Then Notice Results.**

With the throttle set at 12 miles per hour, by opening the M&M your mileage will be increased to 18 or 20 miles with **the Same Amount of Gasoline,** and less carbon. It is used instead of your clutch in descending grades, turning corners and slowing up for crossings, at the same time, **Using the Engine as a Brake. What the Coaster Brake Is to the Bicycle** the M&M is **to the Automobile.** The M&M also acts as a safety brake in case of back-fire.

The M&M is made with one ground valve seat and six portholes, which when open admits auxiliary air into the manifold, which is giving you a uniform mixture, and when it reaches the cylinders, it is a **Gas of the Greatest Explosive Power.** The auxiliary air which is admitted through the six portholes of the M&M is **Just Like Having Two Carburetors on Your Car.** You will never know how perfect your motor will run until you apply the **M&M Economizer.** Try an M&M Economizer for **Speed, Power and Economy.**

There Is No Screen Placed Inside of Manifold in connection with the M&M. Where a screen is used, it will clog the manifold, and make it harder for the motor to absorb the gas and air coming from the carburetor. When a car is equipped with the M&M the manifold is clear from obstructions, and the motor can **Easily and Swiftly** absorb the gas and air into the cylinders.

Read This Letter! Then watch for the next.

Morristown, Tenn.
March 27, 1913.

Moller Bros.

Gentlemen:—I have had the M&M on a **"Flanders 20"** for about two weeks, and already find it to be a grand addition in gaining speed. I can set my feed at 12 miles per hour and pick up to 25 per hour with all ease. I find that I can almost completely control my car with the M&M. I hardly ever use my brake and never use my clutch, only in extreme cases. I have made no test as yet to see the saving of gasoline, but have all reasons to believe it will save from 40 to 50% as you claim. I see no reason why it should not work on any other car as well as the **"Flanders 20,"** and if so, it is well worth many times its price. Yours Very Truly,

J. M. McCONNELL.

The above **is Just What They All Say.** They are **satisfied** with the M&M in every possible way, simply because we do not **Misrepresent It.** It does just exactly what we state. No car owner with the least bit of mechanical knowledge will hesitate to purchase the M&M, as they can easily understand **Why We Make Our Various Claims.**

The M&M Is Guaranteed to Do Just What We Claim. If Unsatisfactory in Thirty Days, Money Will Be Refunded. (Reference, Citizens National Bank, Lewistown, Pa.) No dealer or jobber is authorized to sell without our guarantee.

The M&M Economizer can be applied to any automobile or motorcycle on the market. The automobile size requires a ¾" pipe tap to insert into manifold, but same can easily be reduced to ½" or ⅛" if necessary. **Operated by Either Friction Foot Pedal or Steering Wheel Control.** The motorcycle size is ¼". The M&M is nickel plated and highly polished.

Price of automobile size, $3.50 complete for attaching (17c extra for postage). Price of motorcycle size, $1.25 prepaid.

Send for our catalog and information. **BEWARE OF INFRINGEMENTS!** Money refunded in 30 days if unsatisfactory.

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Fits any car, easy to operate, has a rich finish. Agents wanted. Send for particulars.



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Ball Bearings

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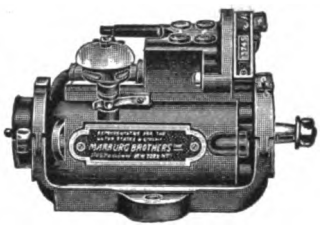
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Option given of 60 H. P., 6 cylinder poppet valve motor or 60 H. P., 6 cylinder Speedwell Rotary-valve motor.

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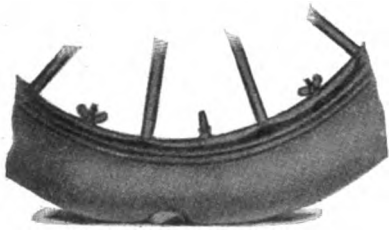
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You can get the whole idea of

Dayton Airless Tires

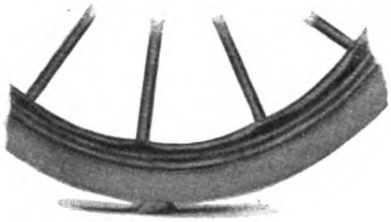
and why they ride smoothly from three pictures and three short paragraphs; here they are:

When a pneumatic tire strikes a stone—



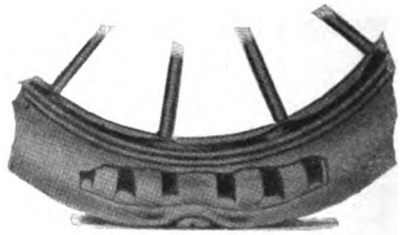
the stone sinks into the tire, air is displaced and the tire passes over the stone with a certain vibration or bounce GREATER, however, than the Dayton Airless.

When a solid tire strikes a stone—



the stone cannot sink into the tire because there is no place for the rubber to "go" or expand into, except on the outside, which is not sufficient, hence, inasmuch as the tire will not yield to the stone, it rides up over it and drops down with a sharp jar or jolt, causing great damage to the mechanism of the car.

But when a Dayton Airless strikes a stone—



the stone sinks into the tire, rubber is displaced and the pier or column of elastic high grade rubber squeezes down and bulges out into the open spaces between the piers and the tire passes over the stone with a very slight vibration or bounce.

You'll want more facts—more proofs and evidence; we've plenty of it; write today for our "Catechism" a book that shows the way out of tire trouble.

Read this reminder now: Dayton Airless Tires must not be mistaken for solid or "filled" tires; they fit all clincher rims; they're made in non skid and smooth tread

DAYTON RUBBER MFG. CO., 1011 Kiser St., Dayton, Ohio

20 Miles to Gallon

Lawrence, Mass., July 13, 1912.
Gentlemen:—Enclosed find check for carburetor. I feel perfectly satisfied. It does 20 miles and over on a gallon. Can recommend it to anyone.
G. A. Schmidt.

19 to Gallon on Cadillac

Edgewater, N. J., May 21, 1912.
Planhard Co.:
I am very much pleased with my new Planhard Carburetor. I made a test of gasoline consumption from Edgewater to Hyde Park, N. Y., and return, and got a fraction over nineteen miles to the gallon. This is on my Cadillac.
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More Speed—Start Cold

Groton, Conn., Feb. 8, 1913.
Dear Sirs:—I put a Planhard on my single cylinder 6-8 h. p. Goshen engine. It gives 50 R. P. M. more than the ——— I took off. With the Planhard I can start cold or hot without priming, which few others can do.
Yours truly, E. A. Scriven.

3¾ More Miles

When Planhard Carburetors were put on the 6 cylinder, 4 cycle Frisbie motor of the fast boat Delphi II, she increased 230 R. P. M., and 3¾ more miles per hour.

Much More Power

Bath Marine Construction Co.—"The gasoline consumption at normal power was better than others and it would develop much more power when pushed." H. D. Bacon, President.
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Gentlemen:—The Planhard Carburetor for my model S Ford Car is very satisfactory. I never bought anything for my car I paid so cheerfully for, as I have a smoother running engine with more power and get *more mileage per gallon* and my engine runs much cooler.
H. W. Grandon.

Gallon Less Per Hour!

on semi-speed boat
HARTFORD III
owned by A. N. Smith, Portland, Maine, who gets better control.

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had a Planhard on her Loew-Victor on her famous trip to Nova Scotia.

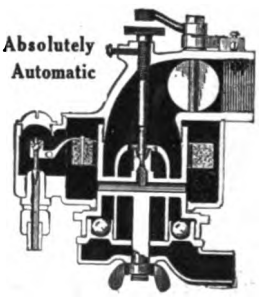
Valient II and Alfred S

took all their prizes with Planhards on their Metropolitan motors.

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made a mile in 1 minute 8 seconds over the Washington government course with Planhards.

"Has them all beaten to a frassle."—A. G. Linden, Cleveland, Ohio.



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Engine .....Carburetor....Size....in.
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J-M Dry Batteries are unqualifiedly guaranteed to give satisfaction under any and all conditions. Should they fail to do this, we will furnish new batteries or refund the purchase price.

Take three

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and three of the make you are now using, connect them in series, and from results obtained we feel convinced a new SATISFIED customer will be added to our rapidly growing list.

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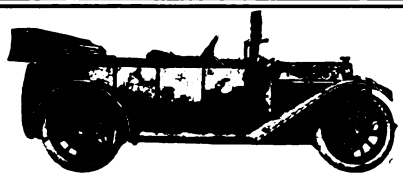
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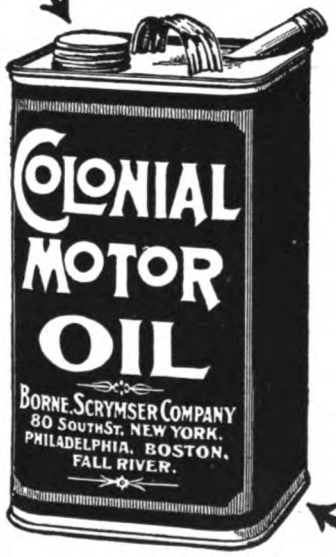
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Use COLONIAL and NOTE the DIFFERENCE

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Specially prepared for the lubrication of transmissions and differentials. Most economical because it wears longest. Silences noisy gears.

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Lubricates until the last particle is used up and will not leave a cake or gum in the grease cup.

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ADJUSTABLE NUMBERED MARKERS
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The Best Built, Medium-Priced Car in America

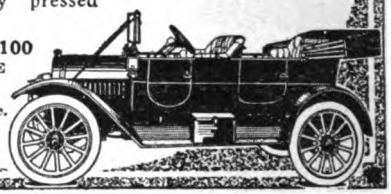
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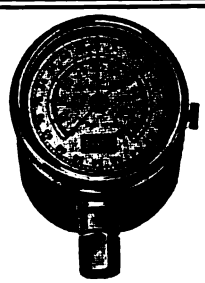
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The "Black Eagle" Spark Plug

PATENTED

50 Cents Is Enough

The "Black Eagle" Spark Plug has made good because it was designed and manufactured with this result in view.

A person in close touch with the supply and manufacturing ends of the trade was a visitor at our factory recently, and was shown the details of construction, including the machinery, testing, and assembling of the "BLACK EAGLE" Spark Plug. What he said we believe will be of interest to you, as it indicates the effort on our part to supply a high grade plug at a reasonable price. We therefore quote below his impressions.

> "I am simply amazed at the workmanship, material, and construction of the 'BLACK EAGLE' Spark Plug. When I saw this plug advertised at a price of 50c to the consumer, I naturally supposed it was a cheap, common, plug such as you occasionally find in jobbing houses on the bargain counter. I am convinced, after seeing these plugs tested, and examining minutely the machine parts which enter into their construction, that **no better porcelain spark plug is offered by any one, regardless of the price they ask.**"



We are not **influenced** by what our competitors **charge for spark plugs!** We have **ignored price precedent,** for the reason that a **high grade spark plug** can be manufactured and sold at **50c each, and that is enough.**

Sent prepaid on receipt of price. Made in all standard threads.

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MIGHTY MICHIGAN "40"

40-Horsepower Touring Car or Roadster, absolutely silent in operation. Oversize tires 35x4 1-2---cylinders 4 1-4x5 1-4 in.---118-in. wheel base---four-forward-speed transmission ---demountable rims---nickel mountings ---massive, straight-line body---big, roomy seats---electric lighting by generator---everything. Price $1585, includes full equipment. We also make a 33 H. P. model. Catalog on request.



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Electric self-cranking, electrically lighted.
Four Forward Speeds.

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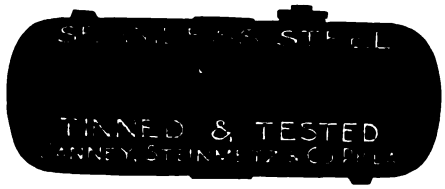
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Jackson Automobile Co., 1400 Main St., Jackson, Mich. (Jackson.)
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Knox Automobile Co., Springfield, Mass. (Knox.)
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Lenox Motor Car Co., Inc., Boston. (Lenox.)
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Mercer Automobile Co., 1100 Whitehead Road, Trenton, N. J. (Mercer.)
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National Motor Vehicle Co., 1033 22d St., Indianapolis. (National.)
Nordyke & Marmon Co., Indianapolis. (Marmon.)
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Pierce-Arrow Motor Car Co., Buffalo, N. Y. (Pierce-Arrow.)
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Sampson Mfg. Co., Alden, 3 West 61st St., New York. (Sampson.)
Selden Motor Vehicle Co., Rochester, N. Y. (Selden.)
Speedwell Motor Car Co., 80 Essex Ave., Dayton, O. (Speedwell.)
Studebaker Corporation, Detroit. (E-M-F and Flanders.)
United States Motor Co., 3 West 61st St., New York. (Brush, Maxwell, Sampson, Stoddard-Dayton, Columbia.)
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Sullivan Motor Car Co., 611 East Ave., Rochester, N. Y. (Sullivan.)
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Branches: See Cars—Gasoline Commercial.
General Vehicle Co., Long Island City, N. Y. (G. V.)

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Canton Foundry & Machine Co., Canton, O. (Portable Floor.)

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Leavens & Co., Wm., 32 Canal St., Boston. (Leavens Shock Absorbing.)

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Milwaukee Auto Specialty Co., 128 Second St., Milwaukee.
Prest-O-Lite Company, 271 East South St., Indianapolis. (Prest-O-Carbon Remover.)
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Dover Stamping & Manufacturing Co., Cambridge, Mass. (Dover.)

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Ross Gear & Tool Co., 794 Heath St., Lafayette, Ind. (Ross.)

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Hawthorne Manufacturing Co., 29 Spruce St., Bridgeport, Conn. (Old Sol.)

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Branches: 284 Columbus Ave., Boston; 118 Arch St., Philadelphia; 3556 11th St., N. W., Washington, D. C.
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Branches: See Accessory Manufacturers and Jobbers.
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Standard Oil Co., New York. (Polarine.)
Branches: In all cities.
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Emblem Manufacturing Co., Angola, N. Y. (Emblem.)
Branches: Los Angeles, San Francisco.
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Miami Cycle & Manufacturing Co., 320 Hanover St., Middletown, O. (Flying Merkel.)
Swenson, B. A., 522 Broad St., Cor. Blackstone St., Providence. (Indian.)

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Federation American Motorcyclists, E. M. Estabrook, Bangor, Me.

MOTORS AND POWER PLANTS.

Rutenber Motor Co., Marion, Ind. (Rutenber.)

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Johns-Manville Co., H. W., Madison Ave. and 41st St., New York City.

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Anti-Rust Paint Co., Dept. 7, Akron, O. (Thomas.)

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Invincible Puncture Proof Tire Co., 58 Sabin St., Providence, R. I. (Invincible.)
National Motor Supply Co., 1911 Euclid Ave., Cleveland.

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Johns-Manville Co., H. W., Madison Ave. and 41st St., New York City.

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Hawthorne Manufacturing Co., Inc., 29 Spruce St., Bridgeport, Conn. (Hawthorne.)

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Johns-Manville Co., H. W., Madison Ave. and 41st St., New York City.

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Boyd, F. Shirley, 903 Boylston St., Boston. (Dorian.)
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Branches: In all principal cities.
United States Tire Co., Broadway and 58th St., New York. (Continental and Whittlesey Demountable.)
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National Gas Engine Starter Co., 30-32 N. Dearborn St., Chicago. (National.)
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Branches: See Batteries.

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Hopewell Brothers, Newton, Mass. (Paos.)
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Simplex Aluminum Solder Co., 108 Broadway, Long Island City, N. Y. (Simplex.)

SPARK PLUGS AND IGNITERS.

American Ignition Co., 319 Adams St., Dorchester, Mass. (Amico.)
Bosch Magneto Co., 223-225 W. 46th St., New York.
Branches: See Magnetos and Magneto Supplies.
Frontier Specialty Co., 734 Main St., Buffalo. (All-in-One.)
Heinee Electric Co., Lowell, Mass. (H. E. Co. Priming.)
Janney, Steinmetz & Co., Philadelphia.
Johns-Manville Co., H. W., Madison Ave. and 41st St., New York City.
Mosler, A. E., & Co., P. O. Box M, Mt Vernon, N. Y. (Spit Fire.)
Randall-Faichney Co., Boston. (Mac-Kae.)
Branches: See Horns.
Splitdorf Electrical Co., 98 Warren St., Newark, N. J.
Branches: See Magnetos and Magneto Supplies.
Standard Co., The, Torrington, Conn. (Black Eagle.)

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Johns-Manville Co., H. W., Madison Ave. and 41st St., New York City.
Randall-Faichney Co., Boston. (Mac-Kae Blits.)
Branches: See Horns.

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Hoffecker Co., The, Motor Mart, Boston. (Hoffecker.)
Jones Speedometer, New Rochelle, N. Y.
Branches: Broadway and 76th St., New York; 109 Massachusetts Ave., Boston; 1416 Vine St., Philadelphia; 1430 Michigan Ave., Chicago; 852 Main St., Buffalo; 253-255 Jefferson Ave., Detroit; 530 Golden Gate Ave., San Francisco; 1229 So. Olive St., Los Angeles, Cal.; 329 Ankeny St., Portland, Ore.; 917 E. Pike St., Seattle, Wash.
Warner Instrument Co., 1221 Wheeler Ave., Beloit, Wis. (Auto-Meter.)
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Marburg Bros., 1790 Broadway, New York. (Marburg-Hagen.)
Perfection Spring Co., No. 1 Plant, 2414 Superior Ave., N. W.; No. 2 Plant, East 65th and Central Ave., Cleveland.

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Boyd, F. Shirley, 903 Boylston St., Boston. (Baldwin.)

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Standard Welding Co., Cleveland.

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Branch: New York City.

TANKS, TIRE INFLATING.

Prest-O-Lite Co., 271 East South St., Indianapolis. (Baby Tire Filler, The Emancipator.)
Branches: See Cylinder Cleaning Compound.

TAPE, ASBESTOS.

Johns-Manville Co., H. W., Madison Ave. and 41st St., New York City.

THERMOS CASES.

Dover Stamping & Manufacturing Co., Cambridge, Mass.

TIRE ACCESSORIES.

Firestone Tire & Rubber Co., Akron, O.
Branches: See Rims—Removable and Detachable.
Shaler Co., C. A., Waupun, Wis.

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TIRE CASES.

Hopewell Brothers, Newton, Mass. (Hopewell.)
Branch: 1974 Broadway, New York.

TIRE CHAIN GRIPS. (See Chains.)

TIRE PRESERVATIVES AND PROTECTORS.

Approved Auto Specialties Co., 1731-37 Broadway, New York. (Goodman Tire Shield.)
Gray Specialty Co., 148 Avon Ave., Newark, N. J.
National Rubber Co., 4433 Papin St., St. Louis, Mo. (Tirenew.)
Page-Lester Co. 2644 Indiana Ave., Chicago. (Tite-Wad Rubber Putty.)

TIRE REMOVERS.

O-Tak-A Tire Remover, Le Roy, N. Y.

TIRES—CASINGS AND INNER TUBES.

Diamond Rubber Co., Akron, O. (Diamond.)
Firestone Tire & Rubber Co., Akron, O. (Firestone.)
Branches: See Rims—Removable and Detachable.
Fisk Rubber Co., Chicopee Falls, Mass. (Fisk.)
Branches: 811-813 Boylston St., Boston; 171½ Dorrance St., Providence.
Frontier Tire & Rubber Co., 1054 Main St., Buffalo, N. Y. (Frontier.)
Gaulois Tire Co., 1926 Broadway, New York. (Gaulois.)
Goodyear Tire & Rubber Co., Madison St., Akron, O. (No-Rim-Cut.)
Branches: In all principal cities.
Hood Rubber Co., Watertown, Mass. (Shawmut.)
United States Tire Co., Broadway and 58th St., New York. (Continental, G & J, Hartford, Morgan & Wright.)
Branches: See Rims—Removable and Detachable.

TIRES—CUSHION.

Cataract Rubber Co., Wooster, O. (Cataract.)
Branches: Boston, New York, Providence.
Firestone Tire & Rubber Co., Akron, O. (Firestone.)
Branches: See Rims—Removable and Detachable.
Mots Tire & Rubber Co., The, Akron, O. (Electric Special Mots Cushion.)
Branches: Boston, New York, Philadelphia, Pittsburg, Chicago, Kansas City, Detroit, Cleveland, Los Angeles.

TIRES—MOTORCYCLE.

United States Tire Co., Broadway and 58th St., New York. (Morgan & Wright. G & J.)
Branches: See Rims—Removable and Detachable.

TIRES—SOLID AND COMMERCIAL.

Diamond Rubber Co., Akron, O. (Diamond.)
Firestone Tire & Rubber Co., Akron, O.
Branches: See Rims—Removable and Detachable.
Fisk Rubber Co., Chicopee Falls, Mass.
Branches: See Tires—Casings and Inner Tubes.
Mots Tire & Rubber Co., The, Akron, O. (Mots.)
Branches: See Tires—Cushion.
Polack Tyre and Rubber Co., 246 W. 59th St., New York City. (Polack.)
Republic Rubber Co., Youngstown, O. (Republic.)
United States Tire Co., Broadway and 58th St., New York.
Branches: See Rims—Removable and Detachable.

TOPS AND ATTACHMENTS.

Springfield Metal Body Co., 20 Medford Ave., Springfield, Mass.

TROUBLE FINDERS.

Hopewell Brothers, Newton, Mass. (Vibrator.)
Branch: 1974 Broadway, New York.

TRUCKS—See Cars, Commercial.

TRUNK RACKS.

Connecticut Steel & Wire Co., Hartford, Conn.

TUBING, GAS.

Johns-Manville Co., H. W., Madison Ave. and 41st St., New York City.

TURNTABLES.

Beach Co., T. C., 108 Ottawa St., St. Johns, Mich. (Beach.)

UNIVERSAL JOINTS.

Brets Co., J. S., 520 W. 54th St., New York. (Hartford.)
Kinzler-Bennett Co., The, P. O. Box 124, Hartford, Conn. (Kant-Break.)

VALVE GRINDERS.

Wall, J. H., 290 Hope St., Bristol, R. I. (Ford.)

VULCANIZERS.

McVey Manufacturing Co., Third and Canal Sts., Dayton, O. (McVey.)
National Motor Supply Co., 1911 Euclid Ave., Cleveland. (Garage and Individual.)
Branches: In all principal cities.
Shaler Co., C. A., Waupun, Wis.
Williams Foundry & Machine Co., Akron, O.

WELDING OUTFITS.

Prest-O-Lite Co., 309 W. South St., Indianapolis. (Prest-O-Welder.)
Branches: See Cylinder Cleaning Compound.

WELDING, STEEL.

Standard Welding Co., Cleveland.

WHEELS.

Eberly & Orris Mfg. Co., Mechanicsburg, Penn.

WIRES AND CABLES.

Diamond Rubber Co. of N. Y., Akron, O. (Diamond.)

WIRE MECHANISM.

Brets Co., J. S., 250 W. 54th St., New York. (Bowden.)

WRENCHES AND COMBINATION OUTFITS.

Allen Wrench and Tool Co., Providence, R. I. (Allen Friction Socket Sets.)
Coes Wrench Co., Worcester, Mass.
Cutter, George A., Taunton, Mass.
Walworth Manufacturing Co., Boston. (Stillson.)

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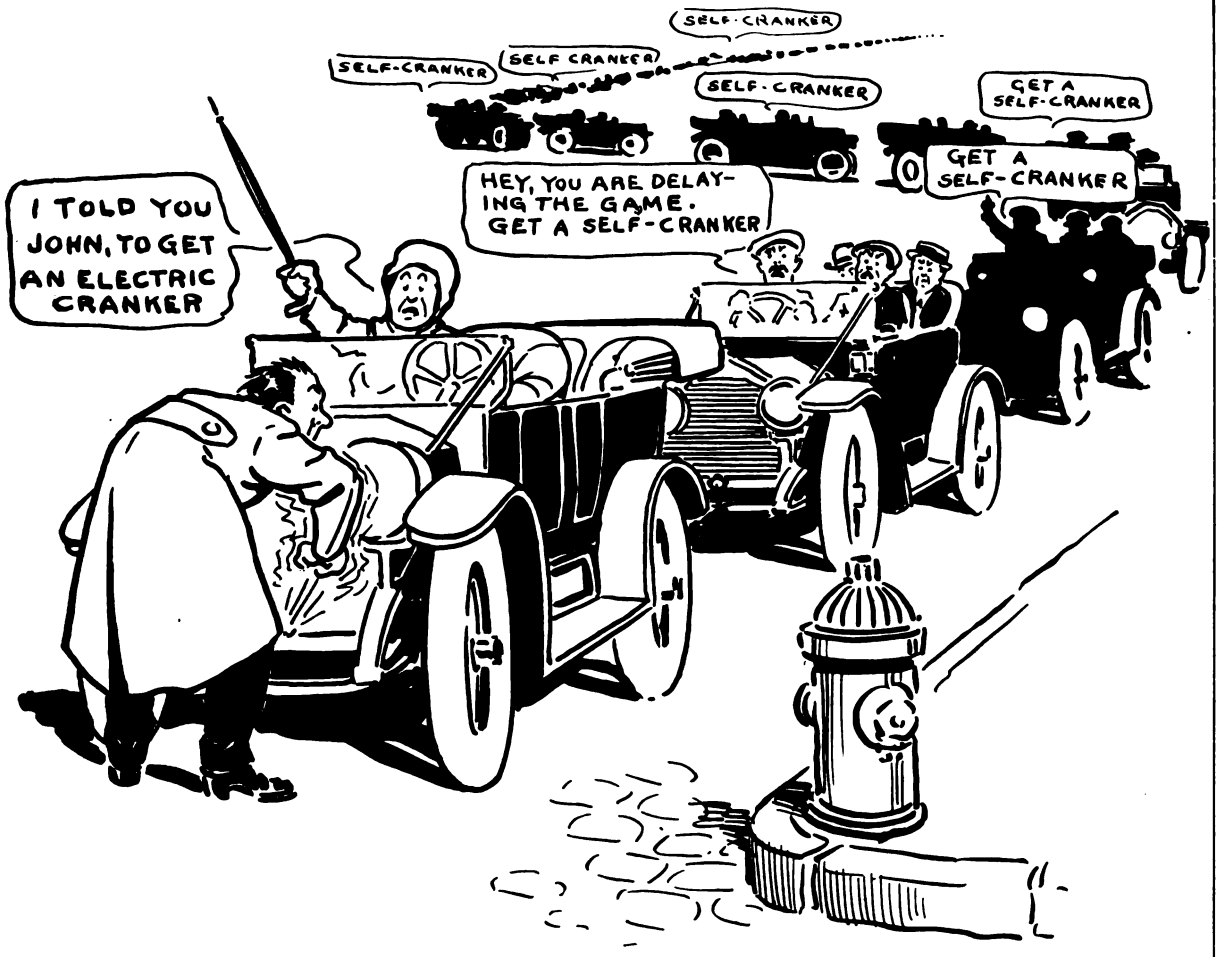
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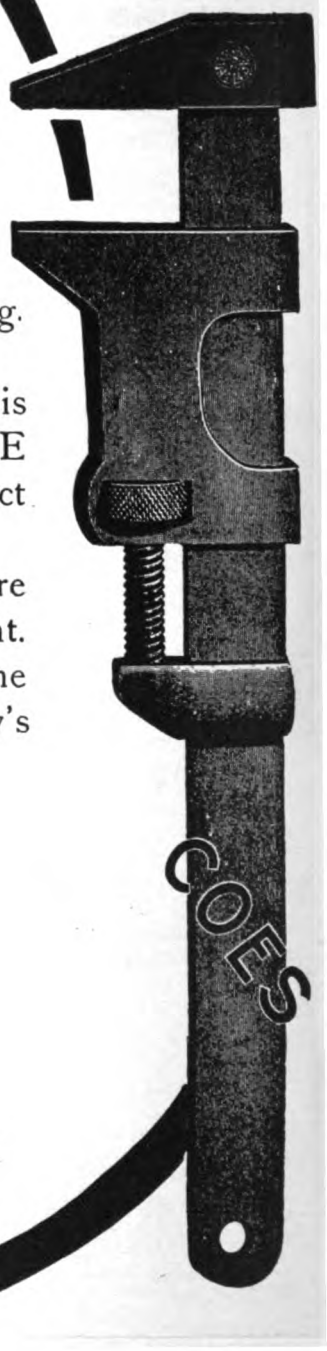
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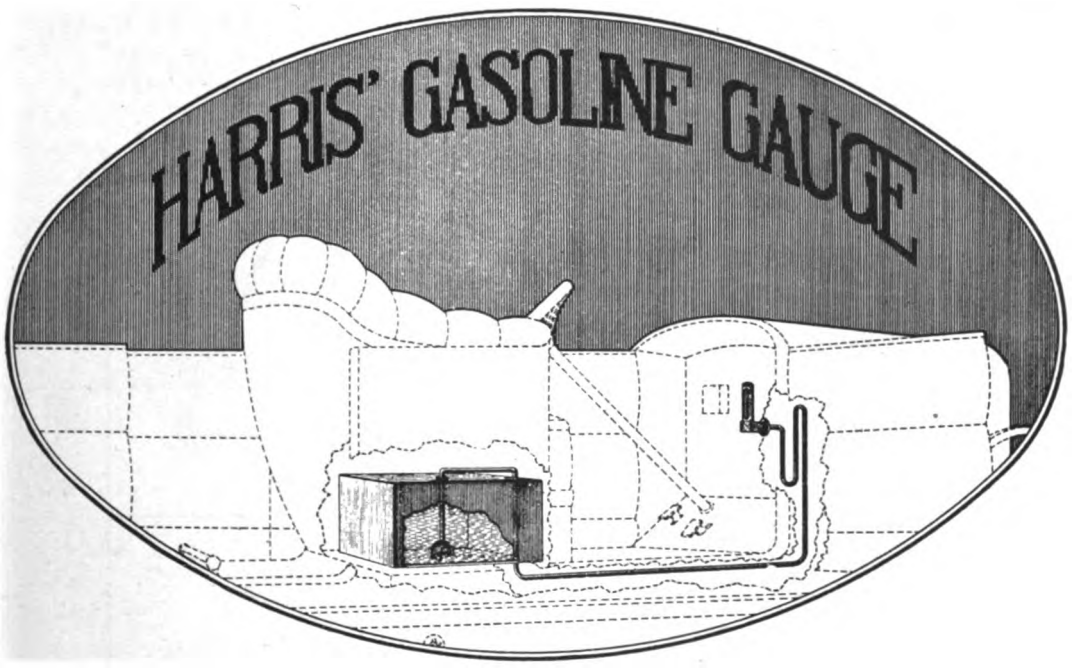


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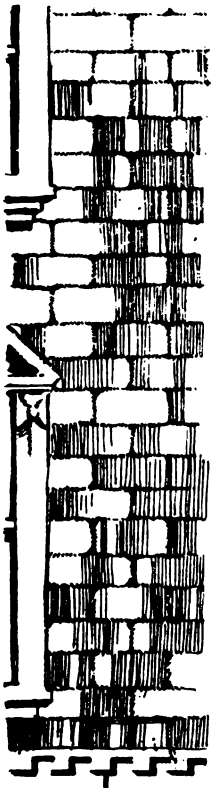
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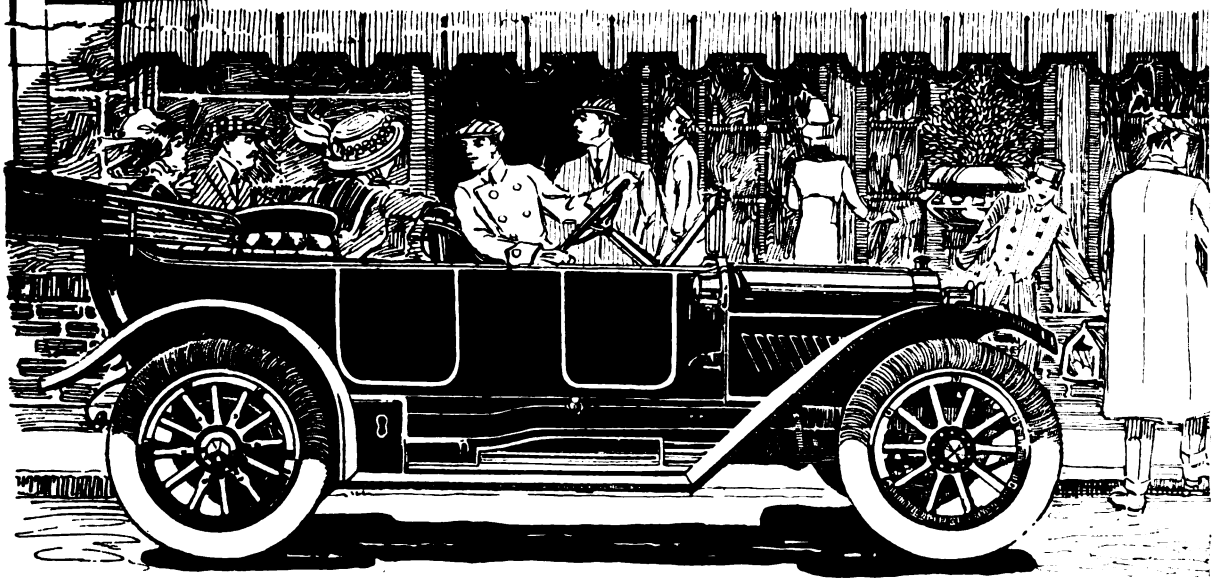
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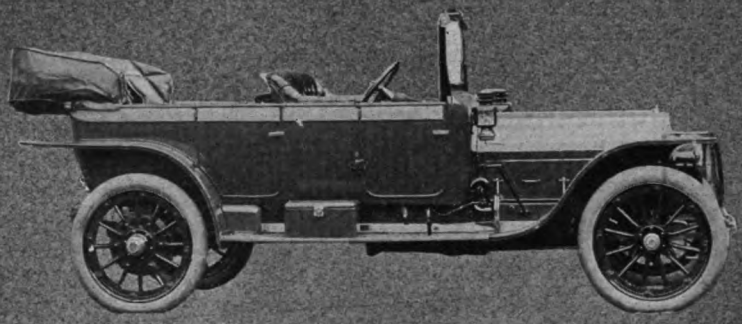
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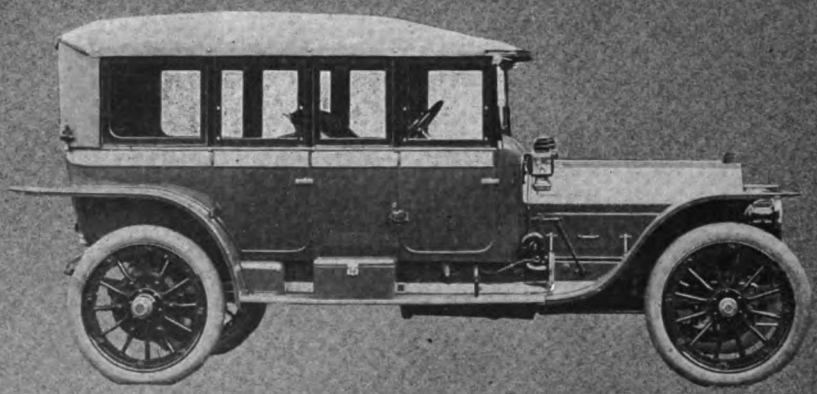
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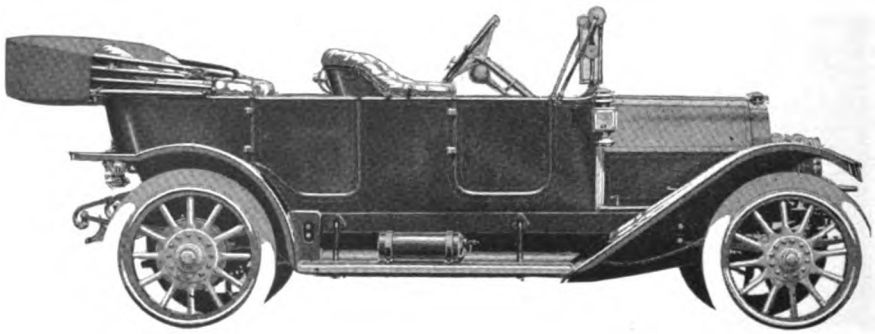
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Index To Advertisers

	Page
Abbott Motor Co.	5
American Ignition Co.	7
American F. N. Company	75
Anti-Rust Paint Co.	91
Apple Electric Co.	Cover
Approved Auto Specialties Co.	3-80-81
Austin Automobile Co.	92
Barrett Manufacturing Co.	82
Beach Co., T. C.	90
Borne, Scrymser Company	81
Bosch Magneto Company	13
Boyd, F. Shirley	83
Bretz Company, The J. S.	81
Brown Company	92
Brown Scientific Tube Distributors	84
Buckeye Manufacturing Co.	90
Cameron Mfg. Co.	82
Cartercar Company	92
Cataract Rubber Co.	9
Chelsea Clock Co.	4
Coes Wrench Company	2
Cole Motor Car Company	92
Continental Motor Mfg. Co.	82
Cutter, Geo. A.	87
Cutting Motor Car Co.	87
Dayton Rubber Mfg. Co.	88
Dean Electric Company	91
Dixon Crucible Co., Jos.	87
Dover Stamp. & Mfg. Co.	85
Eagle Oil & Supply Co.	92
Emery Mfg. Co.	16
Empire Automobile Co.	87
Federation Amer. Motorcyclists.	75
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Geiszler Bros. Storage Bat. Co.	87
Goodnow Mfg. Co.	86
Goodyear Tire & Rubber Co.	85
Gray Specialty Co.	92
Harris Oil Company, A. W.	82
Hawthorne Mfg. Co.	82
Haynes Automobile Co.	82
Herreshoff Motor Co.	91
Hoffecker Company, The	90
Ideal Motor Car Company	89
Indian Refining Co.	Cover
Invader Oil Co.	15
Invincible Tire Co.	87
Jackson Automobile Co.	85
J. H. Tonneau Shield Co., The	80
Johns-Manville Co., H. W.	85
Jones Speedometer Company	81
Kissel Motor Car Company	87
Knox Automobile Company	84
K-R-I-T Motor Car Co.	82
Leavens & Co., William	82
Lenox Motor Car Company	87
Marburg Bros.	87
McVey Mfg. Co.	90
Mea Magneto	87
Mercer Automobile Company	86
Miami Cycle & Mfg. Co.	73
Michigan Motor Car Co.	91
Miller, Chas. E.	Cover
Moller Brothers Controller & Economizer Co.	89
Mosler & Co., A. R.	81
National Motor Vehicle Co.	85
New Departure Mfg. Co.	87
Nordyke & Marmon Co.	83
N. Y. & N. J. Lubricant Co.	90
O-Tak-A Tire Remover Co.	81
Owen & Co., R. M.	81
Paige-Detroit Motor Car Co.	86
Perfection Spring Co.	92
Pierce-Arrow Motor Car Co.	Cover
Pilot Car Sales Co.	90
Planhard Mfg. Co.	88
Pyrene Co. of N. E.	89
Randall-Faichney Co.	80
Remy Electric Company	83
Reo Motor Car Company	81
Royal Equipment Co.	86
Sager Company, J. H.	83
Shaler Co., C. A.	87
Speedwell Motor Car Co.	86
Splitdorf Electrical Co.	89
Springfield Metal Body Co.	6
Standard Co., The	91
Standard Welding Co.	86
Standard Woven Fabric Co.	83
Studebaker Corporation	92
Sumner, George, Inc.	91
Texas Company, The	81
United States Tire Co.	87
Valvoline Oil Company	91
Waite Auto Supply Co.	91
Wall, J. H.	83
Walpole Tire & Rubber Co.	85
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Page

*Advantages of Portable Garages....17
Miller's Gasoline Trophy....23
*The Overhaul of the Power Plant....24
Truck Owners Object....29
*M&M Fuel Economizer....29
*General News of the Industry—
Additional Plant in Pittsburg....30
Motokart Company Formed....30
To Produce Motor Truck....30
Pullman Buys Factory Site....30
Vaughn Car Redesigned....31
To Interest French Capital....31
Strout with Haynes Company....31
With Continental Motor....32
Is Producing Turntables....32
Erecting New Buildings....32
Hermes Car in Cincinnati....33
Akron Strike Ended....33
Selects Cleveland Site....33
To Locate in Nashville....33
Receiver Makes Report....34
*New and Novel Accessories....35
*Continental Line Augmented by New Six....38
Engineers to Investigate....39
*Novelty in Side Curtains....39
*With the Motoring Interests Abroad—
Details of Italian S. C. A. T....40
British Imports and Exports....41
Developing Foreign Trade....42
News Notes from Abroad....42
*Correspondence with the Reader—
Selecting Files....43
Haynes Motor....43
Gear Ratio of K-R-I-T....43
Locating Ignition Troubles....43
Soap for Garage Purposes....43
Leaky Storage Battery....43
Rewiring Magneto....43
S. A. E. Horsepower Formulae....44
Measuring Radiator and Hoods....44
Glass for Windshield....45
Rectifier for Ford Cars....45
*Jackson Line Includes Three Models....46
Still Another Tire Company....47
*Bosch Supply Stations....48
Panama-Pacific Exposition....48
*International Sweepstakes....49
Glidden Tour Route....49
Editorial, Scientific Motoring Law....50
Editorial, The Effect upon the Industry....50
Makers Discuss Pertinent Subjects—
Care and Repair of Tires....51
Concerning Storage Batteries....52

Page

Testing Lubricating Oils....52
Making the Curve Safer....53
Regarding Good Roads....53
Honest Advertising Law....53
*Mechanical Notes for Owners—
Methods of Converting Tierods....54
A Simple Lock Nut Device....54
Saving Asbestos Gaskets....54
Removing Broken Studs....55
Adjusting Roller Bearings....55
Racing the Motor....55
*In the Commercial Vehicle Field—
New Buick Delivery Wagon....56
Seven-Ton Vulcan Truck....56
The Worm Driven Blair....57
Makers' Census of Truck Industry....58
Truck Competes with Railroad Service....59
Motoring Laws and Their Enforcement—
Scientific Interstate License Plan....60
Zone Reciprocity System....60
Fifty Cents a Horsepower....61
New Indiana Law....61
To Aid Garage Keepers....61
Legislative Briefs....61
*French Motor Starts Cold on Kerosene....62
*Curtiss Military Tractor Biplane....64
*Latest Reports from Flooded Districts....66
Quality, Not Quantity....67
*The Repair Shop and Garage—
Running in Bearings....68
New Motor Fuel....68
Ozo, a Carbon Destroyer....69
Fitting Wires or Cables....69
Tests of Benzol....69
*Garage and Repair Shop Equipment—
Westinghouse Rectifier....70
Eastern Runabout Fuel Outfit....70
Formulae and Useful Mechanical Tables....71
Tetzlaff Discusses Lubrication....71
*In the Realm of the Motorcyclist—
Effects of Recent Floods....72
Denver to Get Convention?....72
Many Girls on Kansas Tour....74
Addition to Henderson Plant....74
Bosch in the Flood....74
Merkels in Telephone Work....74
A New Blue Streak....74
Merkel Defeated Indian....74
Tourist Trophy Races....74
Harley-Davidson's Birthday....75
Annual Herring Run....75
Club Notes, Here and There....75
*New Incorporations and Maker's Notes....76
Recent Patents....78
Coming Events....78
Brooklyn's Automobile School....79

*Indicates article is illustrated.

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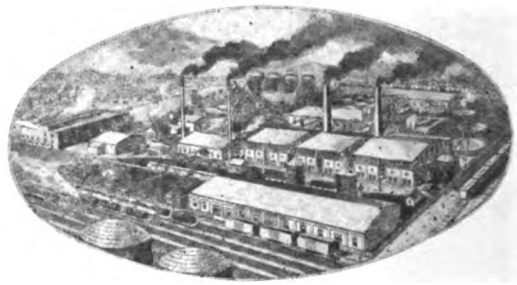
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THE AUTOMOBILE JOURNAL

VOL. XXXV, No. 6 APRIL 25, 1913 Price, $1.00 the Year

ADVANTAGES OF PORTABLE GARAGES.

Why a Large Percentage of Owners House Their Cars in Private Buildings---Details of Construction, Dimensions and Prices of Types Now in the Market---Features to Be Considered in Making Selection.

RELIABLE figures secured from state officials at the beginning of the year indicated there were not less than 1,000,000 motor vehicles of all types in service in this country. The returns from Alabama, Maine, Massachusetts, Maryland, Missouri, Montana, New York, Oregon and Rhode Island, in which the registrations of pleasure and commercial vehicles were reported separately, revealed that some 85 per cent. of the automobiles in these states were pleasure cars. Assuming that the same relative proportions held true of the remainder of the country, there must have been a total of 850,000 of this type alone, and, of course, the figures have been increased materially by sales made since that date.

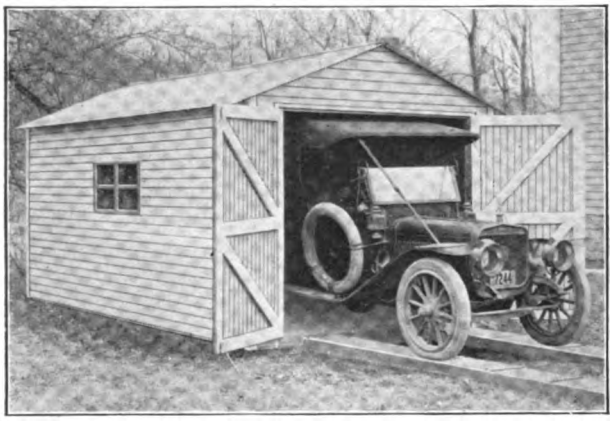
Were it possible to secure equally reliable information as to the capacities of the various public garages and service stations, there is little doubt that the difference between the number of cars in use and the number of machines which could be cared for in these institutions would be surprisingly large. It seems safe to assume that a majority of the pleasure cars owned in the Union are housed in private garages.



The Portable Garage May Be Made to Harmonize in Every Particular with the Residence and Other Surroundings.

Besides the economy afforded through the elimination of storage charges, which average from $20 to $35 a month, depending upon the size of the city and the local conditions, there are certain

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Edwards Design Provides Ample Room for Big Winton.

advantages in the plan of having the car at home. The American motorist finds keen enjoyment in looking after his own machine, and there is opportunity for decided economy in this respect as well. The need for minor adjustments and repairs is discovered and the work is done at slight expense before it assumes important proportions.

In addition, the car is at all times under the watchful eye of the owner, and the danger from abuse at the hands of the "joy rider" is wholly eliminated. There is no mysterious disappearance of tools and equipment, and there is less liability of scratches and mars on the body work. Even the gasoline bills seem to grow less. And above all, the machine is nearby, ready for instant use at any time of the day or night. All these items spell economy.

The owner of his first machine—and many of the older owners—finds himself studying the problem of the private garage. His first step may be that of consulting an architect or contractor in an effort to determine the necessary expense of construction. Sooner or later he undoubtedly will ask himself whether or not it is possible to satisfy his needs for less money.

Irrespective of the expense involved, the garage must be a thoroughly practical structure. First of all, it must afford complete protection to the car. By this is meant that it must not only give protection from the elements, but it must insure against theft. Aside from being substantial in every particular it ought also to be attractive in appearance and of such design as to harmonize with its surroundings.

The portable garage offers in combination these three essentials—practicability, attractiveness and inexpensiveness. Elsewhere is presented a table setting forth the list price for different sizes of portable garages as produced by five concerns, and this will serve as a guide to the owner who is considering the proposition from the standpoint of first cost. Accompanying illustrations set forth in a measure the features of practicability and attractiveness.



Edwards All-Steel Garage Owned by Mayor Henry T. Hunt of Cincinnati.



Edwards Steelcote Model with Two Windows on Side.

The idea of portable buildings has become associated with the summer outing. There is little doubt that the first structures were produced solely for this purpose. The city dweller who could procure a desirable lot at the seashore or in the mountains, found it desirable to purchase a portable house for use during the summer season. Very soon there arose a demand for a building which could be left in position throughout the winter, giving suitable protection for such goods as were required during the annual vacation outing. As a result the product was perfected until it embodied permanent features as well as portable.

The portable garage is in a sense a development from the portable house. With the more general adoption of the automobile it became necessary to provide for the machine even where

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the summer was spent in the most substantially constructed country house. The portable garage offers a practical solution of this problem, particularly where it is desired to store the car only during the summer months, and yet with the perfection of design and construction people of means have found it possible to consider these buildings as a permanent improvement to their country property. The structure not only remains in position throughout the year, affording protection for such tools and appurtenances as must be kept at the country place, but offering an excellent opportunity for taking a run into the country for a week end or a longer period during the milder portions of the winter months.

Some owners, instead of leaving the portable garage at their summer homes, ship them into the country in May or June and bring them back to the city in September or October, thus making one structure answer their needs in both



O. K. Harry Design Owner by C. S. Marsh of St. Louis, Mo.

places. Perhaps it was this plan which first brought the portable garage to the attention of the city owner as a permanent substitute for the more substantial structure. Certainly, it makes a decided appeal to the man who does not own his own home, or who desires to change his dwelling place. It is easily set up and as quickly taken down. It can be erected on rented land as well as any other, and it is readily moved with the household goods to the place of new abode.

There are a large number of concerns producing portable garages. Some of these are of wood, some are of wood and steel, others of all-steel construction, and still others of concrete in the building of which a portable feature is incorporated. That presented on the title page of this discussion is the product of F. C. Pinyoun & Son, Cleveland, O., and is of wood. The side walls are made in sections about four feet wide from .875-inch white pine siding, tongued and grooved,



Pruden One-Car Garage Owned by a St. Paul Architect.

each being a duplicate of the others and all being interchangeable. The roof is of specially prepared roofing material, and the hardware, glass and fixtures are in keeping. The whole may be painted to match the residence or harmonize with the surroundings in any manner desired.

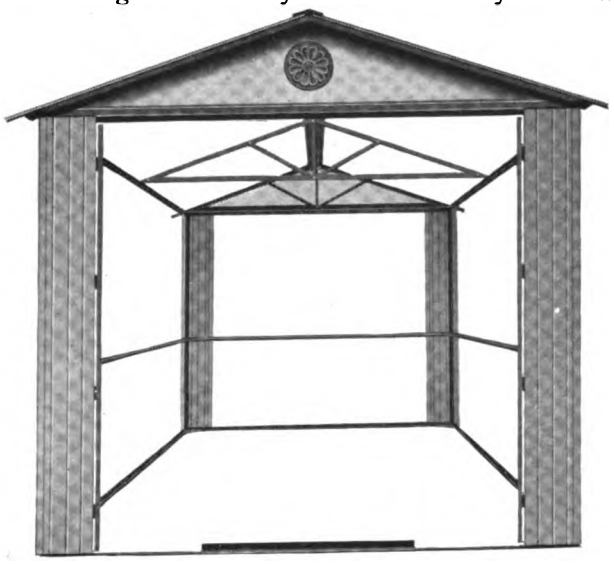
The lumber is dressed on both sides so that the interior has a smooth and finished appearance. It is recommended that it be treated with a coat of stain and varnish to bring out the grain of the wood, thus giving a good finish at a very slight expense. No ceilings are provided, it being maintained that the dressed roof panels take their place and afford good ventilation. The sections are put up in crates of a convenient size for handling, the height of each being eight feet. A flooring may be fitted at a slight extra cost, but the standard garage is furnished with running



Pruden Two-Car Garage in Service at Sayville, L. I.

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planks, two inches thick and 16 inches wide, for the wheels of the machine to stand upon. The sizes range from 10 by 12 feet to 20 by 20 feet.



First Step in Erecting Edwards All-Steel Garage: Corner, Gable and Roof Sections in Place.

One of the oldest producers of steel garages is the Edwards Manufacturing Company, Cincinnati, O., which marketed its first structures of this design in 1905. To meet the varying requirements of motorists, the company not only makes garages in any size desired, although not all are included in its standard list, but in two distinct types, one being the Steelcote and the other the All-Steel.

The Steelcote has a frame of seasoned wood, usually pine, covered with non-rusting galvanized steel. The entire structure, save beams, uprights, etc., on the inside, is steel, and this is made weather proof by the Edwards Tightcote process, in which each sheet of steel is resquared after stamping and before galvanizing. It is then dipped into molten lead and zinc, which throughly covers the edges as well as the sides, a condition which is held to absolutely prevent rusting.

Inasmuch as the steel sections are cut exactly to shape and ready to go into place and each piece of the frame is of proper length, the work of erecting the garage is simplified to a final degree. A foundation is not necessary, as the building may be anchored by means of stakes, but usually a cement foundation is utilized, in which event the anchors are sunk in the cement and the structure attached thereto.

The floor sills consist of two-by-fours securely spiked together. The corner posts are placed in position and the corner pieces of galvanized steel are applied before the siding, the latter being of Tightcote galvanized weatherboard resembling clapboards, and utilizing an interlocking construction that makes water tight seams and provides for expansion and contraction. The roofing is of the same material, made to represent cluster shingles, with interlocking devices and with nails concealed. A metal Spanish tile roof is furnished at an extra cost if desired.

The All-Steel model, as its name imples, contains no wood at all. The roofing, siding, window frames and doors are of non-rusting galvanized steel, and the frame of open hearth or Bessemer steel. To enter a trifle more into detail: The frame work is of angle steel, 1.25 by 1.25 by .125 inches, with holes drilled for fastening side sections. All sills are connected by six by six-inch angle plates, drilled for .3125-inch bolts securely fastened at top, bottom and centre angles. The top plate has six by six-inch angle steel plates .125-inch thick, drilled for .3125-inch bolts and riveted on one side. The sills are punched out at the door for the passage of the wheels. The door posts on either side of the door are drilled for .3125-inch bolts, the hinges being riveted to the post and the corner section.

The trusses are constructed of 1.25 by 1.25 by .125-inch angle steel securely riveted together with one vertical centre brace and two transverse stress braces, riveted in place. Each door is four feet wide and eight feet high, the frame being the same as that of the building itself, covered



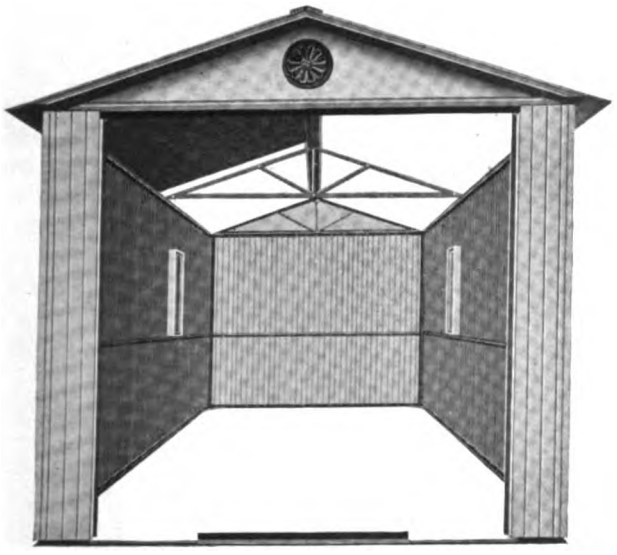
Second Step: Rear and Side Sections Completed.

with galvanized beaded siding and reinforced by one by one by .125-inch angle braces, fastened in the centre with six by eight by .125-inch steel

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plate riveted in place. There are two doors.

The siding is Edwards patent beaded lock joint, 26-gauge, heavily galvanized by the Tight-



Third Step: Sides and Part of Roof in Place.

cote process, each section being equipped with a patented interlocking device, which locks into the stiffening bars, forming air tight joints between sections. The roofing is of the same material, securely locked by slipping into the folded part of the ridge cap and into the turned-up edge of the eave flange. The roof is further reinforced by two extra angle steel purlins, extending the entire length from gable to gable.

Metal fireproof windows are furnished in two of the side sections, each 27 by 36 inches, with two galvanized steel hinges securely riveted to each frame. These sections being interchangeable, the windows may be placed in any position along the side or end of the building. A Yale & Towne three-tumbler lock securely fastens the door and a combination lock and patented galvanized opening rod is supplied for each window.

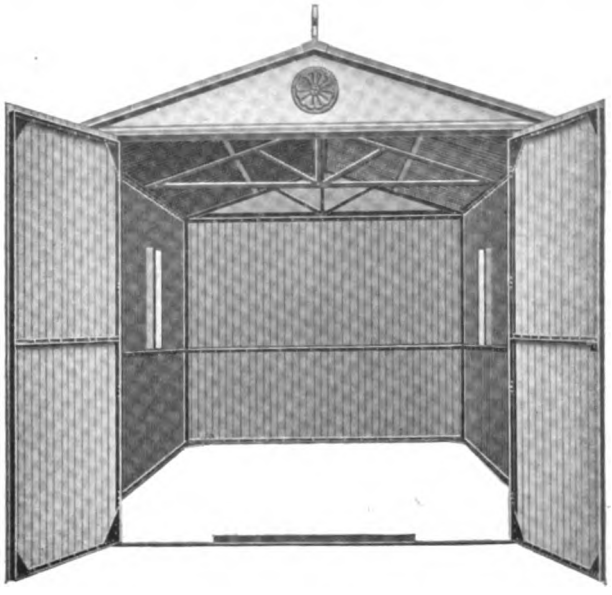
The Metal Shelter Company, St. Paul, Minn., produces the Pruden system garage. This also is an all-metal product, the steel being thickly galvanized. The side and end walls are fastened together by studs which form a part of the integral wall after they are locked in place. The edge of each sheet is formed into a hook or bead which interlocks with the bead of the next sheet, thus forming a tube into which a rod is slipped to hold the sections together. This construction is very similar to that of a door hinge.

The rods are then bolted to the bottom piece or sill, fastening the whole wall together into one solid piece of sheet metal. The sills are of an angle iron material and are anchored to the foundation by means of specially bent clips held down by bolts embedded in the concrete.

Before being slipped into the tube formed by the heads of the two sheets the studs are put through holes in the eave pieces so that when they have been fastened to the sills at the bottom the eaves also are held in place at the top of the wall sections. The outer edges of these eave pieces are bent over to receive one end of the pieces which are slid into the slot thus made and which span the space between these eave ends and the ridge piece at the top of the roof. There is a similar slot in the ridge piece to receive the other ends of the metal roof sections. The roof sheets are fastened together by means of the beads, but there are no studs, as in the side wall sections.

Still another all-steel construction is the O. K. Harry, made by the O. K. Harry Steel Company, St. Louis, Mo. The material is 24-gauge galvanized open hearth steel, reinforced with corrugations, and angle iron. All intermediate seams in the side wall sections are double locked, there being no nails, rivets or lap at this point, a patented construction which is held to possess superior advantages. Where the roof sections lap they are provided with corrugations which are bolted together, an elastic cement being used to cover the bolts.

In erecting this garage the wall sections are laid flat on the ground and bolted together for the rear and sides. These are then raised to a



Interior View of Garage Ready for Occupancy.

perpendicular position and the angles bolted at the corners. Next the centre truss is placed and bolted to the side wall top angles, then the rear

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and front truss in like manner. The roof sections are lifted into place separately and bolted as outlined above. The ridge cap is the last



Standard Model Produced by Riverside Manufacturing Company.

piece to be placed, securely locking the assembly.

Except for the individual design and the difference in the application of the principle, the numerous other steel portable garages made throughout the country may be said to be similar to those already described. The building made by the Riverside Manufacturing Company, Newark, N. J., shown herewith is an example of standard construction in this respect.

The advantages of the steel building include that of complete fire protection. As a rule the makers claim that they comply with all the requirements of the board of fire underwriters, resulting in a reduction in fire insurance premium. Not only do they protect the car from fires originating outside the garage, but in case the fire arises inside the building, it cannot communicate to other structures.

The same thing holds true of the concrete garage, and while this material usually is employed for permanent buildings, David Craig of Boston, Mass., has invented a method of construction by which he claims it is possible to secure a portable feature. An accompanying sketch brings out the details, and a little study of the drawings should make the principle clear.

The chief essential is what is termed the Craig reinforced screw bore presented at B. This is fixed in the slab of concrete by first inserting a master bolt into the hole which has been prepared and located in the mold as shown at C. The wire screw bore is then imposed upon the master bolt. If reinforcing rods are used, they may be placed in position and the ends of the wire wound around them. The mold is then levelled and poured full of concrete. When this has hardened the sides of the mold are removed and the master bolts taken out, leaving the reinforced screw bore correctly placed and imbedded in the slab or unit.

The drawing at A indicates the method of constructing the building, and it will be noted that virtually three slabs are utilized, the screws fitting into the screw bores in the several slabs so as to hold the entire building together. It follows that it should be a simple matter to remove these screws and take the concrete slabs to the new location for the re-erection of the garage wherever desired. In fact, the inventor claims that the only tools necessary for the construction

DIMENSIONS AND PRICES OF STANDARD PORTABLE GARAGES.

Size	1	2	3	4	5*	6*	Size	1	2	3	4
8x10x8	....	....	....	$168	....	....	16x14x8	....	....	....	$280
8x12x8	....	....	....	188	....	....	16x16x8	....	....	$261	296
10x10x8	....	....	....	188	....	....	16x18x8	....	$300	284	308
10x12x8	$130	$130	$160	200	....	....	16x20x8	$330	330	306	320
10x14x8	....	150	175	216	$92.50	$150	16x24x8	....	....	349	....
10x16x8	170	170	189	228	97.50	160	16x28x8	....	....	391	....
10x18x8	190	190	204	240	102.50	170	16x32x8	....	....	455	....
10x20x8	....	210	218	256	107.50	180	18x12x8	....	....	....	296
12x12x8	....	....	177	224	....	....	18x14x8	....	....	....	308
12x14x8	....	170	194	236	102.50	160	18x16x8	....	....	....	328
12x16x8	195	195	210	252	107.50	170	18x18x8	....	....	316	356
12x18x8	220	220	228	264	112.50	180	18x20x8	....	350	340	380
12x20x8	245	245	244	276	117.50	190	18x24x8	....	....	388	....
12x22x8	260	....	....	....	....	....	18x28x8	....	....	436	....
12x24x8	....	....	278	....	....	....	18x32x8	....	....	484	....
14x12x8	....	....	....	240	....	....	18x42x8	....	....	604	....
14x14x8	....	....	212	256	112.50	170	20x16x8	....	....	....	380
14x16x8	....	....	232	268	117.50	180	20x18x8	....	....	....	408
14x18x8	255	....	252	280	122.50	190	20x20x8	....	....	375	448
14x20x8	....	....	272	296	127.50	200	20x24x8	....	....	427	....
14x24x8	....	....	308	....	....	....	20x28x8	....	....	480	....
14x28x8	....	....	348	....	....	....	20x32x8	....	....	533	....
16x12x8	....	....	....	268	....	....	20x42x8	....	....	665	....

*These makes are 10 feet high instead of eight.

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or demolition of the building are a monkey wrench and a screw driver.

When considering the matter of a private garage, the owner does well in not deciding upon a building that is too small. He may consider the length of his car and add a few feet extra, thus securing a building which furnishes shelter for the machine. In so doing he fails to remember that while he may have a small car at present, another year he may decide upon a larger one, or that while he does not expect to do work upon the machine, he may find it expedient to do so later.

This feature of the situation has been covered fully in a series on equipping the private garage now running in The Automobile Journal. However, since it has a more or less direct bearing upon this subject, it is not out of place to call attention to the desirability of securing a garage having plenty of available space. In determining this point it will be necessary to consider not only the wheelbase of the car, but its maximum length from the front of the radiator to the rear of the top when lowered, and to this must be added the number of inches which the wheels extend beyond these points of measurement. The maximum width of the machine, and its height with top up and down also are items of importance. These dimensions must be known first of all, before determining upon the space to be allotted for work bench, etc.

As a partial guide in this matter it may be stated that the Metz runabout, for instance, with a wheelbase of 90 inches, has a maximum length of seven feet six inches, width of 63 inches, height of five feet with top lowered and six feet six inches with top up. The Ford touring car, with a wheelbase of 99 inches, has a maximum length of 11 feet two inches, width of 66.5 inches, height with top down of five feet and with top up of seven feet one inch.

That there is a wide difference in these dimensions may be seen by reference to the figures for a few of the larger machines as given by the manufacturers. The following table gives these dimensions in inches, and in each instance the largest so-called open car made by the company in question is considered:

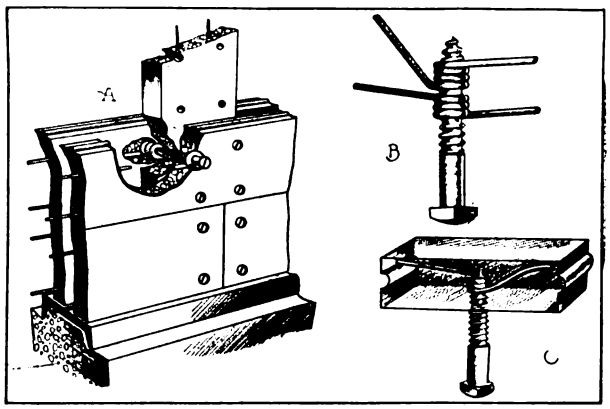
Make	Wheelbase	Length	Width	Top Up	Top Down
Overland	114	154	66.0	84.0	65.00
Cartercar	115	158	70.0	87.0	66.00
Paige	116	169	64.5	82.5	61.25
Mercer	118	180	84.0	82.0	75.00
White	132	180	69.0	....	....
Knox	134	199	67.0	91.0	69.50
Oldsmobile	135	201	71.0	90.0	66.00
Peerless	140	193	68.0	87.0	65.00
American	140	202	66.5	82.0	70.00
Marmon	145	182	67.5	....	....

The importance of this feature cannot be overlooked. The standard height for the portable garages now in the market is either eight or 10 feet. The accompanying price table gives the standard length and width dimensions, some of them being for garages designed to house two cars instead of one. Other sizes than those listed may be secured from any of the makers, but at special prices.

MILLER'S GASOLINE TROPHY.

Donor Makes Further Suggestions Concerning Proposed Fuel Economy Test.

The announcement that Chas. E. Miller, the well known automobile supply man of New York and other cities, would donate a trophy for a fuel economy test to be held in the near future, has occasioned considerable interest throughout the industry. In discussing the situation further, Mr.



Sketch Presenting Details of Craig Portable Feature for Concrete Garages: A, Method of Construction; B, Reinforced Screw Bore; C, Master Bolt Inserted and Placed in Mold.

Miller outlines some of the factors which must be considered in making the award, as follows:

The gasoline fuel economy contest that I suggested recently has attracted attention all over the country, and here in New York undoubtedly either the newly formed Motor Contest Association or the Automobile Dealers' Association will very shortly promote such an efficiency test. Some criticism has been made relative to my suggestion that awards should be made on the basis of 10 miles a gallon, and I might add to that by saying that everything else being on the same plane, if the weight of the car is reduced, the fuel consumption a mile will be reduced.

But this saving is made by giving up some other desirable factor. For instance, very light racing or electric car tires might be used and on a car that uses T head cylinders, the two-point ignition would be valuable. Manual control of the gasoline or air should make it possible to use a light mixture or a heavy mixture, the latter of course on hills and where pulling is hard. Consider also the amount of coasting that the expert drivers did in our last New York City contest four years ago. In conclusion, I feel fully convinced that tests of this sort made all over the country under varying conditions will go a long way towards demonstrating the best method of fuel economy.

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THE OVERHAUL OF THE POWER PLANT.

Outlining Methods of Dismantling, Cleaning and Adjusting Its Components---Parts Requiring Attention and Suggestions for Simplifying the Work.

By C. P. Shattuck.

MOTOR cars are similar to other machinery in that they require periodical overhauling, the exent of which depends upon the age of the machine, service rendered since the last renovation, and future plans of the owner. It is only natural to assume that an automobile purchased new last spring will require less attention than an older vehicle, and that aside from removing the carbon, grinding in the valves, readjusting the bearings, etc., it may be placed in first class condition for the road without much labor or expense. On the other hand, an old model will need considerable attention, including machine work and the replacement of worn parts with new.

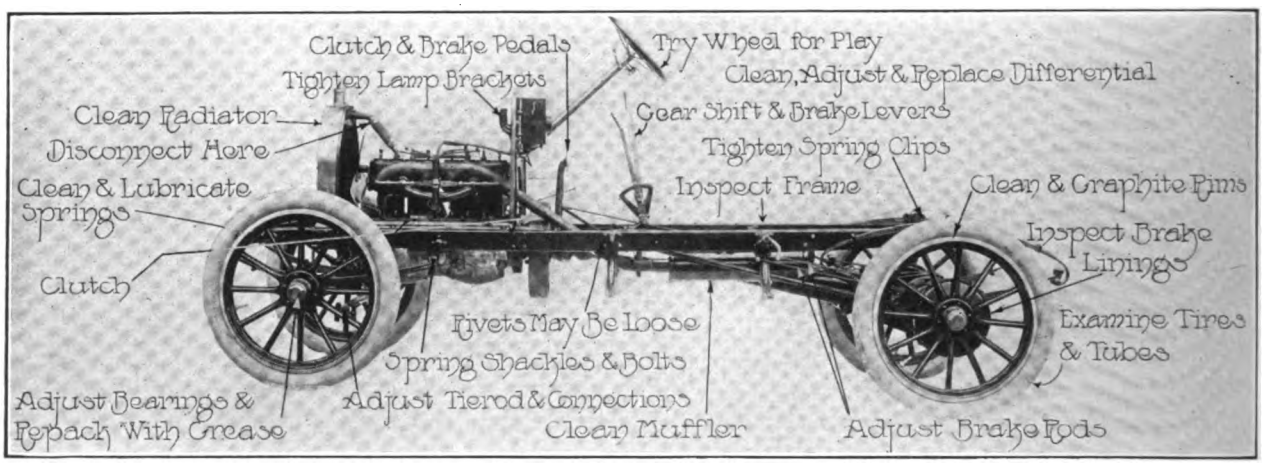


Fig. 1—Illustrating Components Requiring Attention in the Overhaul of the Chassis.

The educational campaign conducted by The Automobile Journal, judging from the large number of letters received and published in the Correspondence Department, has resulted in a large number of automobilists caring for their own cars. Although a certain class of motorists depends upon the expert, there are many who prefer to do their own work, and for the benefit of these the suggestions contained herein are given. The tools and equipment needed for the overhaul were fully described in "The Equipping of the Garage" series.

As the power plant is an important factor its overhaul will be discussed first, although the subject of clutches, transmissions and other chassis components will be taken up in logical sequence. As it is an excellent plan to thoroughly clean and inspect the chassis, even if the car has been used but one season, the removal of the body will facilitate the work. If plans have been made to paint the machine, it can be run to the paint shop and the body removed while the chassis is being overhauled. This plan will save removing and replacing the body twice.

In case it is decided not to paint the car, the accessories and equipment are removed from the body first to lighten the load. Next detach all connections between the body and chassis, making sure that the former is free before attempting to remove it. Four or more persons will be required, depending upon its weight, although with a falls and tackle it will be a simple job.

Having made ready the boxes for the small parts and arranged the work bench for the cylinders, manifolds, etc., the work of dismantling the motor may be started. Previous to the removal of the body the circulating system will require a thorough cleaning if this has not already been done. The subject was dealt with fully in the April 10 issue.

If the motor is to be removed from the chassis the work of cleaning its exterior may be postponed until it is in the motor stand. When the overhaul provides only for scraping out the car-

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bon, grinding in the valves and making adjustments, the engine need not be removed, but the magneto and carburetor should be well covered before washing the power plant with the gasoline and brush or with a special cleaner.

Assuming that a complete overhaul is not necessary, the first step is to mark the wires of the ignition system so that they may be replaced correctly and easily. This may be accomplished by marking a number of small tags and attaching these to the different wires. By observing the same order in the replacement, no difficulty should be experienced in properly wiring the motor. While this work is being done the water may be removed from the cooling system by opening the petcocks under the radiator and pump.

Next shut off the fuel at the tank, and detach the feed pipe at the carburetor by unscrewing the union nut. If the oiling system includes a lead or leads to the dash, tag these before removal and place the pipes where they will not be apt to become injured. Be careful not to bend them. Although the cylinders may be cleaned of carbon without removing the units, the better method is to displace them as it affords an opportunity to inspect the rings, etc., and to locate and remedy the cause of weak compression.

Before attempting to disconnect the water pipes, study the system thoroughly. If a thermo-syphon, detach the pipes at the cylinders, and if similar to the motor shown at Fig. 1, remove the clip on the top of the outlet manifold and detach the union just above the water pump. Do not exert undue pressure upon the pipes and if the union is set up hard, tap the wrench quickly and smartly with a light hammer. Examine all rubber pipes for loose fabric and replace with new if their walls have deteriorated.

For the benefit of those who are not familiar with the enclosed working parts of a motor, the chart presented at Fig. 2 will be of value, while the exterior components are shown at Fig. 3, and by studying these the novice should experience no difficulty in dismantling and reassembling the power plant.

The grouping and location of the exterior components vary according to the design; for example, the method of retaining the intake and exhaust manifolds. This is illustrated by Figs. 3 and 4, which present conventional types of motors. At Fig. 4 the intake and exhaust are separately retained, having flanges with holes to correspond to studs in the cylinders. That at Fig. 3 differs in that both manifolds are secured in place by stirrups, the intake being held by a set screw while the exhaust is locked by the same stirrup.

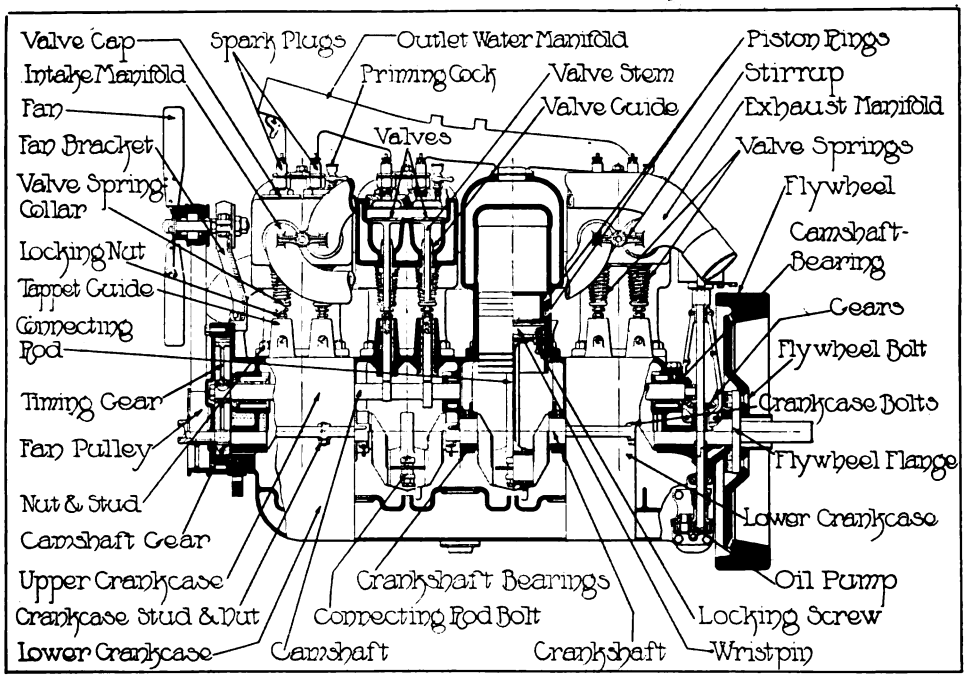


Fig. 2—Part Sectional View of Conventional Motor with Each Component Lettered to Simplify the Work of the Overhaul.

In dismantling any motor one should be systematic and at Fig. 4 is shown a motor with the exterior components alphabetically arranged, which order if followed will simplify the work.

First, remove the spark plugs a and place them to one side for cleaning, then take out the priming cocks b. The valve caps c may be removed with the special wrench and placed in order on a shelf of the bench for cleaning. Next disconnect the pipe leading to the muffler. The water manifold f is retained by bolts d and by displacing the former carefully the gaskets may be saved. The exhaust manifold h is secured by nuts, one of which is shown at g, and in loosening these slack off a little at a time on each. Place the nuts in

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a small box and steady the manifold when removing it. It may stick a little but if care is observed it can be removed without accident or without

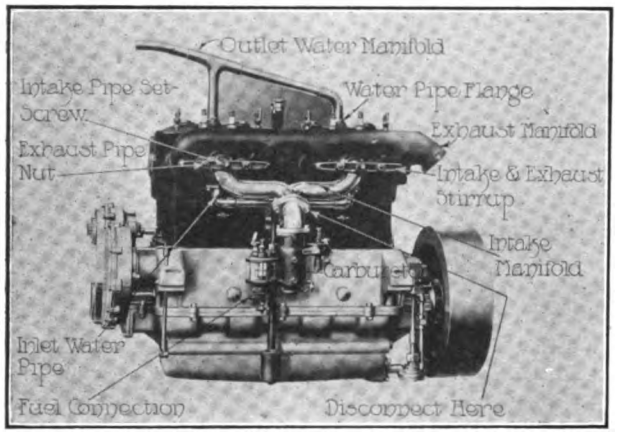


Fig. 3—Exterior Components of Motor, Also Illustrating Method of Retaining Intake and Exhaust Manifolds.

the danger of spoiling the gaskets.

The intake manifold l is similarly retained but before loosening the nuts take out the bolts k, being careful not to exert undue strain upon the pipe, and remove the carburetor. The manifold may now be displaced in the same manner as was the exhaust. The inlet water manifold m is now accessible and as it is retained by four bolts these can be taken out easily. To prevent injury to the fan o and to reach the timing gears this and the belt p are displaced by taking out the bolts n. The starting crank s having its bearing in the housing r the bolts of the latter will have to be removed before the lower crankcase x can be separated from the upper member. By disconnecting the unions t and z the motor is ready for the removal of the cylinders and lower crankcase.

With the power plant either in the frame or on the stand, it is a simple matter to get at the nuts retaining the cylinders. Before taking off the latter make sure they are numbered. If not take a prick punch and mark them 1, 2, 3, 4, if single units, starting from the radiator. If cast in pairs or triplets but two marks will be necessary. The cylinders may be removed without disturbing the connecting rods and pistons or the crankcase may be taken off and the connecting rod caps displaced to permit of the rod and piston remaining in the cylinder. If the first named method is utilized have someone steady the rods and pistons while the cylinder is being lifted off. With the cylinders off the crankcase can be turned over on the stand and the lower half of the case removed for an inspection of the bearings as will be noted in sketch, Fig. 5.

If the cylinders have been taken off with the pistons, take out the latter and rods and place them so they will not become mixed, or better still prick punch them if not already marked. The cleaning of the cylinders of carbon should be thorough and care must be exercised not to scratch the metal. The heads of the pistons will also require cleaning and if the rings are carbonized remove them by slipping them over thin strips of metal inserted between them and the piston. Begin with the top ring and replace in the opposite order. After displacing all deposits from the cylinders, pistons and rings, compress the valve springs, take out retaining pin and place the springs in order on the bench. The valves need cleaning before grinding, which operation requires care and sometimes considerable patience. Any good grinding paste may be utilized, although the writer prefers the finest of carborundum mixed with oil. While complete instructions could be given for this work the writer holds that it is best for the novice to undertake the grinding under the supervision of some one familiar with the operation, a fellow motorist for example.. The screw driver method is the best for the beginner. It is rotated, and the valve lifted and turned from time to time, to secure a good seat. Care should be taken not to use too much abrasive or to exert too much pressure on the tool.

It is important that the valves be replaced in order, and if the heads are not numbered they

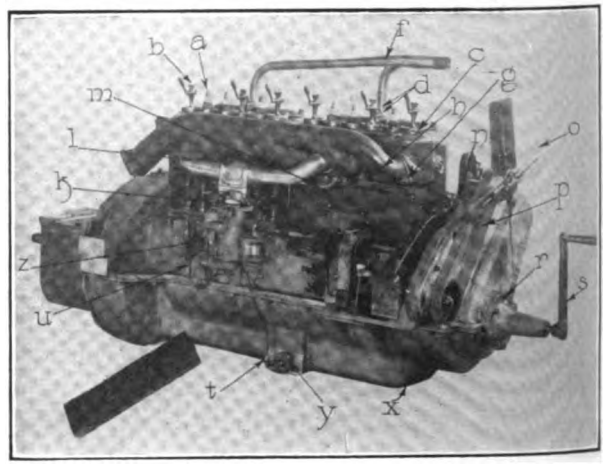


Fig. 4—Showing Proper Steps, Alphabetically Arranged, in Dismantling the Motor—To Reassemble, Reverse Order of Letters.

may be marked with the prick punch to prevent mistakes. The seats, valves and cylinder should be carefully washed with gasoline to remove all

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traces of the abrasive and none should be allowed to get into the cylinder proper. This may be avoided by using waste in the ports leading to

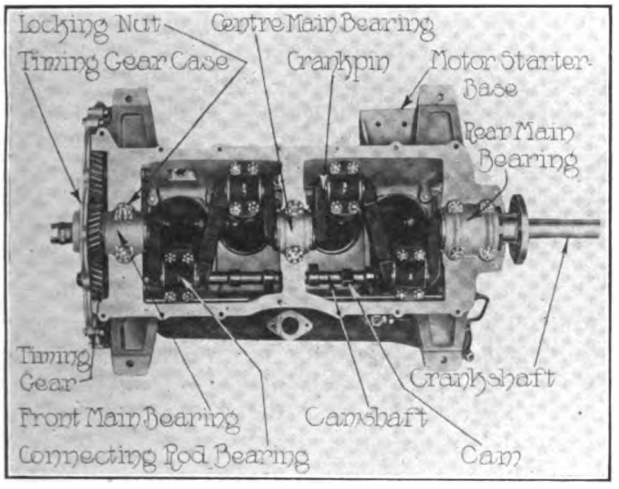


Fig. 5—Bottom View of Crankcase, Showing Conventional Type of Bearings, Etc.

the combustion chamber. Next clean the cylinders and replace valves, springs, etc.

If the pistons have been removed, clean these and replace in the cylinders, taking care to note that the openings of the rings are equally spaced, and use plenty of lubricant. Make sure with the hinge type connecting rod that the bolt end is on the proper side, else a mysterious knock may follow. The wristpins and the small end bearings of the connecting rod should be tested and any existing lost motion eliminated.

When the overhaul does not include the removal of the connecting rods and pistons from the case, they must be handled carefully and care taken not to rotate the crankshaft with the cylinders off. The replacement of the latter will trouble the novice and the work will require two, especially if the cylinders are multiple. The best method is for one to stand on the frame and steady the cylinder while the other person compresses the top ring. A clamp may be made of sheet metal or the ring held in place by winding with stout string. As the piston rings are very fragile the work must be accomplished slowly and carefully.

Before bolting the cylinders to the crankcase be sure to line them up. By this is meant that the intake and exhaust port sides must align, and this may be ascertained by using a straight edge. With the cylinders secured in place the connecting rods are next tested for play. Some side movement is permissible, but vertical play must be eliminated. One method of testing is to place a heavy screw driver between the rod and crank arm and use the tool as a lever. If the rod moves easily or can be slipped back and forth by hand, it is too loose. Remove connecting rod bolts and take out a shim, replace and lock snugly and try the bearing. The taking up of bearings is acquired by experience and it is recommended that the novice have his work inspected. Different types of bearings are adjusted more or less snugly. And it may be possible that they may need scraping. Unless familiar with the operation it is best to have the co-operation of some experienced person. When the motor has been placed on the stand the work of testing, scraping and adjusting bearings is simplified and more accurate. This is usually done in a thorough overhaul.

With the bearings adjusted and well lubricated, and each nut locked by a cotter pin, the various parts which were removed from the motor are cleaned before the work of assembling is begun. Prepare a paste of graphite and oil and smear the threads of all nuts, bolts, spark plugs, valve caps, etc., with the mixture.

The assembly may be accomplished by utilizing the alphabetical chart at Fig. 4, reversing the order by beginning with the oiler connections y, t and z. These members should be cleaned and inspected and the lower crankcase thoroughly washed before replacing. In connection with the lubricating system it should be mentioned that it is important to clean all pipes, tubes,

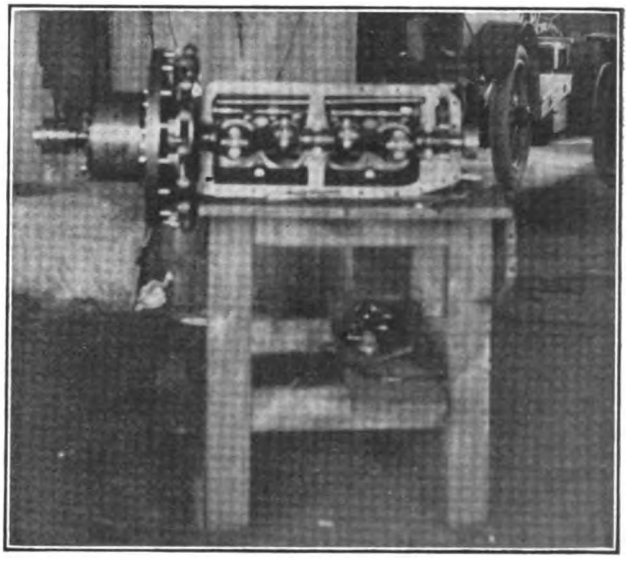


Fig. 6—Showing Motor on Stand Ready for Inspection.

screens, gauges, etc., and if the pressure of the exhaust be utilized, remove all carbon and examine the check valves.

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The fitting of the gaskets employed between the intake and exhaust manifolds must be done carefully. If the gaskets are deteriorated procure new as auxiliary air must be eliminated from the intake connections, while a loose fitting exhaust pipe will be productive of hissing noises. Tighten each nut gradually and make sure that the manifolds are aligned, else undue strain will ensue and may result in a broken flange, etc.

Before replacing the valve caps check up the timing, that is, the opening and closing of each valve. An arrow or indicator is generally provided for this purpose. If not, make a prick punch in the centre of the last cylinder. The marks on the flywheel are utilized for timing and these are denoted by letters and figures, which may be as follows:

E O, exhaust valve opens.
E C, exhaust valve closes.
I O, intake valve opens.
I C, intake valve closes.
1, 2, 3 or 4, number of valve.
C, centre.

To check the timing rotate the flywheel until the mark I O 1 2, for example, coincides with the arrow and the intake valve of the first cylinder begins to lift. It may be late or early, which can be determined by rocking the flywheel back and forth. If out of time, loosen the check or locking nut and screw the tappet in or out until the valve starts to lift with the mark opposite the arrow. If correct, lock the nut and turn the flywheel until the I O appears. Next check the exhaust of the first cylinder and so on until each is correct. If the flywheel is marked in degrees the instruction book may be consulted, but the method is similar to the plan outlined.

It is an excellent plan to clean the carburetor before replacing it and in performing this work care should be exercised not to disturb the adjustments unless one is familiar with its setting. The gasket between it and the intake pipe must be in good condition and the connection tight. Before connecting the fuel pipe, allow a little gasoline to flow.

Next refill the crankcase and oiler with lubricant and spin the motor a few minutes to splash the oil to all working parts. Replace valve caps, spark plugs and priming cocks, taking care that these are set up tightly. After going over the power plant and trying all nuts, the ignition wires may be connected and tested. If the system includes a timer or distributor, these should be cleaned, or if worn, adjusted or repaired. As the wires were tagged or numbered, no difficulty ought to be experienced in replacing them correctly. However, a suggestion as to wiring the magneto will be of value in the event it has been removed or in case of trouble.

Assuming that the magneto has been removed: Place it on its base and turn the motor until the piston of the first cylinder is at the top of the compression stroke. Remove the distributor cap or housing and rotate the armature of the magneto until the arm or brush is in contact with either the extreme right or left hand segment, depending on the direction of rotation. It should be borne in mind that the distributor arm revolves in the opposite direction from that of the armature.

With the arm touching the No. 1 segment and the motor firing 1, 3, 4, 2, for example, the high-tension wire from this terminal is connected to the spark plug of the first cylinder. Next to fire is the third cylinder and the second contact to be made by the arm is connected by cable to the spark plug of the No. 3 cylinder. The fourth cylinder explodes third and its plug is connected to the third contact made by the arm. The remaining cylinder will be the second and firing last it is wired to the remaining contact of the distributor. If the novice will remember that the firing order of the cylinders must be observed on the distributor he will not experience trouble. Directions for connecting the primary leads, etc., of a magneto and battery system cannot be given because of the variance existing, but by studying the wiring plan in the instruction book the proper connections should be made easily. The different magneto systems have been discussed from time to time in The Automobile Journal.

As the muffler is a component of the power plant it should be cleaned thoroughly before starting up the motor, and if it is disassembled, smear all nuts and bolts with graphite before replacing these members. Next refill the radiator and note if any leaks exist; if so, these will require attention. If the bearings have been set up snugly, it will be a good plan to prime the motor.

Be sure that there is plenty of oil in the crankcase and if the system is of the non-circulating type, feed more lubricant until the bearings are run in. Run the motor slowly for a few minutes, listening carefully to catch any strange noise or any slight knock. If these exist, investigate and correct the trouble. If the engine runs sweetly it may be operated 15 minutes or more at a time to work in the bearings nicely before taking it out on the road for tuning up.

Ed. Note—The next article will deal with the overhaul of the clutch, transmission, rear axle and other components of the chassis.

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TRUCK OWNERS OBJECT.

Rhode Island and Massachusetts Legislators Seek to Impose Heavy Tax.

Motor truck owners in Rhode Island and Massachusetts have been brought face to face with a decidedly new problem. Without going to the trouble of holding a hearing the senate in the former state amended the motoring law so as to impose a license fee of $20 for commercial vehicles of one ton capacity and $10 for each additional ton. The present rate is $2 for each car of this type. When the matter came before the house it was referred back to the committee, and motor truck owners and users immediately formed an association to fight the bill. A hearing was accorded the measure April 22, at which members of this association explained that the fees proposed were sufficient to discourage all use of the mechanical transport. It is understood that the framers of the bill hold that commercial vehicles do much toward destroying the state roads, but it was brought out at the hearing that very few of these machines operated outside the cities.

In Massachusetts, the committee on roads and bridges reported a bill imposing a fee of $5 a ton, the present rate being $5 flat for all commercial vehicles. At once the Boston Commercial Motor Vehicle Association and the Electric Vehicle Club of that city, which have been busy throughout the session in opposing the bill to limit the size and weight of trucks, using the highways, called a meeting of motor truck users and owners and steps were taken to defeat the measure.

The commercial vehicle committee of the National Association of Automobile Manufacturers is aiding the organizations in both states.

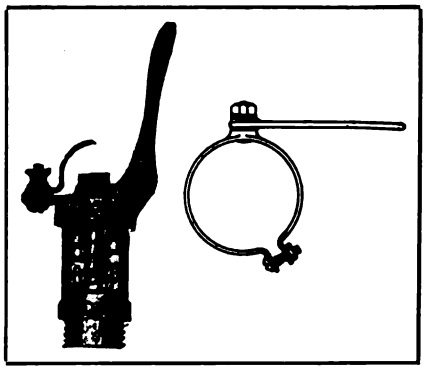
M&M FUEL ECONOMIZER.

Device Making for Uniform Mixture by Supplying Additional Air When Required.

The value of additional air in carburetion is demonstrated by the general adoption of an auxiliary air intake to provide for a uniform mixture which is essential for speed and power. If the fuel is not sufficiently vaporized, either at low or high ratios, the mixture is rich and the operation of the motor is affected, to say nothing of the waste of fuel.

The principle involved with the M&M economizer is that of supplying additional air through the intake pipe or manifold above carburetor breaking up the globules of gasoline and converting them into a uniform mixture. This is accomplished by its construction, which comprises a single valve with a ground seat and six port holes, and including means for cutting out the mixture and ignition when descending grades, slowing up for corners or crossings. It is adaptable to all types of motors and systems of ignition, and may be termed a carburetor adjuster in that the operator of the vehicle can secure more speed and power with the same throttle opening by admitting air into the intake pipe.

In addition to saving a large percentage of the fuel it serves as an efficient brake in that a simple movement of the steering wheel or pedal control cuts off the supply of gas and ignition, and with the clutch in, the motor acts as a brake. The engine consequently draws in pure air, cooling the cylinders. The motor is restarted easily by the control member, as the ignition is cut in and the mixture is supplied automatically by the economizer.



M&M Economizer and Steering Wheel Control.

The ignition control is by a special spring, which may be set to conform to any system of ignition. The economizer is installed easily, the work involving only the drilling and tapping of a hole in the intake pipe. The control member may be located on the steering wheel or operated by a friction pedal. With the latter method the economizer will remain in the position in which it is set until changed. It may also be utilized as a cut-out or an accelerator, operating in the same manner as the carburetor throttle.

The M&M is also made for motorcycles and is constructed of high grade material, nickel plated and highly polished. It is manufactured by the Moller Bros. Controller & Economizer Company with main offices at 700 Betz building, Philadelphia, and is fully guaranteed.

It is understood that the Motor and Accessory Manufacturers will soon take steps in opposition to the new tariff schedule on tires, and that several of the tire makers in Trenton, N. J., and vicinity are organizing for this purpose.

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GENERAL NEWS OF THE INDUSTRY.

Model Gas Engine Works to Locate Additional Plant in Pittsburg—New Concern Organized to Produce Cars and Trucks—Changes in Personnel, Etc.

THE Model Gas Engine Works, Peru, Ind., maker of gasoline engines, for automobiles, tractor engines, clutches and transmissions, has purchased four acres of land fronting on the railroads at Pittsburg, Penn., and a factory will be built to cost $200,000, to be in operation Sept. 1. The Peru plant will be operated as formerly and there will be little change in the company's organization except that men of considerable wealth will be added to the directorate. It is announced that $500,000 in cash, in addition to the present capital, is being put into the business, thus making the total capitalization $750,000.

The Peru concern is of long standing and having outgrown capacity, labor supply and railroad facilities at Peru, decided to establish the second plant at Pittsburg. A noiseless, dirtless, electrically driven plant of light brick and pleasing architectural design will be erected and 500 skilled workmen will be employed. Within three or four years extensions that will aggregate $500,000 will be made and the number of employees will be doubled. The new company will be incorporated under the laws of Pennsylvania, the name being the Pittsburg Model Engine Company.

MOTOKART COMPANY FORMED.

A. R. Gormully Heads Concern Engaged in Producing Parcel Delivery Wagons.

Papers have been filed at Albany, N. Y., covering the incorporation of the Motokart Company, a $250,000 concern organized for the purpose of building light commercial automobiles. The new company will be headed by A. R. Gormully, recently of the United States Motor Company, as president. Wallace Odell of Tarrytown, N. Y., a new comer in the industry, is named as vice president and treasurer, and B. J. Knerr, auditor of the United States Motor Company, is secretary.

The company will start with stock subscriptions of $50,000. It has secured under a three years' lease a shop at Tarrytown, which has over 30,000 square feet of floor space and general offices have been established in the United States Rubber building at 1790 Broadway, New York City. It is the company's expressed intention to confine itself to the manufacture of parcel delivery wagons, the first model being a small four-wheel vehicle. Further particulars will be given in an official statement which will be made public at a later date.

TO PRODUCE MOTOR TRUCK.

Los Angeles Concern Organized to Manufacture Worm Driven Vehicle of New Design.

The Los Angeles Motor Truck Manufacturing Company, Los Angeles, Cal., has been formed to build a new type of motor truck, with underslung chassis, with a low centre of gravity and loading platform 21 inches above the ground, but having 11 inches road clearance. The concern has purchased a 30-acre tract of land at Bangle Station, near Wilmington, Cal., at Los Angeles harbor. Plans are being drawn for five large, reinforced concrete buildings, which will cost, together with machinery, materials, etc., over $300,000. About 250 men will be employed at the plant.

W. B. Joslyn, E. E., A. E., who has been connected with the automobile industry practically from its inception, and who for several years was in charge of the experimental department of the Studebaker Corporation, Detroit, maker of Studebaker pleasure and commercial cars, is vice president and general manager of the company. Mr. Joslyn and M. S. Walton, M. E., A. E., a designer of many years' experience, have worked out the new type of truck. The drive is by worm with all parts housed and protected so as to be dirt and dust proof.

PULLMAN BUYS FACTORY SITE.

All Question of Possible Removal Now Eliminated and Work of Expansion Planned.

The Pullman Motor Car Company, York, Penn., has purchased the complete land and properties on which its plant is located, together with the three adjoining buildings. The addition of the latter gives ample scope to further the company's expansion policy and plans are now being perfected for the rearrangement of many

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departments which will facilitate the manufacture of Pullman cars and expedite their prompt delivery.

The Pullman company by this purchase makes itself absolutely independent and eliminates the possibility of future removal because of property conditions over which it would have no control. The various departments are being expanded and brought to the highest point of efficiency. Improvements started several months ago are now rapidly being completed.

VAUGHN CAR REDESIGNED.

New Company Organized in Kingston, N. Y., to Produce Six-Cylinder Machine.

A new company has been formed to build the Vaughn car at Kingston, N. Y. It has been incorporated for $1,350,000 and numbers among its officers some well known men of the automobile industry. The Vaughn has been newly designed and will be brought out as a six-cylinder machine.

The following are the officers of the concern: President, A. B. Cordner, formerly manager of the General Motors Truck Company, New York branch; general manager, F. E. Moscovics of the Remy Electric Company; secretary-treasurer, Harry W. Jones, formerly connected with the E-M-F organization.

TO INTEREST FRENCH CAPITAL.

Herrington Resigns as President of Wheel Company to Visit European Makers.

L. Herrington of Chicago, inventor of the automobile wheel which is being manufactured by the Fort Wayne Universal Wheel Company, Fort Wayne, Ind., has resigned the presidency of that concern after being re-elected to that office three months ago. He plans to visit France for the purpose of demonstrating his invention before a number of capitalists in that country with a view to organizing a $1,000,000 company which will manufacture the wheel for the automobile trade in Europe. After spending some little time in France he will go to Germany and England on a similar mission.

New officers were elected at a recent meeting of stockholders as follows: President, J. W. Wisehart; vice president and treasurer, L. H. Moore; secretary, J. C. Thornburgh; superintendent, W. F. Davis; assistant secretary, H. P. Moses; attorney, E. G. Hoffman; directors, J. W. Wisehart, L. H. Moore, J. C. Thornburgh, H. P. Moses, W. F. Davis, E. F. Davis, E. G. Hoffman, Edwin Irle and Dr. G. A. Leach.

STROUT WITH HAYNES COMPANY.

New Sales Concern Established to Handle Cars of This Make in Middle West.

George H. Strout, for the past year district sales manager for the Cole Motor Car Company, Indianapolis, Ind., maker of Cole cars, has been appointed general sales manager of the Haynes Automobile Company, Kokomo, Ind., maker of the Haynes line. He succeeds Webb Jay, who with several others has organized the Haynes Motor Car Company, with headquarters in Chicago, to take over the sales of Haynes cars in the Middle West.



George H. Strout, Sales Manager, Haynes Automobile Company.

Mr. Strout is one of the best known men in the industry, and his change of plans came as a complete surprise, even to his associates with the Cole company, who join with his many friends and acquaintances in wishing him success in his new position. For a long time he was sales manager of the Apperson Bros. Automobile Company of Kokomo, maker of Apperson cars, and therefore will be entirely at home in that city. While with the Cole organization he did much to strengthen the sales force east of the Mississippi river.

The officers of the new Haynes sales company in Chicago are as follows: President, A. E. Starbuck; vice president, Webb Jay; secretary and treasurer, A. G. Seiberling. As a further evidence of the increased demand for machines of this make it may be added that the factory has been enlarged and will be rushed to its capacity to take care of the orders which are now rapidly coming in.

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WITH CONTINENTAL MOTOR.

A. H. Doolittle Leaves Thompson Agency to Handle Advertising Campaign.

That the Continental Motor Manufacturing Company of Detroit and Muskegon, Mich., is to inaugurate an extensive selling campaign is borne out by the appointment of Albert H. Doolittle as advertising manager. Mr. Doolittle is well known in the industry, and goes to the Continental company from the staff of the J. Walter Thompson Advertising Agency of Detroit. It is understood that the Continental business will still be placed through the MacManus Company of Detroit and Toledo.

After studying mechanical engineering at Cornell University, Mr. Doolittle became a member of the engineering force of the Pope Manufacturing Company, Hartford, Conn., in 1904, for the experience that branch afforded. Less than a year later he entered the shops of the Electric Vehicle Company of that city for a thorough course in automobile building. Here he went through every department of mechanical construction, assembling, testing, repairing, demonstrating, contest driving and selling, becoming assistant manager of the New York branch.



A. H. Doolittle, Advertising Manager, Continental Motor Manufacturing Company.

In 1909, Mr. Doolittle made an extended motor tour of Europe, entering six countries and covering over 7000 miles. During this trip he crossed 17 of the highest passes in the Alps in an American car without trouble. He also visited a number of foreign factories and gained a good insight into their methods.

Upon his return he entered the employ of the Knox Automobile Company, Springfield, Mass., and in six months became advertising manager. His copy was conceded to be of a special value and his publicity stories were widely used. In this manner he was brought to the attention of the Journal Company of Troy, N. Y., where he aided in directing the advertising campaigns of various automobile concerns and became automobile editor of The Carriage Dealers' Journal. While engaged in special work for this company on behalf of a factory in Moline, Ill., he became associated with the Thompson agency.

IS PRODUCING TURNTABLES.

Michigan Concern Incorporates and Secures Enlarged Facilities for Manufacturing.

The T. C. Beach Auto Turntable Company, St. Johns, Mich., has incorporated with capital stock of $10,000 for the purpose of manufacturing automobile turntables. The incorporators and stockholders are: T. C. Beach, R. S. Clark, W. J. Moss and Robert H. Chapin, all of St. Johns.

The cement factory at the crossing of Lansing street and the Grand Trunk railway has been leased, a provision being included for the purchase of the building later if desired. The concern proposes to increase its scope and equipment as fast as the business warrants.

ERECTING NEW BUILDINGS.

Motor Foundry Company Increases Capital to Meet Demands of Enlarged Business.

Stockholders of the Motor Foundry Company, Detroit, at the annual meeting, gave approval to the plan for increasing the company's capital from $35,000 to $100,000 to provide funds for extensions of the plant necessitated by enlarged business. The additional capital has been fully paid in and work has begun on the erection of new buildings adjoining the present plant, which covers 2.5 acres on Hart avenue.

The company employs 265 men and has a melting capacity of 40 to 50 tons of iron a day. Completion of the additions will increase the capacity to 80 tons a day. The plant is one of the largest gray iron foundries in the country producing exclusively castings for gasoline motors.

The officers are: President and general manager, J. H. James; vice president, E. A. Nelson; secretary and treasurer, L. H. Green. The active management of the company is in the hands of Mr. James and Mr. Green, both young men of wide experience as foundrymen in iron, steel and malleable iron castings.

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HERMES CAR IN CINCINNATI.

New Company Considering Offers from Many Cities as Location for Its Plant.

The Hermes Motor Car Company, with preliminary capital of $30,000, that shortly is to be increased to $300,000, is a new concern organized at Cincinnati, O., with its preliminary experimenting plant at 1625 Blue Rock street. Although the company is said to be desirous of locating permanently in Cincinnati, it is understood that offers from 15 cities are being considered.

A test motor car, which will be called the Hermes, has been completed by the company and it has been in operation in and around Cincinnati. The machine is equipped with Beaver motor, wire wheels, electric starting and lighting system, and has a 124-inch wheelbase. The promoters have not been named as yet, but will be announced when the company decides definitely upon its future plans.

AKRON STRIKE ENDED.

Goodyear Official Sets Forth Conditions at the Close of the Recent Trouble.

Earlier in the month, C. W. Seiberling, vice president of the Goodyear Tire & Rubber Company, Akron, O., announced the end of the recent strike of the employees of the rubber concerns in that city. Mr. Seiberling's communication follows:

When the I. W. W. rubber strike was formally declared off by the imported leaders at a meeting on Sunday, the last bar to prevent Akron industrial institutions from returning to normal was removed. Akron has passed through a time of considerable stress and indications are that there will be no further labor disturbance for a good many years to come. Workmen in the Akron rubber factories who were temporarily carried away by the Socialistic agitation of the Industrial Workers of the World appear to have returned to a sensible view of the situation, and we firmly believe that conditions in Akron will be better than ever before, though the workmen and the manufacturers themselves have experienced some loss by reason of suspended operations. It now seems certain that the result is for the better of all concerned, though absolutely no concessions were granted by employers to bring about Sunday's declaration that the strike is off.

Through the work in Akron of the state arbitration board and later of the special probe committee appointed by the state the world was permitted to know that the Akron rubber factories pay higher wages for equal ability and experience than any other industry in the country; that Akron factories are modern and working conditions as pleasant and satisfactory as it is possible to make them. In our factory we have many men making from $5 to $7 daily who never earned $2 a day in their lives before they came to the Goodyear plant. It is remarkable that in view of such conditions, the strike agitation could have prevailed so long as it did.

But the fact remains that it did prevail, because the agitators of the I. W. W. had noted that Akron was filled with contented, well paid workers, and might possibly be made a fruitful field for contributions to their cause. While at the height of the excitement fully 10,000 men were taken from their work because of the excitement, because they sympathized with others, or because of intimidation, when the final meeting was held there were less than 300 stubborn members left, and these voted overwhelmingly to declare the strike off.

Now that normal conditions have returned we feel that we shall have little, if any, difficulty in meeting all our orders promptly and in making the big increase in our business for the year that we predicted some months ago.

SELECTS CLEVELAND SITE.

Plans Completed for Location of Chandler Plant on New Belt Line Property.

Negotiations for the purchase of a site and the erection of factory buildings at Cleveland, O., have been concluded by the Chandler Motor Car Company, which will manufacture the Chandler car. The ground upon which the plant will be built consists of six acres and is the first to be located on the new Belt Line railway, a $20,000,000 line connecting with seven trunk railroads, as follows: Lake Shore, Nickel Plate, Big Four, Erie, B. & O., Wheeling & Lake Erie and Pennsylvania.

This gives unexcelled shipping facilities. Plans for the factory have been drawn and bids for construction are now being received. Adjacent to the site is a large section occupied by the homes of working people and street car and transportation facilities are splendid. It is contemplated that the plant will be complete and ready for occupancy early in June and will be in full operation by July 1.

TO LOCATE IN NASHVILLE.

Evans Motor Car Company Will Succeed Detroit Concern in New Surroundings.

The Evans Motor Car Company of Nashville has been chartered at Nashville, Tenn., with capital stock of $50,000, for the purpose of manufacturing commercial motor vehicles and the Evans gas engine. The incorporators are: Everett Philpot, George R. Anthony, Howell Brandon, Clarence Woodcock, A. P. Foster and R. H. Evans.

The concern will take over the business of the Automobile Manufacturing & Engineering Company of Detroit, in which Mr. Evans is interested. It is the intention of the company to locate the factory five miles from Nashville on the Gallatin pike. It is planned to manufacture

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500 cars the first year, and later to increase the capital stock to $200,000. The plant eventually will employ 600 to 1000 men.

RECEIVER MAKES REPORT.

Financial Condition of Flanders Manufacturing Company of Pontiac, Mich.

Ralph Stone, vice president of the Detroit Trust Company, Detroit, has made report to the stockholders and creditors of the Flanders Manufacturing Company, Pontiac, Mich., for which his company is receiver. This sets forth the condition of the property, and indicates cash on hand amounting to $230,000; cash paid preferred claims, $16,700, making a total of $246,700 thus far realized for creditors. Application will be made to the court for permission to distribute this to creditors whose claims have been proved and allowed. The report also sets forth the following:

At Pontiac, Mich., are the following departments:

1—Electric automobile department, which we continued to operate, completing in all 39, which were all that could be profitably made without the purchase of a large amount of expensive parts. These we readily sold for cash at very little under the average prices received by the company in the past.

2—Gear and transmission department, which was producing rear axles and differential gears complete for the Flanders Motor Company. This work was continued to Feb. 1, at which time it was thought desirable from a receiver's standpoint of view to discontinue it.

3—Foundry department, was operating on a small scale. The unfilled orders on hand in this department amount to $29,000, some of which we filled and then shut down because it was not deemed profitable to operate unless the output was somewhere near its maximum capacity. The orders on hand and prospect for work in view of the receivership made it impracticable for these reasons to continue this department.

4—Drop forge department, was operating on a small scale. The unfilled orders on hand in this department amounted to $15,000, some of which we filled and then shut down because it was not deemed profitable to operate unless the output was somewhere near its maximum capacity. The orders on hand and prospect for work in view of the receivership made it impracticable for these reasons to continue this department.

At Chelsea, Mich., are the following departments:

1—Ball bearing department, which we continued to operate until March 1, when the same, including all materials, stock and supplies, was sold.

2—Motorcycle department. There were 142 nearly completed machines of the 1912 style on hand which we sold. The company had under way the manufacturing of 500 single-cylinder machines for 1913, and were also working upon the tools, patterns, etc., for a twin-cylinder machine, the drawings for which had been made and approved, all of which work we discontinued owing to the fact that so little had been done on both the single and twin-cylinder machines that it was impractical, from the receiver's standpoint, to continue their manufacture.

3—Screw machine department. This department we operated for a short time to complete unfilled orders on hand. In this department there were operated several automatic screw machines which the company had manufactured, as it contemplated not only operating automatic screw machines, but the manufacture and sale of some designed and built by it. It perfected one machine and secured letters patent for same in several foreign countries, and had some time prior to our appointment endeavored to dispose of the patent rights, without success.

4—Spraying machine department. This department was not operating for some time prior to our appointment.

The receiver states that some time after the appointment it was advised that the largest stockholders would not be interested in any plans for reorganization. Application will be made for the sale of the property in such parcels as will best suit the purchaser. The table shows the inventory and appraisal as of Dec. 6, 1912.

INVENTORY AND APPRAISAL OF FLANDERS MANUFACTURING COMPANY.

Description	Inventory	Total Inventory	Average Percentage of Reduction	Appraisal	Total Appraisal
Quick Assets.					
Cash	$13,229.84		none	$13,229.84	
Accounts receivable	152,457.75		42.87	65,467.77	
Notes Receivable	47,854.75	$213,542.34	95	2,392.74	$81,090.35
Current Assets.					
Pontiac general and stationary stores	108,682.98		40	65,209.79	
Pontiac work in progress	123,742.46		33 1-3	82,494.97	
Chelsea general and stationary stores	68,223.80		29.16	48,330.56	
Chelsea work in progress	221,669.37	522,318.61	43.22	95,814.13	291,849.45
Pontiac Plant and Equipment.					
Land	31,294.00		none	31,294.00	
Buildings	230,410.00		6.98	214,331.00	
Equipment	427,054.00		12.99	371,618.00	
Drawings	42,649.00		none	42,649.00	
Detroit branch equipment	910.00		10	819.00	
Indianapolis branch equipment	226.00	732,543.00	10	203.00	660,914.00
Chelsea Plant and Equipment.					
Land	20,534.00		none	20,534.00	
Buildings	263,893.00		13.14	229,268.00	
Equipment	406,321.00		23.25	311,862.00	
Drawings	24,518.00	715,266.00	none	24,518.00	586,182.00
Fixed Assets.					
Deferred charges, contract stock, trade name, good will, etc., and patents	544,124.45	544,124.45	100		
Grand totals		$2,727,794.40			$1,620,035.80

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NEW AND NOVEL ACCESSORIES THAT APPEAL TO MOTORISTS.

Hotakold Bottle.

The Hotakold bottle is produced by the Vacuum Specialty Company, First avenue and 36th street, New York City, and as the name implies is utilized to maintain liquids in a hot or cold condition, this depending upon their temperatures when poured into the vessel. It is claimed by the maker that cold liquids will retain their temperature for three days. The bottle is designed to withstand the hard service in motor cars, as the glass section is flexibly supported in the metal case. Hotakold comes in pint and quart sizes, with cork or ground glass stopper and is finished in nickel or leather in colors.

Simplex Valve Lifter.

F. A. Baker & Co., 10 Warren street, New York City, is marketing the Simplex valve lifter, designed especially for motorcycle engines. It is constructed in such manner that it can be stored conveniently in the tool kit. It is adjustable to differing types of motors and is easily operated, the moving of the handle member compressing the valve spring sufficiently to permit of displacing the retaining pin. The valve lifter is constructed of high grade material and is inexpensive.

Blazer Horn.

The Blazer horn is manufactured by the Motor Specialties Company, Waltham, Mass., and is designed for Ford automobiles. It is operated by the exhaust gases and the maker states that it requires but little pressure to produce a penetrating, musical signal. The horn is attached to the exhaust pipe of the muffler, being slipped over readily and being locked by a clamp and set screw. This construction makes for easy installation and without any alteration. The horn extends toward the front of the car and is actuated by the gases, which are deflected by a simple valve arrangement operated by the usual cable and pedal. Normally the valve is held open by a spring and it does not interfere with their expansion. The Blazer horn is constructed of high grade material, is guaranteed and is moderately priced.

J-D Dual Spark Plug.

The Jeffery-Dewitt Company, Detroit, has brought out a new type of spark plug, which provides for true dual ignition where provision has only been made for one plug in the cylinder. The double system plug as it is termed, is practically two plugs in one, and having two separate and distinct circuits, permits of the use of a magneto on one side and batteries on the other, or two sets of batteries if desired. Each spark gap is independent of the other and the plug may be arranged to work in series with another plug in the same cylinder, thus producing two simultaneous sparks. A standard porcelain plug for motorcycles has also been introduced. In all plugs is featured a new alloy packing, having the same expansion and contraction as porcelain, and it is stated that leakage is prevented by the material.

J & B Junior Master Vibrator.

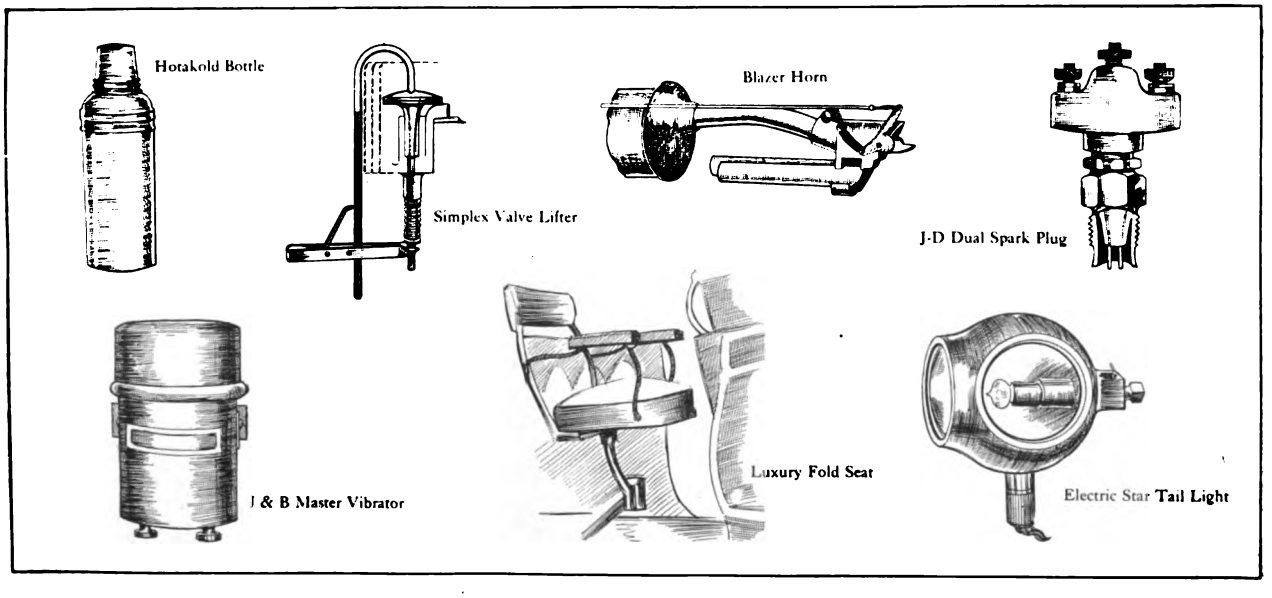
The J & B Manufacturing Company, Pittsfield, Mass., has added to its line of specialties by announcing the J & B junior master vibrator, to meet the demand for a popular priced instrument and one having the same high grade material and workmanship that mark the products of this concern. The new vibrator is very compact, being 3.5 inches long and but 2.625 in diameter. It may be located on the dash or inside the hood as desired, and floats on the line, dispensing with the usual coil box and switch. The control is by the conventional switch on the regular coil. The new instrument is water, oil and heat proof and comes complete with necessary cable cut to the proper length, soldered terminals, screws, fittings, etc. It is particularly adapted for Ford automobiles but may be employed with multi-cylinder units where synchronization of the spark is desired.

Electric Star Tail Light.

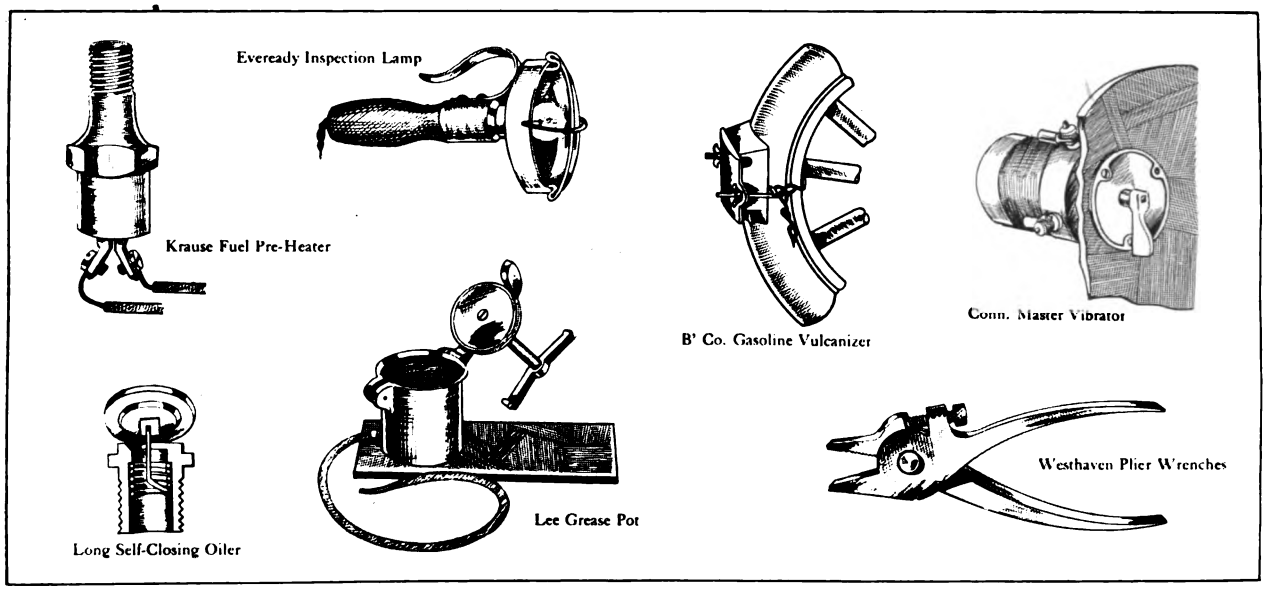
The Milwaukee Bronze Casting Company, 119 Clinton street, Milwaukee, Wis., is manufacturing two designs of Electric Star tail lights, known as types L and M. The latter is designed for fitting any standard rear lamp bracket, round or flat, and is five inches in diameter. Type L is built with bracket integral with the lamp and the wires are contained and consequently are not exposed to the weather. Both types are made with two and three lenses respectively, and these are three inches in diameter. In addition to the usual red semaphore and white light, two styles have a colored semaphore. The lights are made without screws, rivets or solder, being practically a solid construction, and are dust and weather proof. High grade material and workmanship are noticeable of the designs.

Luxury Folding Seats.

The space in the tonneau of a number of automobiles is such as to permit of the installation of extra seats, thus converting a five-passenger car into a seven, for instance. The Hodge & Graves Company, Amesbury, Mass., is manufacturing the patent Luxury folding seats and these are made in four styles, A, B, C and D, respectively. They are made of the highest quality of drop forgings and well finished in the best grade of leather in colors to match that of the machine. The seat and back are padded with the finest of curled hair. A feature is the retaining device, comprising a dove-tailed socket iron, which is secured to the side of the car and is covered by the upholstery. Replacing the usual brace or knee it not only eliminates bulkiness, but makes for convenience



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when the seats are not in service. The seat arm is tapered and fits within a socket in the body iron, a design making for easy removal. When not in use the seats fold back into a very small space when left in the tonneau. They revolve on their brackets, so that the user can face in any desired direction. The Luxury folding seats may be adjusted to any desired height if necessary by bending the supporting arms in a vise and by the use of a wrench. Styles A, B and C are made in three sizes, having 10, 12 and 14-inch bottoms, while style D is made with 14 and 16-inch bottoms. The different grains and colors of leather of the machine are matched by forwarding a sample to the company, which will supply detailed information on request.

Krause Fuel Pre-Heater.

The Krause Manufacturing Company, 654 Franklin street, Detroit, has brought out the Krause gasoline pre-heater, a device operated by electricity and designed for warming the fuel in the carburetor. It replaces the used drain cock, being screwed into the bowl of the carburetor. Two terminals are provided for attaching leads from the battery and the usual switch member is incorporated. Closing the circuit allows current to flow to the pre-heater, warming the fuel and assisting in its vaporization. The device is operated by any six-volt battery.

Eveready Inspection Lamp.

Although provision is made for the utilization of an electric inspection or trouble lamp with the lighting system of the automobile, there are cars not thus equipped. The American Ever Ready Company, 322 Hudson street, New York City, is marketing what is termed the Eveready safety inspection lamp, which is very compact and is made in two styles. One may be operated by three dry cells and the other by five, the voltage of the lamps being four and six respectively. The lamp is equipped with a hook and the bulb is fully protected. A suitable length of flexible cord and terminals are included.

Connecticut Master Vibrator.

The Connecticut Telephone & Electric Company, Meriden, Conn., maker of ignition specialties, is producing a combined master vibrator and switch for model T Ford automobiles that differs from usual construction in that it is mounted on the dash inside the hood with a flush switch member very compact and accessible. All wires and connections are concealed, making for a clean dash. Although the vibrator may be adjusted, being accessible, the company points out that it will not require attention other than once a season and only after considerable service. The same high grade material and workmanship noticeable of the product of the company are incorporated.

B' Co. Gasoline Vulcanizer.

The Brown Company, Syracuse, N. Y., is producing the B' Co. vulcanizer, which is moderately priced, utilizes gasoline and is adapted for repairing both inner tubes and casings. When a shoe is to be vulcanized the vulcanizer is retained in place by passing a chain around the felloe and securing the holder to the clamps. The device is provided with a long concave surface, permitting of the repair of cuts, etc., near the bead of the tire, and is constructed in three parts, body, cover and measuring cup. When employed in an upright position the measuring cup is utilized to retain the gasoline. The cover fits the convex surface and is used when tubes are to be mended. The vulcanizer is finished in nickel, weighs but three pounds and is very compact.

Long Self-Closing Oiler.

Long Bros., Kokomo, Ind., maker of oiling devices, is marketing self-closing oilers known as style S. The construction is simple, the cover being opened easily when lubricant is to be inserted, and the design is such that dust and foreign elements are excluded. The spring actuating the cover is of music wire and does not interfere with the replenishing of the lubricant. Hexagon heads are incorporated for installation and the threads are standard, ranging from .3125 to .5 inch.

Lee Grease Pot.

A grease pot for refilling differentials, transmissions, etc., has been designed by H. B. Lee of New London, Conn. Its body is seven by seven inches of cast iron and the plunger six inches in diameter. The latter with the screw and handle is retained by a crossbar, hinged to the pot at both ends, although either side may be removed. The pot is mounted on a board, eight by 20 inches and when filled with grease the plunger member is closed down and the screw turned. This forces the lubricant through a flexible metal tube to the part to be filled. The Lee grease pot is made in two styles, one for light grease and oil, and the other for heavy grease.

Westhaven Plier Wrenches.

The Westhaven patent plier and adjustable wrench is produced by the West Haven Manufacturing Company, New Haven, Conn., and among the features of the tool is its adaptability for several kinds of work. The design differs from conventional types in that a set screw is incorporated in one of its arms and that the jaws may be adjusted to the size of the work by means of the screw member. When utilized as a wrench the stresses are cared for by the screw and arm, energy being applied to the latter as with an ordinary tool. It is easily and quickly converted into pliers by turning back the set screw. Part of one jaw has teeth milled crosswise, while the opposite member is smooth, with the exception of a groove milled lengthwise for holding wire. A wire cutter also is incorporated. The tool is specially adapted for work not easily accessible with ordinary members and may be employed as a ratchet member, as it is stated that it will grasp round work instantly. It is sturdily

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constructed, being a drop forging of tempered steel, and is made in two sizes, one 6.5 inches long and having a jaw opening of one inch, and the other 8.5 inches long with opening of 1.5. Different finishes are provided.

Mayo All-Steel Trucks.

The all-steel trucks produced by the Mayo Manufacturing Company, Chicago, are of the double wheel caster truss design, having long bearings and specially adapted to the garage or repair shop. The runway plates are self-elevating, are always clear of the floor and constitute a lock when depressed by the tire. But one model is made and it is held to be capable of carrying any size car. The trucks come in pairs, finished in black enamel.

Victor Exhaust and Intake Gaskets.

The Victor Manufacturing & Gasket Company, Troy and 21st streets, Chicago, is marketing a special gasket for intake and exhaust pipes. It is of the centre flange type, composed of asbestos and copper and is designed to be compressed between the manifold and cylinder in the conventional manner. Not only does the flange prevent entrance of auxiliary air, but the escape of the exhaust gases as well. They are made in different sizes and diameters.

J-M Fyro Extinguisher.

The H. W. Johns-Manville Company, Madison avenue and 41st street, New York City, has brought out a new chemical fire extinguisher of the one-quart type, known as the J-M Fyro. Because of its lightness and compactness it is specially adapted to be carried in the automobile or stored in the garage. It differs from the usual extinguisher in that compressed air is employed for discharging the extinguishing fluid. The latter is a liquid gas, five times as heavy as air, and on account of its weight quickly envelopes the flames, displacing the oxygen. When thrown on a fire it instantly volatilizes, forming a dense combustion and arresting gas in which flames cannot live. It is claimed that one quart of the J-M Fyro liquid will expand to 4000 cubic feet of fire annihilating gas and that one quart of ordinary extinguishing fluid will make only 1000 feet. It is held to be especially effective on naphtha, oil, varnish, calcium chloride and electrical fires, as well as gasoline. It is non-corrosive and will not injure metals, fabrics or furnishings. A feature of Fyro is that it does not deteriorate and is not affected by differing temperatures.

Lassco Rear Signalling Lamp.

The Lassco rear lamp and signalling device is manufactured by the Auto Safety Signal Lamp Company, 246 North street, Philadelphia. It is circular, about seven inches in diameter, and is divided into four sections, each of which contains a small tungsten bulb. These may be operated together or independently of each other and the control member is a four-button switch located on the steering column. The first section is the conventional red semaphore, another shows the letter R and the third the letter L, for right and left turns of the vehicle. The fourth section presents the word "Stop." The lower part of the lamp illuminates the license tag with a white light.

Weiss Filler Hole Gauge.

A filler hole gauge especially designed for motorcycles has been brought out by the Weiss Manufacturing Company, Torrington, Conn. It is fitted into the opening of the fuel tank, acting as a filler cap and gauge. The device is automatic in its action and is properly vented. The gauge is constructed to fit standard makes of motorcycles and comes nickel plated.

Moore Spark Plug Wrench.

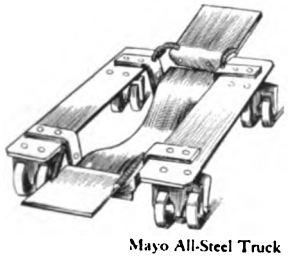
J. C. Moore & Co., Racine, Wis., is manufacturing a spark plug wrench which comes in two parts, the wrench proper and a handle. The former is a double headed member, fitting .5-inch standard and .875-inch A. L. A. M. spark plugs. It is constructed of high grade material and by it plugs may be removed when an ordinary wrench could not be utilized.

Sparton Electric Horn.

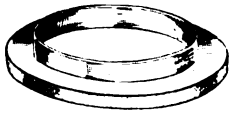
The Sparks-Withington Company, Jackson, Mich., is making its Sparton electric horn in two models and each may be operated by any six or eight-volt battery, dry cells or a storage. A clear, penetrating signal is given by the Sparton, which comes complete with the usual length of flexible cord and push button. The horns are finished in polished brass, white nickel, black and nickel, black and brass, or all black.

Wolf Mixer.

The present grade of gasoline marketed offers difficulty in vaporization and with the carburetor so adjusted as to make easy starting, the mixture is apt to be too rich at higher motor speeds. This is due to the unvolatilized fuel in the form of small globules being carried from the vaporizer to the cylinders. Not only is the gasoline wasted, but the richness of the mixture tends to create soot in the motor. To obtain efficiency from the engine the mixture should be uniform at all speeds. The Approved Auto Specialties Company, 1731 Broadway, New York City, is marketing the Wolf mixer, which is inserted in the intake manifold between the carburetor and the cylinders, and which is designed to break up the globules of fuel. This is secured through the construction of the device, which is free from screens or clogging members. The raw fluid is broken up and converted into a mist and mingled with the air by a whirling motion, created by the design of the mixer. This results in the utilization of less fuel, making for economy as well as maximum efficiency. The Wolf mixer is easily installed, being inserted in the intake pipe and without fittings of any kind. It is retained in position by a flange and will endure for an indefinite period of time.



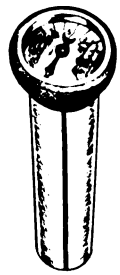
Mayo All-Steel Truck



Victor Special Gasket

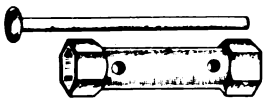


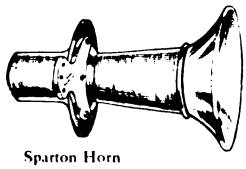
J-M Fyro Extinguisher



Weiss Filler Hole Gauge

Moore Spark Plug Wrench





Sparton Horn

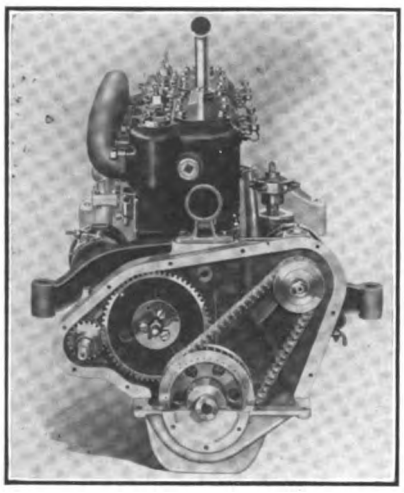


Lassco Signalling Lamp

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CONTINENTAL LINE AUGMENTED BY NEW SIX.

THE Continental Motor Manufacturing Company, Detroit, maker of the well known Continental motors, announces a new little six, termed the model P 6, which was designed to meet the increasing demand for a thoroughly high grade, light weight engine of normal horsepower. Following the custom of the company the new model was tested for over a year and complete preparations have been made for its production in large quantities.



A Silent Chain Is Utilized for Starting Purposes.

In keeping with the other types manufactured, the new motor is designed to be utilized independently or in the form of a complete or unit power plant with a multiple disc clutch and a three or four-speed selective transmission. Any type of magneto, ignition, dynamo or lighting device may be installed and the construction of the crankcase is such that any motor starter may be fitted easily. Provision is made for right or left hand drive, side or centre control.

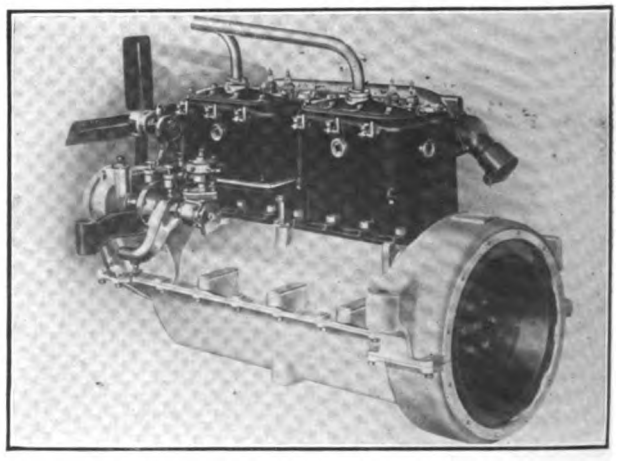
In connection with the motor starting feature it is interesting to note that a silent chain is employed this running in the timing gearcase and in a bath of lubricant, insuring durability as well as noiseless operation. It also serves to drive the pump and commutator and an electric generator when not utilized for starting purposes.

The bore is 3.75 inches and stroke 5.25, a bore to stroke ratio of 1:1.41, which places it in the long stroke class. Although the rating by the S. A. E. formula is 33.75 horsepower, it will develop 48 at 1500 revolutions a minute. The cylinders are of the vertical L head type cast in triplets and the design is very compact, the maker stating it may be installed under a 40-inch hood without crowding. The total weight with flywheel and regular equipment is but 600 pounds.

The crankshaft is two inches in diameter and its three bearings are as follows: Front, two by 3.25 inches; centre, two by three; rear, two by 3.875. The length of the connecting rods is 10.375 inches with bearings 1.875 by 2.25 inches. The piston length is five inches, wristpin bearing 1.21875 by 1.875 inches, and three rings .1875 inch wide are fitted. The diameter of the camshaft is 1.0625 inches and its three bearings are as follows: Front, 2.25 by 2.625 inches; centre, two by 1.875; rear, 1.125 by 2.125. All cams are integral and accessible. The flywheel has a face of 4.375 inches and diameter of 15. The crankshaft rear extension is made to meet requirements.

The valve mechanism is enclosed by two metal covers retained by simple wing nuts, easily removed, and the valves are located on the right. They have a diameter of 1.6875 inches with .3125-inch stems. Carburetion is by any 1.25-inch standard make.

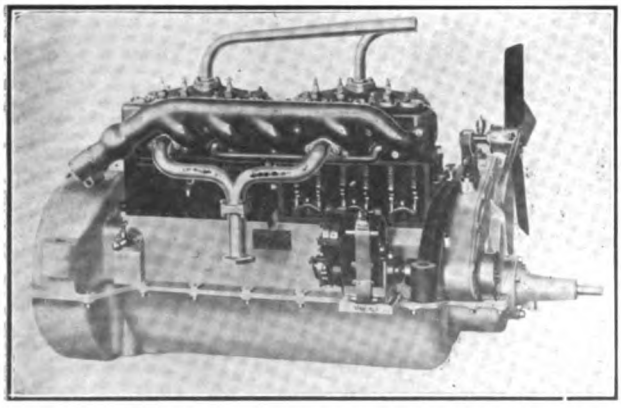
The oiling system is held to be very efficient and is a combination force feed and splash of the constant level type. The lubricant is circulated by a gear pump with positive multiple feeds, which forces the oil directly to the three main bearings, whence it is returned to the reservoir in the lower part of the crankcase. The overflow of the front bearing falls into a pocket in the timing gearcase. As the sprocket on the crankshaft and the silent chain are partially submerged they carry the oil to the helical cut timing gears and bearings in the front of the case. A constant level of lubricant is maintained in the wells under the connecting rods by gear pumps, forcing oil in equal amounts and in proportion to speeds.



New Continental Little Six 48 Horsepower Motor, Designed for Left, Right or Centre Control, and Having a Three Point Suspension.

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The cooling is by water, circulated by a large centrifugal pump located on the left hand side of the motor. The inlet water manifold is on the



Showing the Intake and Exhaust Side of New Continental Motor Having Enclosed Valves and Adapted to Motor Starter, Lighting Dynamo, Etc.

right, the cooled fluid entering the cylinders directly under the valves at points subjected to the greatest heat. The fan is mounted on a removable bracket and adjustment of the belt tension is by an eccentric.

Both the intake and exhaust manifolds are located on the right and the former is of a simple Y shape, communicating with a gas passage cored inside of each block cylinder. The mounting of the motor is with three point suspension, thus avoiding opportunity for twisting strains on the crankcase. The pivot support in the front of the motor is fitted with a bronze bushing and the bearing is suitably lubricated. Any drop within reason from the supporting arms to the centre of the crankshaft can be supplied.

ENGINEERS TO INVESTIGATE.

Will Assist Committee Appointed by Manufacturers in Study of Fuel Problem.

Announcement is made that special arrangements are under way between the committee appointed some three months ago by the National Association of Automobile Manufacturers to study the fuel problem and the Society of Automobile Engineers, under which members of the latter organization will take up research work in connection with the subject of a substitute for gasoline. It is understood that the engineers' society will undertake the more technical side of the proposition, although no definite details of the plan have been made public.

Under its constitution the Society of Automobile Engineers is not permitted to engage in any remunerative enterprise, or to approve any commercial or engineering proposition. However, President Howard Marmon has lent his aid in the present instance, because he believes the development of improved methods of carburetion, particularly those applicable to heavier grades of fuel, is directly in line with the standardization work in which the society is engaged.

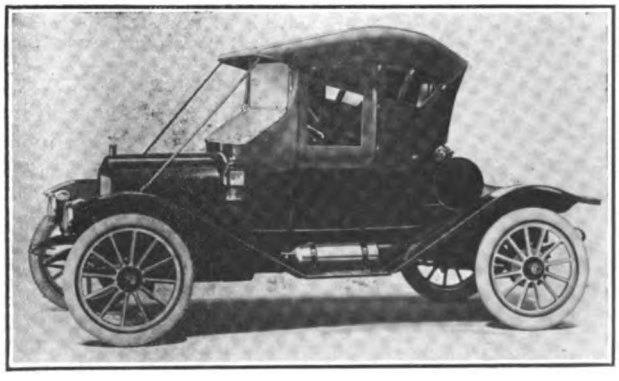
Special opportunity will be given inventors and others who are interested in the development of fuels to demonstrate their applicability to automobile propulsion. As the work progresses more definite announcement of its features will be made.

NOVELTY IN SIDE CURTAINS.

Studebaker Corporation Produces Type Designed to Swing with Door.

With the increased use of roadsters and runabouts by physicians, contractors and others, the Studebaker Corporation, Detroit, believes there has arisen a demand for some kind of storm protection which may be attached easily and which does not interfere in any manner with constant entrance and egress. An accompanying illustration shows the design recently presented by one of this company's engineers, as fitted to a 20 horsepower Studebaker roadster.

It will be noted that the side curtains in question are so fitted that they swing with the door of the car, thereby affording the required protection from the elements in summer or the cold of winter without changing any of the characteristics of the machine's standard equipment. This arrangement is expected to appeal very strongly



Studebaker Roadster with New Type of Side Curtain.

to the man who has frequent occasion to leave the car and who wishes to avoid the necessity for unbuttoning the curtain each time.

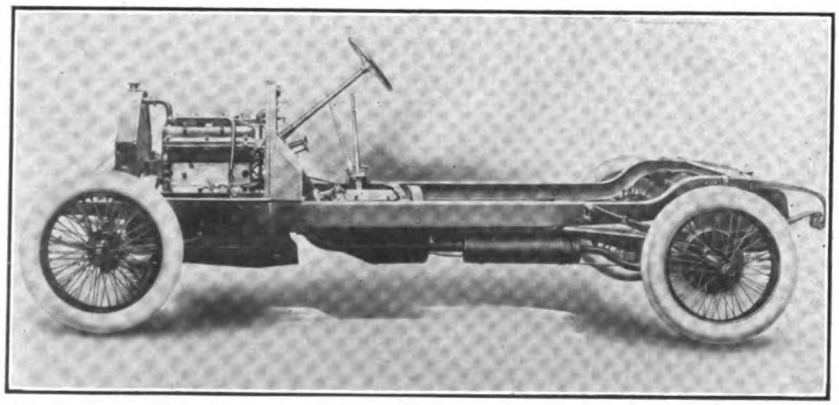
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WITH THE MOTORING INTERESTS ABROAD.

Constructional Details of Italian S. C. A. T. as Fitted for British Market---Possibilities for American Automobile Business Abroad---Other Foreign News.

A FOREIGN car which possesses features of interest for Americans is the S. C. A. T., produced in Turin, Italy, particularly as machines of this make won the Targa Florio races of 1911 and 1912 in Italy. The former event was taken by Ernesto Ceirano of Turin, while the victor in the latter was Cyril Snipe of Manchester, England, a young man who had had no previous experience in racing. Snipe represented Newton & Bennett, Ltd., of London and Manchester, which concern fits S. C. A. T. chassis with the N. B. motor starter and wire wheels for the British market.

The chassis described herein is that rated at 22 horsepower and is the same as those of the Targa Florio winners. The motor is a four-cylinder unit, cast en bloc with bore of four inches and stroke of 5.5, giving a piston displacement of 276.5 cubic inches. The rating under the R. A. C. or the S. A. E. formula is 25.6 horsepower. The valves are specially large, mechanically operated, and the valve stems, springs and adjustable tappets are enclosed by a cylinder casting, easily accessible by removing an aluminum cover plate. Ignition is by Bosch high-tension magneto, carburetion by a Zenith automatic vaporizer, cooling by water using a honeycomb radiator, centrifugal pump and a fan incorporated with the flywheel, and lubrication by a circulating system utilizing a rotary pump.



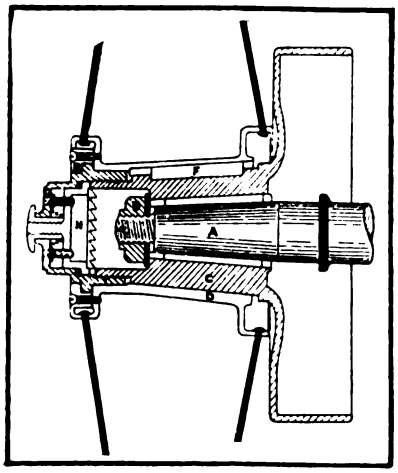
Chassis of the 22 Horsepower N. B. Self-Starting S. C. A. T., Showing Block Motor and General Arrangement of Components.

In the main the construction throughout follows conventional practise. The clutch is a multiple disc. The transmission affords four forward speeds and reverse. The gearbox is provided with two layshafts, below and at the side of the main shaft, and all the brakes are internal expanding, the pedal brake being on the propeller shaft. A large fork ended torque tube is fitted, which encloses the propeller shaft, and this member and the axle consist of two T shaped sections bolted together.

Because of the fact that motor starters are not numerous in Great Britain and because the N. B. has been thoroughly tested under all conditions of service since early in 1910, it possesses more or less interest. The principle involved is the same as that which has been used with success on American cars. A small compressor, driven by the engine and located on an extension at the front end of the crankcase, delivers air to a steel container, from which reservoir it passes through a rotary distributor to the cylinders.

This compressor comprises an air-cooled cylinder with bore of 1.96 inches and stroke of 1.57, the piston of which is actuated by a ball bearing eccentric on the front end of the crankshaft. The reservoir is a weldless steel cylinder 28 inches long and 8.5 inches in diameter, which may be located at any convenient place on the chassis. A rotary valve actuated by bevel gearing from the camshaft controls the admission of air to the engine cylinders in proper sequence, the air entering the cylinders through small non-return valves in the exhaust valve caps. When the engine is running under its own power the rotary valve automatically lifts through suction, thereby, it is claimed, reducing wear on the valve faces. Pressure to the gasoline tank also is maintained from the air compressor, this being reduced by a pressure reducing valve. For the purpose of providing an initial pressure in the tank, compressed air may be admitted from the reservoir through the same valve. Tires may be inflated as with any air compressor.

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Constructional Details of N. B. Wire Wheel.

The N. B. air starter is protected by so-called Harper patent, as is the N. B. wire wheel. The special feature of this wheel is held to be the conical mounting of the detachable hub on the permanent hub. This is claimed to make the wheel absolutely self-centring and rigid laterally, and thus enables it to cope with the enormous reversed and lateral strains to which a road wheel is subjected. The locking device is self-acting and when the wheel is tightened it is maintained that it cannot be left other than locked.

An accompanying sketch sets forth the features of this construction. It will be noted that the detachable hub D has a tapered or coned interior to accord with the conical exterior of the permanent hub C. A plate retains the hub cap G, which can be rotated and is confined in an annular channel presented by the disposition of the hub D and the plate. The reduced end of the hub C is cut with an external screw thread and the hub cap G has an internal thread to engage therewith. A key takes the drive for the wheel by engaging with the keyway in the detachable hub, but it is claimed that the conical mounting forms a clutch sufficiently powerful to transmit the power without this key.

In the hub cap G is a circular ratchet plate H, provided with ratchet teeth, and this device slides upon two guide spindles secured to the cap and can be retracted against the action of the spring on its spindle. The latter passes through the hub cap and is provided with a head to be acted upon when the ratchet plate H is to be withdrawn.

In applying the wheel the tapered or conical hub D is pushed onto the conical boss C and the hub cap G rotated to force the conical faces into contact. As the hup cap is rotated in a forward direction by turning the spanner, the ratchet teeth lock and backward movement is held to be impossible. To withdraw the wheel the spanner, which is provided with a slidable device to engage with the back of the head and so take the ratchet teeth out of engagement, is applied and the hub cap turned in a backward direction.

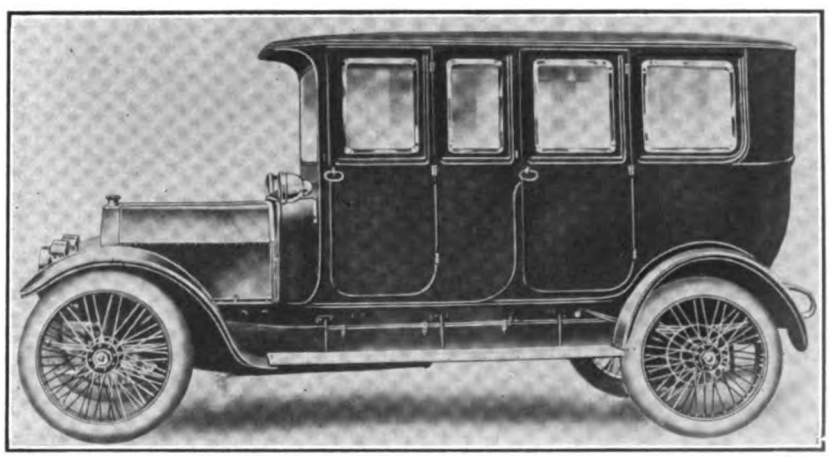
BRITISH IMPORTS AND EXPORTS.

Interesting Comparison of French, English and American Foreign Business.

The Manchester Guardian, published at Manchester, England, gives the following table showing the value of the motor cars and parts exported from France, the United Kingdom and the United States since the beginning of the industry. The record starts with the year 1897 with respect to France and 1902 for the other two countries:

	Year ended Dec. 31.		
Year.	United Kingdom.	France.	United States (year ended June 30).
1897	.....	$121,000	.....
1898	.....	340,000	.....
1899	.....	832,000	.....
1900	.....	1,834,000	.....
1901	.....	3,070,000	.....
1902	$837,000	5,883,000	$950,000
1903	1,674,000	9,898,000	1,207,000
1904	1,747,000	13,825,000	1,895,000
1905	2,637,000	19,568,000	2,481,000
1906	4,228,000	26,833,000	3,497,000
1907	6,725,000	28,098,000	5,501,000
1908	6,423,000	24,779,000	5,278,000
1909	8,141,000	28,541,000	5,992,000
1910	13,460,000	31,510,000	11,190,000
1911	17,246,000	30,795,000	15,509,000
1912	.....	.....	25,657,000

The predominance of French exports over British reached its maximum in 1906 and since



Twenty-Two Horsepower N. B. Self-Starting S. C. A. T. Equipped with Pullman Salon Body.

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then it has declined fairly steadily. It is only since 1904 that the exports of motor cars, motorcycles and parts from the United Kingdom have been considered separately. In the years since then the imports and exports of motor cars have been as follows:

Year	Net Imports Number	British Exports Number
1904	4,964	701
1905	5,046	1,078
1906	5,103	1,379
1907	4,285	2,318
1908	3,396	2,216
1909	3,116	2,580
1910	3,694	3,555
1911	5,731	4,536
1912	6,276	5,282

England still imports a larger number of complete motor cars than it exports, though the excess of imports was only about 1000 in 1912, instead of over 4000 as in 1904, but the value of complete cars exported is greater than the imports. The number of cars imported from the Netherlands decreased from 93 in 1907 to 18 in 1912; Switzerland from 89 to six; Italy, 28 to two; and France, 3613 to 2236, showing how great has been the decline of French cars sold on the British market. On the other hand, the number of cars imported from Germany has increased from 174 to 275; Belgium, 219 to 439; and from the United States, 555 to 3734. France and the United States are still the most important sources of British supply.

DEVELOPING FOREIGN TRADE.

Special Consular Reports Present Conditions and Possibilities Abroad.

An extremely interesting booklet of 70 pages has been issued by the bureau of foreign and domestic commerce, Department of Commerce, Washington, D. C., for free distribution as Special Consular Reports No. 59. The reports set forth existing conditions in many foreign countries and point out the possibilities for American business. No attempt is made herein to present even a brief review of the booklet, but some of the more striking suggestions may be summed up as follows:

United Kingdom—The most talked of matter in the English motor trade is the wide sale of American cars, but several British experts are saying now that their introduction is not to be deplored, as it has stimulated and will continue to stimulate British manufacturers, and has at the same time extended the market. The excellence of the construction has been widely and generously acknowledged. The only points criticised are the finish, the lack of the few additional coats of varnish that would lend distinction, and the uncomfortableness of the seats.

France—Factory owners or managers, the men of intelligence, energy and business foresight, who have created the vehicle and built up its success, should come abroad in person, study the nature, extent and character of the demand, etc. Having decided to make a systematic effort, one or more of the ablest managers, with a full line of sample cars and parts, and a first class mechanic, should be installed in Paris, from which point agencies should be supplied. American automobiles sold in Europe during 1913 will meet the keenest competition that the French and other European makers can organize. Already several leading manufacturers announce reduced prices for their smaller and simpler types and add that they are prepared to produce automobiles on the American plan.

Spain—One of the causes for the small market for American machines is the big profit exacted from purchasers by the agent, which brings the selling price to almost double what is asked in the United States. Care should be used in stating the horsepower, as it appears to be the general practise in Europe to quote the minimum or average, instead of the maximum. The Spanish buyer does not desire a machine of high power.

Russia—Few places in Europe afford better opportunities for the extension of American trade. The high grade expensive machine is having much difficulty in competing with those of European manufacture, but the buying public is gradually realizing that the American car of any grade is fully as good and often in some particulars better than those constructed elsewhere. Some manufacturers are catering to this trade by building their machines on lines similar to those adopted by the progressive and successful makers in France and Germany. They are thus pleasing the public, and evidently in the course of a short time will be on equal grounds with their strong European competitors.

Italy—The first 11 months of 1912 showed continued increases in the sale of low priced, well made American automobiles of good appearance. This may be attributed to the fact that the business and pleasure seeking people have been convinced by satisfactory tests and daily observations that these machines, costing from $1000 to $1600, will answer all ordinary purposes. Italian agents are manifesting special interest in American cars, but complain that while they are splendid machines for the money deliveries are slow and unsatisfactory.

Switzerland—Dealers express the opinion that they could sell an American car delivered in Switzerland to retail at $1200 to $1600, at a good profit in the form of a discount to the agent. American firms established in Paris probably can enter this market through Geneva, and once a footing is obtained, German Switzerland, with headquarters at Zurich, should follow.

India—A substantial increase is noted in the importations from the United States, which is now in second place. The American car sold at prices up to $2000 has won its way absolutely on its merits, and with the assistance of very little advertising as compared with the space used by Continental and British manufacturers.

Japan—Two American manufacturers have sent special representatives, one establishing a general agency with branches in other parts of the Far East. One dealer intimates that some 1200 cars will be sold within the next two years, and that at least 70 per cent. of them will be American made low priced machines.

NEWS NOTES FROM ABROAD.

In connection with the forthcoming visit of the British Institute of Automobile Engineers to America, a movement is on foot to extend the trip to the Pacific Coast at the conclusion of the official tour planned by the American Society of Automobile Engineers.

The 1913 Targa Florio race will be held on the island of Sicily May 11-12. Instead of being a non-stop contest, the event will be run in two sections, from Palermo to Girgenti the first day, and back to Palermo the second.

The court of appeal in Great Britain has found for the defendant in the case of Knight & Kilbourne vs. Argylls, Ltd., for alleged infringement of the Knight sleeve valve motor patent. This decision confirms that of the lower court. It will be remembered that this action was based on the first Knight patent, which was for a single sleeve motor.

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CORRESPONDENCE WITH THE READER.

Selecting Files.

(1517)—In your article on equipping the garage you make mention of the desirability of selecting tools of good quality. They inform me that there is a difference in files. How are you to tell the good from the inferior makes? OWNER.
Charlotte, N. C., March 24.

In purchasing a file it should be balanced on one finger midway its length, and struck lightly with some hard body. If the tool be a good one it will ring almost like a tuning fork. The file should next be held nearly level with the eye, the light falling obliquely up its teeth, which should present a perfectly regular and even appearance viewed from either end. The color should be a dull, silvery gray, free from spots or mottling, except at the end or tang, where it is tempered.

Haynes Motor.

(1518)—What is the bore and stroke of the 1912 model 21 Haynes car? Was the cylinder cast singly or in pairs? Also give wheelbase, type of clutch and axle. W. J. D.
Tampa, Fla., April 1.

The bore and stroke of the 1912 Haynes, model 21, was 4.5 by 5.5. The cylinders were cast in pairs, of the T head type, and were offset .25 inch. The clutch was a Haynes, a contracting steel band on a bronze drum, supported by the crankshaft. The rear axle was a Timken, full floating type. The wheelbase was 120 inches.

Gear Ratio of K-R-I-T.

(1519)—I desire to know what is the gear ratio on the 1913 K-R-I-T car, having a 3.75-inch bore and four-inch stroke. One party says it is 3.625:1 and another 4:1.
Billerica, Mass., April 13. R. H.

The gear ratio of the 1913 K-R-I-T car, to which reference is made, is 4 to 1; that is, the final gear ratio.

Locating Ignition Troubles.

(1520)—Kindly give me your method for locating which part of the ignition system is at fault. In timing valves you place the flywheel 10 degrees past dead centre, exhaust about to close, and inlet about to open, then replace idler gear and lock it. Does that answer for the rest of the valves or do you have to give the flywheel another half-turn to time the No. 2 cylinder and so on? C. W. S.
Woodlawn, N. Y., April 15.

To give complete instructions for locating ignition troubles would require considerable space as there are many causes for irregular operation. The writer suggests procuring copies of the A B C of Battery Systems and A B C of Magneto Systems, published by The Automobile Journal Publishing Company, which may be found at the leading newstands. The booklets will not only enable the reader to locate and correct all ignition troubles, but explain in detail the construction, operation and maintenance of all systems.

The second question was answered fully in the Feb. 10th issue of The Automobile Journal, a copy of which has been forwarded.

Soap for Garage Purposes.

(1521)—I wish to know about all makes of soaps for motor and garage purposes. S. W.
Boston, April 17.

There is a large number of concerns manufacturing soaps for the work referred to and the information desired will be found in the Classified Buyers' Guide, published elsewhere in this issue.

Leaky Storage Batteries.

(1522)—I have a three cell storage battery lead type, which leaks acid very badly. It will not hold a charge; that is, it becomes exhausted very quickly after it has been charged. The man in charge of the battery station informs me that the cells can be repaired, but it may cost as much as $10, depending on the amount of work to be done. Would you advise having the battery repaired or purchasing a new one? SUBSCRIBER.
Providence, R. I., April 18.

If the battery is an old one and in the condition stated it would hardly pay to have it repaired. A battery expert might be consulted and possibly he would disassemble the cells and give an estimate as to the work required, cost and probable service the battery would give after an overhaul. It may be that the plates are well sulphated and while the trouble sometimes may be corrected by a long charge, the writer is of the opinion that it would be more economical to purchase a new battery.

Rewiring Magneto.

(1523)—Having occasion to replace the high-tension cables on my magneto with new wires, I could not start the motor. It back fired and kicked. I am pretty sure I put the wires back properly. The shaft driving the magneto runs to the right and I began on the left side of the distributor to replace the wire leading to the first cylinder; that is, when looking at the breaker box end of the magneto. What is the trouble and how shall I remedy it? A prompt answer will be appreciated as I want to get my car running and do not want to call in a repairman as I live some distance from the city.
APPRECIATIVE.
Nashua, N. H., April 14.

The trouble is due to improper wiring; that is, the cables were connected without regard to the rotation of the distributor. The error is frequently made by those not familiar with the construction and operation of the magneto and who imagine that the distributor arm rotates in the same direction as the armature shaft or that member driving it.

Mounted on the armature shaft is a gear which is meshed with another twice as large as the first named gear. With the armature gear rotating clockwise, looking at the breaker box end,

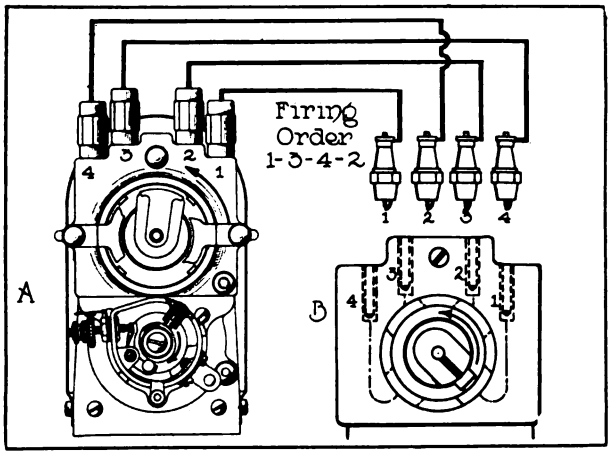
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the distributor gear will revolve in the opposite direction. Consequently the leads or high-tension cables will be connected, starting with the No. 1 cylinder at the right hand side of the distributor housing.

These points are brought out clearly in an accompanying illustration, the drawing at A showing the breaker box, and the arrow denotes the direction of rotation of the armature shaft. The distributor housing is outlined with its cover removed to show the distributor arm and it will be seen that it revolves to the left or anti-clockwise.

For convenience the secondary terminals are numbered 1, 2, 3 and 4, beginning at the right, as the arm makes contact in this order. The sketch at B illustrates the segments and the connections to the terminals, to which are secured the leads.

The wiring plan of a four-cylinder motor firing 1, 3, 4, 2 is shown at A with the plugs similarly numbered. It will be seen that the No. 1 terminal on the magneto is in circuit with the No. 1 plug. As the next cylinder to fire is the No. 3, and the second contact to be made by the distributor arm is the No. 2, the wire from the latter is led to the third cylinder. The third contact to be made is the No. 3 and this is connected to fourth cylinder. The last connection to be made will be from the No. 4 terminal to the second cylinder. In wiring a four-cylinder motor firing 1, 2, 4, 3, or a six-cylinder unit, the order should be maintained; that is, the connections between the distributor to the cylinders should be made in the firing order.



Wiring the Magneto: A, Illustrating Direction of Armature Shaft, Distributor Arm and Connections Between Terminals and Spark Plugs; B, Showing Order of Contacts Made by the Distributor Arm.

S. A. E. Horsepower Formulae.

(1524)—Will you kindly let me know how you get at the S. A. E. horsepower rating? I am unable to find out here. We have an R-C-H rated at 25 horsepower, while you give the rating in your March 10th issue as 16.90. Our legislators have a bill under consideration to tax on the horsepower which if passed would make a considerable difference. Which is the correct rating of the R-C-H horsepower? H. E. R.

Vitoqua, Wis., April 15.

The S. A. E. formula was fully explained in the April 10th issue of The Automobile Journal. It is based on a piston speed of 1000 feet a minute and is obtained by squaring the bore, multiplying this by the number of cylinders and dividing by 2.5. Only the bore is taken into consideration.

The 16.90 horsepower referred to in the March 10th issue is the S. A. E. rating, while that of 25 is given by the company. And it may be stated that the majority of cars will develop considerable in excess of the rating given by the S. A. E. formula, particularly motors in the long stroke class.

Measuring Radiator and Hoods.

(1525)—I have an old model car and the radiator has been soldered so many times that it is useless for cooling. I cannot get a new, similar one, as the company has gone out of business. I note a number of radiators advertised for sale and wish to get one. How can I tell if they will fit my car? How are they measured? A. D. W.

Evansville, Ind., April 16.

There are a number of measurements to be considered, especially those having to do with the mounting of the cooler. If the old radiator is retained by studs and sets deeply in the retaining member between the side members of the frame, the width must be accurate.

In an accompanying illustration are shown the most important points to be considered in taking the measurements of the old radiator and it will be noted that the stud holes are marked 1" D. However, if the studs of the new cooler are larger the openings in the retaining member may be enlarged.

Unless the shape of the new cooler is similar to that of the old one it will be necessary to fit a new hood and the method of securing the measurements is also outlined in the sketch. Care should be exercised in selecting a new radiator to make sure that the starting crank will not interfere with its fitting. Unless sure of the measurements it would be best to make arrangements with the dealer to permit of trying the cooler upon the car before purchasing. The location of the inlet and exhaust pipes will require consideration as well as other measurements. It is possible that the old radiator was manufactured by some cooler concern which could supply a new one. As the make of the car was not mentioned this information cannot be given.

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Glass for Windshield.

(1526)—I wish to replace the lower glass in the windshield of my 1910 Cadillac car. The size of the glass is 16 by 40 inches. What will it cost and will it be necessary to send the shield away to have a new glass fitted? It broke or cracked in two with the car rounding a curve on a grade at moderate speed. The road was fairly smooth. What caused the glass to break? Is it a common thing? How can it be avoided? M. F. C.
Truro, Mass., April 21.

It is not possible to give figures as to the cost of the stock and labor, but it ought not to be expensive. It should not be necessary to send the shield away as a lower glass could be fitted by any glass worker. It is possible that the work can be accomplished at Middleboro or some convenient town.

As to the cause of breaking it may have been due to a stone thrown up by a tire or to the dash springing and twisting the frame of the shield. It would be difficult to state the cause in the case mentioned. It is suggested that the body bolts be examined to note if they are tight and those securing the shield to the dash also should be inspected.

Rectifier for Ford Cars.

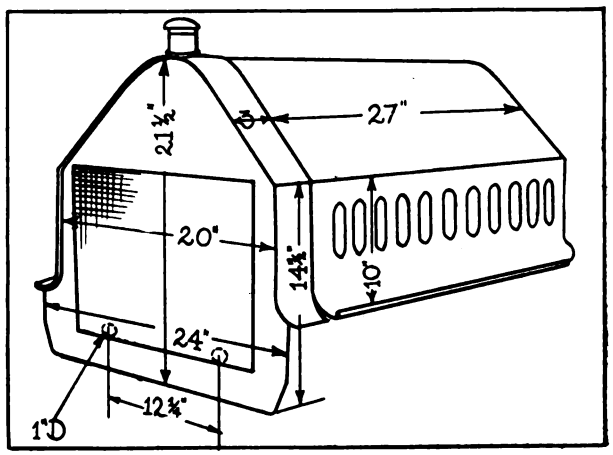
(1527)—Is it possible to fit a rectifier to a model T Ford automobile to change the alternating current into direct and charge a storage battery when the motor is operating? I was told that the Wagner Electric Company of St. Louis, Mo., makes a type adapted to Ford cars. FORD ENTHUSIAST.
New York City, April 14.

The Wagner Electric Manufacturing Company states that its rectifier is not adapted for changing the form of alternating current produced by the Ford magnetic needle. The reason for this is that as the Ford magneto is connected to the engine it varies with motor speed and the frequency of the current generated by the magneto manifestly varies through the same range of cycles as does the engine speed.

The alternating current rectifier made by the company requires a constant frequency, as it operates on the vibrating reed principle, the reed being tuned in length and weight to a special frequency. It will not vibrate synchronously except when operated on this frequency. The reed is like a pendulum in that it has a set rate of vibration, which is determined by its length.

Even if the magneto would charge a battery through a rectifier, it would be more expensive, as considerable gasoline would be consumed in the operation. In charging storage batteries it is important that the rate recommended by the maker be observed strictly. As the frequency of the current developed by the Ford magneto would vary with the car in operation, the utilization of a rectifier would not be practical. Another factor to be considered would be the use of a cut-out, as it would be essential that the magneto be cut out when its output fell below that of the cells. Otherwise the battery would discharge through the magneto. On the other hand it would be difficult to regulate the charging rate, which is important in charging cells.

The Ford magneto was not designed for charging batteries and if these are utilized on the car it is best to have them charged at a regular station or to utilize the garage or house current. If the latter be alternating it can be employed in connection with a rectifier and there are several designs made especially for the work, among which are the Wagner, Edison and Westinghouse. Chas. E. Miller, 97-103 Reade street, New York City, and the Bi-Motor Equipment Company, 180 Massachusetts avenue, Boston, also handle these devices. A description of the Westinghouse rectifier will be found elsewhere in this issue. It will be noted that the direction of the



Illustrating Method of Measuring Radiator and Hood.

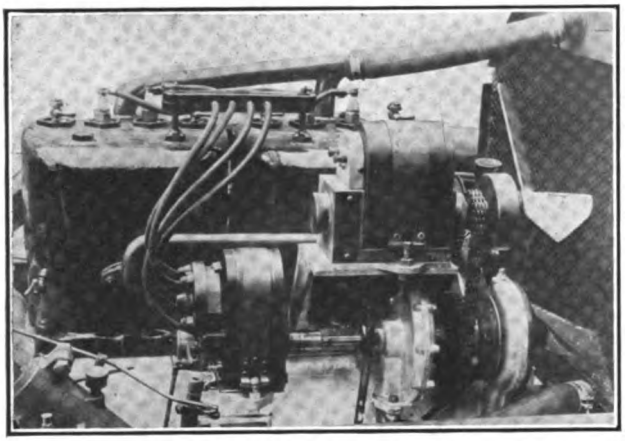
charging current varies or alternates. By this is meant that the current flows first in one direction, north for example, until it attains its maximum, then in the opposite direction, or south.

A minister of Los Angeles, Cal., has made the statement that the motor car is drawing people to church who seldom or never attended divine service before. His fellow pastors of the city, assisted by newspapermen, made a thorough canvass of the city and proved his contention. The minister in question holds that while it may be true that the automobile has drawn some people away from church, the fact that the streets near churches are lined with motor cars during Sunday morning services is proof positive that the vehicles have worked for much good, as they get people out early in the morning for a ride, after which they attend service.

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JACKSON LINE INCLUDES THREE MODELS.

THREE models, the Sultanic, Majestic and Olympic, constitute the 1913 line of the Jackson Automobile Company, Jackson, Mich.,



Power Plant of the Jackson Majestic, Showing Location of Lighting Dynamo Driven by Silent Chain.

and each are of the touring type, five and seven-passenger seating capacity. Although the designs may be said to be entirely new the principles of mechanical construction entering into the previous chassis have been retained. The equipment is very complete, comprising electric lighting and motor starting and including those accessories making for comfort and convenience.

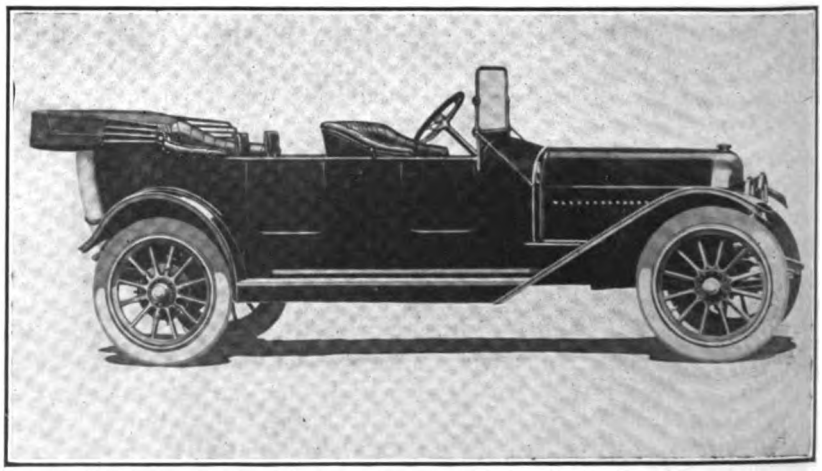
The size of the motor in each model is proportioned to the weight of the car and the load it is designed to carry, and is sufficient to meet all requirements of service. All three chassis are fitted with the unit power plant, differing in the bore and stroke. The Sultanic is a six-cylinder, with a 4.125-inch bore and 4.75-inch stroke and is rated at 55 horsepower. Both the Majestic and Olympic have four-cylinder motors, the former having a bore of 4.5 inches and stroke of 5.25, rated at 45 horsepower, while the bore and stroke of the Olympic is the same as that of the large car.

All three have enclosed valve mechanism. The bearings are liberal in size throughout and very accessible. Ignition is by a magneto with dry cells for starting, and on the Sultanic and Majestic the lighting battery may be utilized if desired. The gasoline capacity of each model is 20 gallons with the service tank located under the dash and at sufficient elevation to provide a positive feed by gravity. The main fuel supply is carried at the rear, easily accessible for filling, and the fuel is forced to the forward tank by a pressure pump on the dash. A gauge indicates the amount on hand.

Lubrication is by a force feed system, the oil being taken from a large reservoir in the engine base and forced to the bearings by a mechanically driven pump. A sight feed gauge is located on the dash. The clutch hub and yoke bearings are lubricated through a hollow shaft from the transmission, which is of the selective type, affording three speeds forward and reverse. All gears are large with shafts rotating in high grade ball bearings.

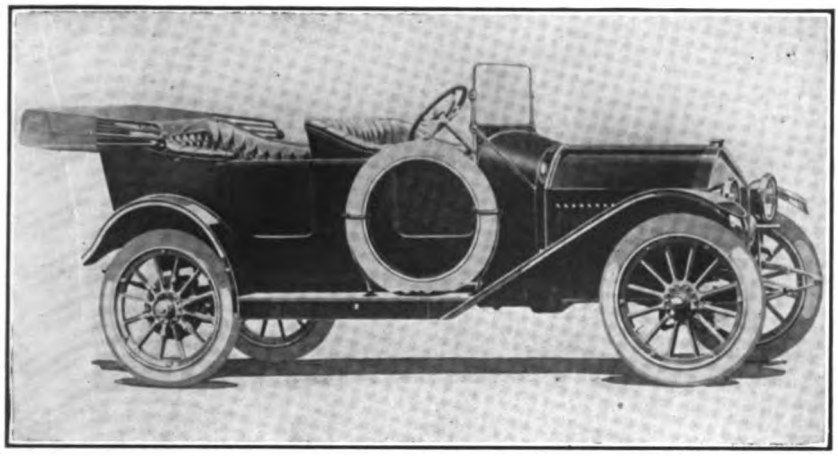
The Sultanic is fitted with a full floating type of rear axle and ball bearings are employed throughout. The other two models have a semi-floating rear axle with roller bearings, but ball thrust members. Full elliptic springs are used both front and rear and the conventional drop of the frame makes for a low centre of gravity. All spring bolts, steering knuckles, tie rod pins, etc., are lubricated by grease cups. The front axle is of the conventional I beam section type with tie rod at rear, and the knuckles and steering linkage are sturdily constructed.

The tires are sufficiently large to care for overload, the Sultanic being equipped with 36 by 4.5-inch, while the Majestic and Olympic have 36 by four and 34 by four-inch shoes respec-



Jackson Sultanic Touring Car, Having Six-Cylinder Motor Rated at 55 Horsepower, Fully Equipped, Including Electric Lighting and Motor Starter.

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Jackson Majestic, a Five-Passenger Touring Car, with Roomy Body and Attractive Lines.

tively. The last two named types have quick detachable demountable rims with one extra member as standard. Demountable wheels with detachable rims are fitted to the Sultanic, being demountable at the hub flanges, and it is held that accuracy of alignment is secured through a machined joint between the removable and fixed member. The spare wheel fits equally well over front or rear hubs.

The wheelbase of the models varies, the Sultanic being 138 inches, while that of the Majestic and Olympic is 124 and 115 respectively. The standard tread is 56 inches, although option is given at 60. The steering gear is of the worm and gear type, constructed in the factory of the company, and makes for a large factor of safety. The gear is completely cut, although but one-quarter of its circumference is utilized. This provides means for adjustment which is accomplished easily. The driver is located at the right.

The Sultanic and Majestic are equipped with electric starting units operated by a switch member convenient to the driver. A Disco gas starter is standard equipment on the Olympic. With the exception of the last named all models have electric lighting dynamos. Gas headlights and oil side and tail lamps with a Prest-O-Lite tank are utilized on the Olympic, which model is provided with a device for lighting the gas lamps by electricity.

All three bodies have ample room for the passengers, being extremely wide. The seats are provided with 10-inch cushions with eight-inch seat backs, and there is plenty of foot room. Both Turkish and high grade leather is employed throughout.

Each model is completely equipped, including mohair top, side curtains and boot, ventilating windshield, speedometer, oil and gasoline gauge on dash, extra rim, tire holder, electric horn, coat and foot rails, pump, tools, jack, etc. Dark blue with black and nickel trimmings is the standard color with the Sultanic and Majestic and dark maroon with the Olympic.

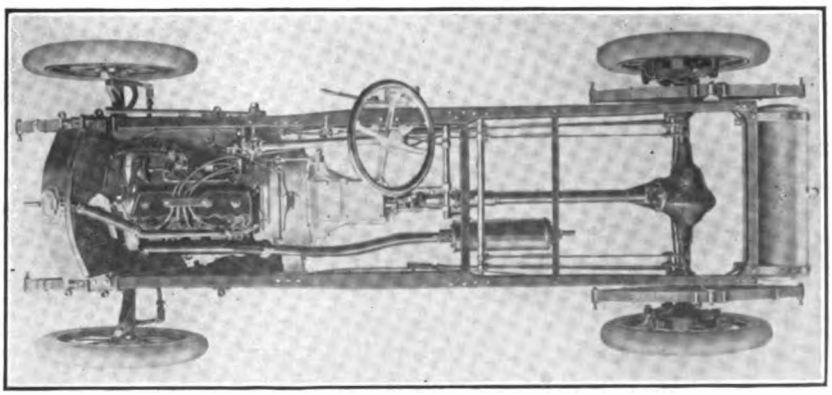
The finish is high grade, and numerous coats of paint make for durability. Throughout attention has been paid to small details and each part is proportional in harmony with the whole.

STILL ANOTHER TIRE COMPANY.

Morgan & Marshall Concern Will Erect Plant in East Liverpool, O.

The Morgan & Marshall Co-Operative Rubber & Tire Company, East Liverpool, O., which was organized recently, will erect new buildings, instead of purchasing the old Warner-Keffer property as was at first contemplated. It was decided that the best policy was to secure a modern plant in every particular.

It is expected that the factory will be ready for the manufacture of automobile tires and rubber sundries by July 1, and that about 100 skilled workmen will be employed at the start. The equipment will be of the very latest type in every particular and the company announces its intention to specialize in tires for heavy duty cars.



Top View of Jackson Olympic Chassis, Showing Unit Power Plant, Three Point Suspension and Accessibility of Components.

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BOSCH SUPPLY STATIONS.

Each Displays a Distinctive Sign, Which Insures Willing Aid to Users.

The constant growth of the Bosch Magneto Company, New York City, maker of Bosch magnetos, plugs and ignition apparatus, has made it necessary to establish a large number of supply stations throughout the country. For some time, besides the main office in New York, fully equipped branches have been maintained in Detroit, Chicago, San Francisco and Toronto. Last year a number of Bosch distributors were appointed, each with a distinctive sign to acquaint users of these products with the location of an establishment with facilities for adjustment and cleaning, as well as for the complete installation of equipment on automobiles. As a result these distributors are able to handle the bulk of the repairs, etc., in their respective districts, by reason of the fact that the men employed have received special training with the Bosch company.



Sign Designating Office of Bosch Supply Station.

The latest move is the appointment of a large number of official Bosch supply stations in the larger towns and cities of each distributor's territory. Such supply stations are subsidiary to and act in conjunction with the official distributors. Their function is practically that of a sub-distributor, each being required to carry a stock commensurate with the needs of its district and to be capable of rendering assistance to Bosch users in the way of installations, minor adjustments and technical help. Each is designated by a distinctive sign, a reproduction of which is shown herewith. The following appointments have been made recently:

Lemke Electric Company, Milwaukee, Wis.; Miller-Dudley Company, Washington, D. C.; Beverly Garage, Staunton, Va.; Virginia Motor Car Company, Petersburg, Va.; Dan Valley Motor Company, Danville, Va.; Fairchild Auto Company, New Orleans, La.; Ozburn Auto Supply Company, Memphis, Tenn.; Drennan Motor Car Company, Birmingham, Ala.; Chester Motor Car Company, Nashville, Tenn.; Hobbie Motor Car Company, Montgomery, Ala.; Mobile Auto Company, Mobile, Ala.; Woodside Motor Company, Charlotte, N. C.; American Ball Company, Providence, R. I.; Bakersfield Garage & Auto Supply Company, Bakersfield, Cal.; Ballou & Wright, Seattle, Wash., and Portland, Ore.; E. A. Featherstone, Los Angeles, Cal.; Herring Motor Supply Company, Des Moines, Ia.

It is of interest in this connection to note that 23,773 magnetos were shipped from the factory in Springfield, Mass., during March, which is considered by the company as a new record.

PANAMA-PACIFIC EXPOSITION.

Seeking to Interest Automobile Manufacturers in Separate Building.

Those interested in the exploitation of the Panama-Pacific international exposition to be held in San Francisco in 1915, are still anxious that the automobile industry shall occupy a separate building. A recent announcement dated April 3 and signed by H. M. Wright of the editorial department, division of exploitation, contained the following:

After negotiations lasting nearly a year, the National Automobile Manufacturers' Association, at a meeting of its executive committee, agreed to sound manufacturers of the country as to their willingness to subscribe for the necessary amount of space to put up a building; the price was set at $2 a square foot of net space, the site being donated by the exposition management. Thus far the replies from the manufacturers have not come in rapidly enough to assure the building, as many manufacturers did not desire to make commitments two years in advance of the opening of the exposition. Unless some immediate action, however, is taken it will be necessary to relinquish the location chosen for the palace and perhaps to abandon altogether the idea of a separate building. We are very sure that when the manufacturers realize the importance of taking early action the demand for space will fill a building double the dimensions of the one contemplated.

In reply to a letter addressed to Samuel A. Miles, general manager of the National Association of Automobile Manufacturers, the situation with reference to that body is set forth as follows:

The facts are that this association agreed with the exposition authorities to sound the trade and ascertain whether there is a sufficient demand for space to warrant the construction of such a building at the expense of the industry; that we did consult the trade and did not find the manufacturers sufficiently interested in the subject to proceed further, and that at our meeting in March it was decided to take no further steps in the matter.

This information was immediately transmitted to the exposition authorities and was sent to the trade press. Since that time we understand a movement has been started in California to erect a separate building, but concerning this we have no definite information, nor has the association been consulted.

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INTERNATIONAL SWEEPSTAKES.

Foreign Cars for Third Annual 500-Mile Race on Indianapolis Motor Speedway.

The third annual 500-mile race on the Indianapolis motor speedway, Memorial Day, will be international in fact as well as in name. This event has been termed the international sweepstakes, and while in former years cars of foreign make have competed there has been no effort on the part of the European manufacturers to be represented. This year at least three countries, Great Britain, France and Italy, will have machines direct from the factory in the contest.

Herewith are presented reproductions from photographs of three of the best known foreign racing drivers who will take part. Albert Guyot will drive a Sunbeam, made in England, while Jules Goux and Paul Zuccarelli will pilot Peugeot cars, made in France. It also is understood that the Isotta Fraschini factory in Italy intends to send three machines to this country for the race.



Three Foreign Drivers Who Will Compete in Indianapolis Memorial Day Race: Left to Right, Jules Goux, Peugeot; Albert Guyot, Sunbeam; Paul Zuccarelli, Peugeot.

Guyot belongs to the old school of French drivers. In 1908 he won in the light car class for the French Grand Prix, and has taken hundreds of medals and trophies by his cool headed, scientific driving. Goux is best known as the winner of the Sarthe Grand Prix last year, although he has been victorious with Peugeot cars in a large number of important events. His machine in this event will be a duplicate of the model driven to win last year's Grand Prix. Zuccarelli is an Italian, but he has been driving French cars for years. He also is a long time winner and a fitting teammate for Goux.

GLIDDEN TOUR ROUTE.

Lakes-to-Gulf Plan Appears to Have Been Abandoned in Favor of Northwest.

A report from Detroit states that the American Automobile Association has returned to New Orleans its $1000 payment, which was made by that city to secure the finish of the Glidden tour from the lakes to the gulf, for which the routing was made last August by a Flanders electric. Accordingly, it is understood, the national tour start committee, composed largely of Detroit men, has abandoned further efforts.

The probable route of the 1913 tour is expected to be from the "Twin cities," Minneapolis and St. Paul, to the Yellowstone and Glacier parks, following closely the lines of the Northern Pacific Railroad. The plan includes the same arrangement as was followed in the tour from Denver to Detroit in 1909 when a hotel train, composed of sleeping cars, accompanied the tourists.

Jules Goux, driving a Peugeot car, created new world's class records on the Brooklands track, Weybridge, England, early in the month, his time for the flying half-mile being 0:16.58; flying kilometer, 0:20.79; flying mile, 0:33.87; 10 laps (approximately 25 miles), 16:04.9. Later he drove 107.5 miles in one hour. The car was rated at about 30 horsepower.

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SCIENTIFIC MOTORING LAW.

The so-called scientific motoring law suggested by Job H. Lippincott, state commissioner of motor vehicles in New Jersey, deserves careful consideration. It is possible to disagree with his conclusion that reciprocity as now established is a failure, and at the same time grant that the proposition advanced by him was not formulated without serious thought. Those who have advocated federal supervision of highways and a federal registration of automobiles, will have little difficulty in following the plan for interstate licenses, bearing something in the nature of coupons entitling the motorist to enter other states at will.

New Jersey has long labored under an erroneous conception of the value of reciprocity as applied to interstate touring. It is not a question as to whether the residents of other states wear out more Jersey roads than Jersey citizens wear out in other commonwealths. Instead, New Jersey must decide whether its share of the business which naturally follows unrestricted interstate touring offsets the damage that may be occasioned to the highways.

The proposed law may be scientific in its fundamental principles, but it can be foreseen that its application may be no easy task. Judging from the wide variance in registration fees demanded by the different states, this subject has by no means been reduced to a scientific basis as yet. It would seem that much could be accomplished by a consultation among commissioners representing the several commonwealths, such as has been suggested by New York and agreed to by Delaware.

THE EFFECT UPON THE INDUSTRY.

The automobile industry is extremely fortunate in escaping serious loss as a result of the recent floods in Ohio and Indiana. This has special reference to the manufacturers of cars and accessories located within the stricken district, all of whom appear to have been delayed but slightly in their ability to fill orders and resume business. However, these floods and the tornado which visited Omaha a few days previous to them will have an appreciable effect upon the industry.

While thousands of individuals lost heavily, American business enterprise refuses to consider the possibility of failure. Those portions of the country which were the subject of charitable contemplation a few weeks ago will soon present a most satisfactory market in every practical field. The important part played by motor cars of all types in the work of rescue and rehabilitation was such as to establish their practicability beyond question, and this is particularly true of the commercial vehicles.

The possibilities for automobile business abroad, as set forth in the special consular reports, seems decidedly bright. Europeans apparently have discovered that quantity production is not made at the expense of quality, and it is most significant that French makers are announcing their ability to produce cars on the American plan. The competition is to be keen, but the demand for American machines forecasts another big year for the exporters. The outlook is particularly hopeful.

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MAKERS DISCUSS PERTINENT SUBJECTS.

DUE to the systematic campaign of education inaugurated by the motoring publications, with the co-operation of automobile and accessory manufacturers, the American motorist has a thoroughly practical knowledge of his car and its fittings. However, a considerable percentage of the vehicles produced and marketed each year reaches the inexperienced, and this fact, coupled with the introduction of new features, makes it necessary not only to continue the educational work, but to revert at times to matters which may appear to the majority to be somewhat elementary.

That there is real need for review of fundamental principles and their application is evidenced by the treatment of subjects for publication by the engineering departments of some of the best known concerns in this country. It may be taken as established that these manufacturers are in a position to learn the need for the dissemination of this character of information. This note will be discovered in some of the communications presented below, but whether the reader be an experienced motorist or a novice, there is little doubt that a consideration of the subject from this viewpoint will prove of distinct value.

CARE AND REPAIR OF TIRES.

Suggestions for Increasing Mileage, Making Roadside Repairs and Vulcanizing.

Tires are an important factor in the cost of maintenance and the failure of an owner to obtain maximum efficiency is often due to not giving these members the attention they require. The following letter from a prominent manufacturer is of interest in that it contains valuable hints on the repair of shoes and inner tubes, as well as suggestions for preventing trouble:

Probably an automobile tire has to stand more rough usage than any other part of the car, and without a doubt it receives, in nine cases out of 10, less attention and care than any other part. There are a number of things that every automobile owner can do for his tires that will not only enable him to anticipate and avoid roadside troubles and delays, but will add greatly to the mileage obtained. Or, to put it in another way, he can secure the mileage for which he has paid and which the manufacturer expects him to get.

The importance of inflation to the pressure recommended by the tire maker cannot be over-estimated. Unless tires are kept pumped up full and round under the weight of the loaded car the fabric will be continually bent as one point of the tread after another adapts itself to the irregularities of the road. Consequently the fabric is weakened and disintegrates like a much used leather hinge. A hard tire, too, is less liable to puncture or cutting by sharp stones, nails, etc.

One of the surest ways of spoiling a tire is to allow it to stand in a puddle of oil on the garage floor. Oil, and especially gasoline, will dissolve rubber. Tires should not even be wiped with oily waste. Carelessness about this one point has helped many tires to premature failure.

Rust is one of the worst enemies of canvas and rubber. It may collect on the steel rims after the car has been washed or driven through mud, and water has worked in between rim and tire. The remedy is removal of the tire, a thorough sandpapering of the rim and a coat of shellac. This should be done at least once a season as not only does it prevent rusting, but it facilitates removal of the tire in case of a puncture.

When inserting a new tube or replacing the old one after a repair, the inside of the casing should be dusted with plenty of powdered soapstone (graphite may be used). This prevents kinking or pinching of the tube and by reducing the friction between tube and casing, keeps the tire from heating on a long run and saves wear of the rubber.

Unless extra tubes and an extra casing are carried, the motorist may be obliged to stop for roadside repairs, which are unpleasant to say the least. One does not take a trip for experience in tire repairing and it pays well to see that these extra tubes and casings are kept in first class condition.

The extra casing usually carried for roadside emergencies ought to be protected from light, heat and dampness. In lieu of a special tire cover, a winding of rubber cloth is sufficient, but perhaps not so satisfactory if appearance is a consideration.

If extra tubes are carried as is usually the case, don't throw them loosely into the tool box or under the back seat. You might as well throw them away, for the tools will chafe, and the oil will rot them until they are worthless by the time they are needed. To be carried safely, tubes should be dusted with soapstone, folded carefully and tied, not too tightly, with wide tape. They ought then to be kept in a soft canvas bag, also well dusted with soapstone, and carried in some part of the car where heat and oil cannot reach them. As a spare tube deteriorates quickest at the sharp bends made in folding, it is a good idea to refold it once in a while so that the creases come in new places.

For temporary repairs sufficient to bring the car home without having to run on a flat tire, there are a number of accessories that may be profitably carried. Among the most important are the tire sleeve, to lace around a casing after a blow-out, and the blow-out patch, to place between tube and case. These are generally used together, the sleeve to prevent the entrance of dirt and the patch to keep the tube from bulging into the hole.

For temporary roadside tube repairs, should they be necessary, cemented patches may be used. It is best to use the patches prepared by the tire makers, but if the patch be cut from an old inner tube, it is preferably cut round and ought to have the edges bevelled. A square patch sometimes loosens at the corners. Small nail punctures can be covered by a patch about two inches in diameter. Scrub the point of repair for an area at least an inch larger than the patch with gasoline and clean waste to remove the soapstone and sulphur, then roughen the surface with sandpaper. Cover the patch and the clean place with a thin coating of rubber cement and let it dry thoroughly. Then apply a second coating and when the moisture has all evaporated apply the patch, pressing it down firmly. Clamp it, if possible, between two flat blocks for a few minutes or hammer it all over with a wooden wrench handle. Be sure that the cement has set thoroughly before inflating the tube.

By far the best method, and one which makes permanent repairs, is vulcanizing. This consists in filling the hole with a plug of uncured Para rubber such as the tire was originally made of (it can be obtained from any supply house) and curing it by applying heat at 265 degrees Fahrenheit for a few minutes. The result is a repair that is actually welded into and a part of the tire, so that no amount of service will loosen it. One could vulcanize with any hot iron, but the result in the hands of a novice would probably not be successful on account of the difficulty of maintaining a temperature high enough to vulcanize the repair without endangering the tire by overheating. By the use of a good vulcanizer, one on which the temperature is controlled automatically

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by a thermostat, vulcanizing a tire is as simple and speedy as sticking on a patch. No attention need be given the vulcanizer while it operates, because the temperature cannot run high enough to overcure the repair. The vulcanizer is heated by electricity or an alcohol lamp while preparing the tire and then clamped over the repair for a few minutes. No skill or experience is required to operate these machines as they are designed especially for use by any motorist.

The greatest advantage of having a vulcanizer in the private garage is that it puts the motorist in a position to mend stone cuts, etc., in the treads and sides of casings without even letting the air out of the tire. There is no other satisfactory way of mending such cuts, which if neglected, will admit moisture to the fabric, rotting it until a blow-out ruins the tire. A good tire will run 10,000 miles if the fabric is protected from foreign substances, so the importance of sealing every injury is evident.

The inconvenience of sending tires to the repair shop for repairs and the prohibitive expense of having every small cut vulcanized, often deter the motorist from even trying to keep them shipshape. Not only will a vulcanizer that he can operate himself save him practically all of his tire repair expense, but it will enable him to get double or even treble service from his casings.

CONCERNING STORAGE BATTERIES.

Information as to Treatment Necessary to Insure Their Maximum Efficiency.

The following suggestions for the resuscitation and care of storage batteries were contributed by the engineering department of a prominent battery maker whose instructions are based upon years of experience, and which if followed will result in maximum efficiency:

The almost universal adoption, by car manufacturers, of electric lighting and starting systems, has necessitated the use of storage batteries to an extent never before reached. This has resulted in placing thousands of storage batteries in the hands of users whose knowledge of them and of their proper maintenance, at the best, can only be elementary.

The storage battery, properly handled, is a most efficient and uncomplaining servant, but like a good watch or any piece of machinery, it is neither trouble nor fool proof and will suffer from lack of care or unintelligent handling. Storage battery ailments, as a matter of fact, are really very few, but as the most annoying one is a so-called "dead battery," the following instruction for its resuscitation may prove of benefit to users:

Should your battery become dead, first ascertain if the generator is putting up its proper amount of current; a storage battery is not a creator of energy and depends for its supply upon the generator, which is driven by the engine. If you find your battery dead at any time, introduce an ampere meter in the battery circuit and see how much current is being delivered by the generator at different speeds—eight, 12, 16 and 20 miles an hour. If the generator is designed to give an output of 10 amperes at 12 miles an hour, and if you are only getting seven amperes at this speed, it should be adjusted to give its full output.

When a storage battery is allowed to fall behind it will not store the energy supplied by the generator even though the latter is giving its output, for the reason that the battery has gotten into a stale condition and does not properly take a charge. If investigation shows that the generator has not been giving its rated output, and the battery has fallen behind, it should be taken to a garage and charged according to directions given on the battery name plate. Adjust the generator so that it delivers the output claimed by the manufacturer of the car or generator; put the battery back into service and as long as the generator gives its output there will be no lack of light or power for starting.

Some manufacturers furnish with their apparatus an ampere meter, which is placed on the dash of the car and shows the amount of current passing into the battery. This is very desirable as it indicates whether there is any interruption of current due to any cause whatever and also whether the generator is giving its full output. It will be readily understood how valuable this kind of an instrument is when consideration is given to the fact that a battery may become dead and possibly ruined by lack of knowledge of conditions existing in the generator.

Faulty lamp sockets may also cause a storage battery to lose its current. After proceeding as above, if the cause of your trouble has not been located, examine your lamp sockets and look for looseness and poor contacts, which should be corrected at once. Investigate the switches in both the lighting and starting circuits and make sure that they return properly to the "Off" position when current is not being used. Ascertain whether your wires are in good condition. Look for places where the insulation may be worn off from friction, where wires rub against the frame or other metal parts of the car. Inspect your lamps to determine whether or not your battery is overloaded. The total candlepower of lamps used should be in proportion to the capacity of the battery and if you are using more than you should, get lamps of the proper candlepower.

All parts of your lighting and starting systems being right, remember that if you operate your car mostly at night, when lights are all on, and very little in daytime, you are not giving your generator opportunity to do its work and a dead battery resulting from this cause shows no fault either in generator or battery. To avoid this condition when car is used mostly at night, economize on your lighting when possible and run your engine awhile each day to fill up the battery.

Last, but not least, don't neglect keeping your battery well filled with distilled water. Remove vent plugs once a week and see whether plates are covered with solution to the depth of at least half an inch. If not, add pure water, never anything else. This is important, as nothing will more certainly insure loss of capacity and final ruin of a storage battery than allowing the plates to become dry.

TESTING LUBRICATING OILS.

Chas. E. Miller Offers Methods Which Owner May Utilize for Himself.

Chas. E. Miller, 97-103 Reade street, New York City, maker of the Pan-American line of lubricants, offers the following simple directions for determining easily the qualities of lubricating oils without chemists' testing apparatus:

Lubricating oils, owing to their present high cost and our wasteful way of using them, like fuel oils and the cost of tires, add largely to the expense of maintaining the modern motor car.

To determine the presence of solid impurities, kerosene is added to half a tumbler of oil until the whole becomes quite thin. The mixture is then passed through filter paper or ordinary white blotting paper, after which the paper is washed with kerosene. The residue, if any, will show if the oil had any solid impurities.

Impurities also may be roughly detected by smearing a piece of writing paper with oil and holding it against the light. If the oil is free from solid impurities the blot will be equally transparent throughout; otherwise, the solid particles will show.

The oil must not resinify. To test it in this respect, pour it into a shallow dish and leave in a warm place about a week. There must not be the slightest crust at the end of that time. Another way to test it is by mixing it with fumes of nitric acid. If the oil is pure, a thick mass will form in a few hours, while resinifying oil will remain thin.

Acids are very injurious impurities in lubricating oil, since in time they attack the machine parts lubricated. To test for them, copper oxide or copper ash is added to the oil in a glass vessel. Acid free oil retains its original color, while if it contains acid, it becomes greenish or bluish.

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Another test is to drop the oil on a sheet of copper or brass and leave it there for a week. If the oil contains acid there will be a green spot on the metal. Blue litmus paper dipped in acid free oil stays blue, but becomes red if it contains acid.

A good oil must be greasy in order to have good lubricating qualities. To find which of the several oils is best in this respect, place a few drops of each on a smooth, slightly inclined metal or glass sheet. The drop of the best oil will travel furthest in a given time.

MAKING THE CURVES SAFER.

Overland Official Believes Americans Can Profit by Example Set by British.

Recently British motorists instituted a plan for improving driving conditions throughout Great Britain, by removing obstructions at curves and crossings. G. W. Bennett, vice president of the Willys-Overland Company, Toledo, O., comments upon this in the following manner:

The English have shown a commendable spirit of progressiveness in clearing the turns and curves of their roads of objects that prevent a clear view. British motoring publications recently have called attention to the good being done along this line. In two instances I have noted very dangerous curves have been made perfectly safe by cutting down hedges and undergrowth which have prevented a view of the curve. Where heretofore tall hedges, growing inside the curve, have made it impossible to tell what may be approaching from the opposite direction, an unobstructed vision has been obtained merely by eliminating the obstruction. In one case the hedge was cut down and a white painted picket fence, in direct contrast to the surrounding vegetation colors, was built. With these precautions motorists approaching the curve from both directions are enabled to tell at a glance whether the road is clear beyond.

In our own country there are numberless opportunities for this excellent work. Many of our country roads are crossed at various angles by railroads and more often than not it is impossible to tell whether a train or car is approaching because of the growth of brush or other obstructions. In the cities, too, there are scores of dangerous places, where billboards and other unsightly objects are erected close to the crossing or curve. I am confident that in the near future our great automobile clubs will see the need for these preventative measures. And when the work is taken up the number of automobile accidents will greatly decrease.

REGARDING GOOD ROADS.

R. E. Olds Discusses Possibility of Co-Operation in Construction and Maintenance.

The subject of good roads is receiving deserved attention in several parts of the country. Motorists are particularly active and the following suggestions by R. E. Olds, one of the pioneer American automobile manufacturers and designer of the Reo cars, should prove of decided interest:

As road improvement is of nation-wide interest it should be supported by our national, state and county governments. This is notably true with interstate highways, for it is manifestly unjust to tax all the improvement to the abutting land, to the county or even to the state. Why should not our national government promote interstate commerce through good country roads as well as through river and harbor improvements?

Good and patriotic men seem to be at variance as to what is the best system of building roads. Some advocate three or more cross-continent trunk highways to be built and maintained equally by the federal government and by the various states through which the trunk highways go. Others favor the improvement of those roads first which run to the county seat, provided it is a good railroad market town, and if not, to the most accessible large railroad town in the county. They believe that these roads should be properly ditched, graded, rolled and dragged. Culverts should be built where the water is inclined to flow across the road during heavy rains. Grades should be raised in low places, hills materially dug down and good bridges built over creeks and streams of all kinds.

The citizens of a given county could by this plan easily determine on the first 10 miles of good roads to be built and maintained. Then the next five or 10 and so on further away from the principal town or towns in the county until every foot of dirt road in the county is put in first class condition.

The good leaven is working in the minds, hearts and consciences of the American people. Good roads, to them, now mean more than ever before, the avenues which lead to national strength, prosperity and happiness to which every good citizen should be glad to give his due measure of enthusiastic support.

HONEST ADVERTISING LAW.

Republic Rubber Company Heartily Indorses Recent Action of Minnesota Legislature.

In commenting upon the law recently passed by the Minnesota legislature with reference to honest advertising, Web Brown, advertising manager for the Republic Rubber Company, Youngstown, O., maker of Republic tires, has the following to say: "While at first glance this may seem to be radicalism in the extreme, yet a more careful examination will show that the object sought—the protection of the reading public—is one worthy of hearty support. It is an inviolate rule of the Republic Rubber Company that there must be no misrepresentation or exaggeration in Republic advertisements and an examination of these will show that this rule has been followed to the letter. I have no hesitancy in saying that the Republic Rubber Company is in hearty accord with the Minnesota law and all other movements having for their object honest advertising." The law follows:

Any person, firm, corporation or association who, with intent to sell or in any wise dispose of merchandise, securities, service or anything offered directly or indirectly by such person, firm, corporation or association, to the public, for sale or distribution, or with intent to increase the consumption thereof, or induce the public in any manner to enter into any obligation relating thereto, or to acquire title thereto, or any interest therein, makes, publishes, disseminates, circulates, or places before the public, or causes directly or indirectly, to be made, published, disseminated, circulated or placed before the public in this state in a newspaper or other publication or in the form of a book, notice, handbill, poster, bill, label, circular, pamphlet or letter, or in any other way, an advertisement of any sort regarding merchandise, securities, service or anything so offered to the public, which advertisement contains assertion, representation or statement of fact which is untrue, deceptive or misleading, shall be guilty of misdemeanor.

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MECHANICAL NOTES FOR OWNERS.

Outlining Methods of Converting Tierods into Adjustable Members---Adjustment and Lubrication of Roller Bearings---Simple Lock Nut Device.

LOST motion in the steering linkage is undesirable and a common source of trouble is wear of the bushings of the tierod yokes and sometimes of the pins themselves. In fitting new bushings the wheels should be tested for alignment and it is possible that a slight alteration of the length of the tierod may need to be made. This is a simple matter if the member is of the adjustable type, but while provision is made in the modern machine, a number of early types have non-adjustable tierods. When these members become bent through accident, etc., it is a troublesome task to align the wheels.

The tierod may be converted into an adjustable member at a slight expense, and at Fig. 1 are

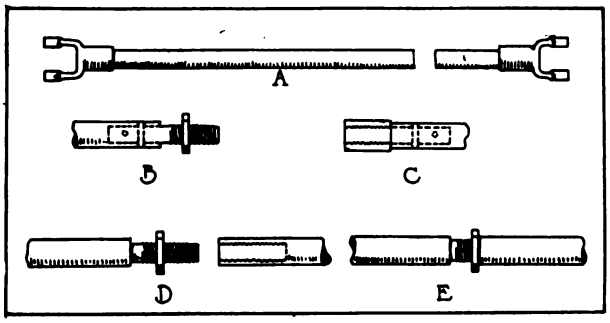


Fig. 1—Converting Tierods into Adjustable Members: A, Where the Cut Should Be Made; B and C, Method Applicable to Tierod Constructed of Tubing; D, Plan for Solid Member; E, Showing Parts Assembled and Locking Nut in Place.

presented two methods of completing the work. A is a tierod constructed of tubing which is cut near the yoke to permit of incorporating the parts B and C. The former is prepared by taking a round piece of steel and making a driving fit into the tubing, after which the piece is pinned and brazed, also threaded and a nut fitted. At C is shown the other section of the rod and it will be noted that the inserted member is slightly larger and that it is tapped to take the screw bolt. With this construction it is a simple matter to lengthen or shorten the tierod by removing one yoke end from the knuckle and screwing the yoke section in or out as desired, after which the lock nut is set up hard.

If the tierod be solid the plan at D may be utilized. The rod is cut and one end is tapped as indicated in the drawing, while the other end is turned down and threaded to fit the first part. The assembly of the rod is shown at E. It will not be necessary to cut a very long thread for adjustment as a slight increase or decrease of length will be sufficient to secure the desired alignment.

A SIMPLE LOCK NUT DEVICE.

Some components of the motor car are subject to considerable vibration and unless the nuts are locked securely it is difficult to keep the parts properly adjusted. At Fig. 3 D is a simple and easily constructed locking device utilized by the writer on a planetary transmission and where the studs holding the drive shaft to the transmission casing repeatedly loosened, although the conventional lock washers were employed.

The casing and drive shaft with one of the screw bolts are shown at C and as the end of the shaft is carried in a bearing it is essential that the plate be locked securely to the housing to preserve alignment. The locking device is illustrated at D. It is made by taking a piece of flexible sheet metal and cutting it out to the shape shown. It should be made sufficiently wide to permit of cutting out the opening for the bolt and without weakening the metal. The length should permit bending of the long ends over the top of the casing or part, also over the nut. The bolt is then slipped through the opening and attached in place, after which it is set up hard and the ends of the locking device bent over as shown at E. The parts assembled are illustrated at C. This kink may be adapted to a number of places where the nuts or bolts have a tendency to work loose. It will also save an inspection from time to time and will be of service where the parts are not easily accessible.

SAVING ASBESTOS GASKETS.

Plain asbestos gaskets are essential on some motors because of the need of varying thickness to compensate for the cylinders being slightly out of line or the exhaust manifold uneven or warped. In displacing the gaskets they are usually spoiled and new ones must be fitted. If the parts are out of line, and considerable trouble

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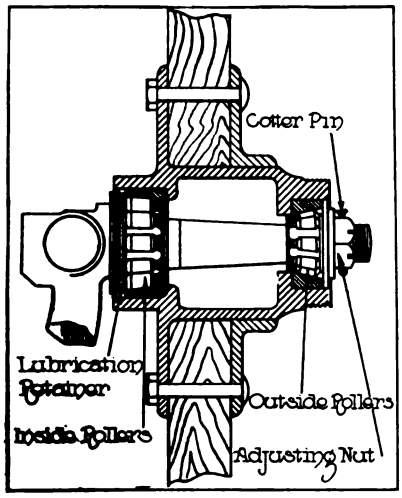


Fig. 2—Adjusting Mechanism of Roller Bearings.

is experienced in making the joint, the asbestos is apt to become broken up.

At Fig. 3 B is illustrated a gasket made of brass wire gauze and by making two of these it is a simple matter to protect the asbestos. The wire gaskets may be cut out in the usual manner by placing the gauze over the parts and tapping the openings with a ball pein hammer. The gasket should be made slightly large so that its ends may be turned over to retain the asbestos. By coating the gauze with graphite the gasket may be displaced easily and utilized a number of times.

REMOVING BROKEN STUDS.

Various methods may be employed to remove or replace a stud. Sometimes in the overhaul of the power plant a stud will be unscrewed from the crankcase because the nut has been set up too snugly or because the nut is frozen. It is poor policy to utilize a cold chisel or a Stillson, as the threads of the bolt will be ruined. By screwing down a nut, then locking a second one, as shown at Fig. 3 A, the stud may be removed or replaced, using the wrench on the lower and upper nut respectively.

ADJUSTING ROLLER BEARINGS.

Roller bearings are fitted to the front wheels on several makes of cars and while the average motorist understands the adjustment of bearings of the ball type he is apt to apply the same methods when eliminating play from the roller members. The construction of the latter, such as are utilized on the Overland machines for example, is shown in an accompanying illustration with the parts clearly marked.

To ascertain if the bearings require adjusting, jack up the front wheels and rock them sideways, taking care not to confound wear of the spindle with that of the rollers, etc. If the wheels are loose, remove the hub cap and clean the grease from the locking nut so that the cotter pin may be removed easily. The pin should be so displaced that it can be utilized.

To tighten the bearing, rotate the wheel, and at the same time screw down the notched adjusting nut until the bearing is sufficiently snug to stop the movement of the wheel. Next slack off the nut, but only enough to allow the wheel to spin. Lock and replace cotter pin. It is better to have the bearing slightly loose than too tight as the rollers may be injured. Repack with graphite grease and refill hub cap with the same lubricant. Do not use so much grease in the cap as to prevent its being screwed up home, as loss of the cap will be apt to follow.

RACING THE MOTOR.

It is noticeable that a large number of drivers race their engines to warm them up after starting on a cold day. This is poor practise and considerable damage results. When a motor is raced it attains a speed greatly in excess of that for which it was designed and the working parts are subjected to a considerable strain that is uncalled for. The valve mechanism is called upon to operate at a speed in excess of normal and the constant hammering of the parts is likely to cause breakage of the hardened parts—the cam and roller for example. If the motor must be warmed, allow it to rotate at a reasonable speed, but don't race it.

In moving the car by hand it is poor practise to utilize the steering wheel entirely, as its components are likely to be strained.

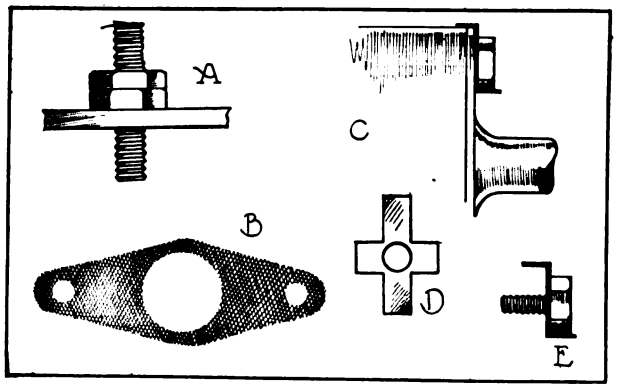


Fig. 3—Suggestions for the Owner-Repairman: A, Utilizing Two Nuts to Remove or Replace Studs; B, Wire Gasket for Preserving Asbestos Members; C, D and E, Illustrating Construction and Application of Simple Locking Device.

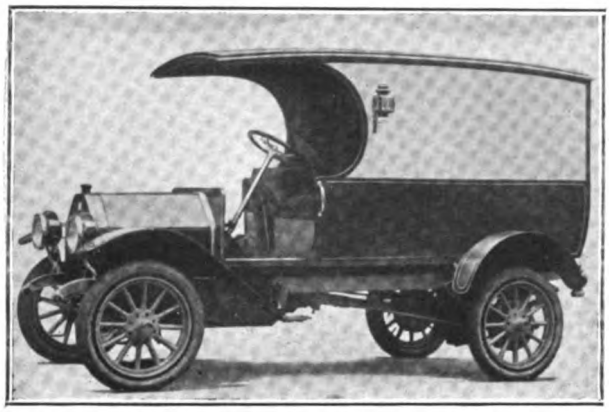
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IN THE COMMERCIAL VEHICLE FIELD.

Constructional Details of New Buick Delivery Wagon, Seven-Ton Vulcan and Worm Driven Blair—Manufacturers' Census Shows 50,000 Trucks.

THE Buick Motor Company, Flint, Mich., is presenting this season a new delivery model, in which the chassis has been specially designed for the work it is called upon to perform. Two sizes are offered, that known as No. 3 being with 100-inch wheelbase and with carrying capacity of 1000 pounds, and the No. 4 having wheelbase of 122 inches and capable of handling loads of 1500 pounds. Various types of bodies are provided to meet the requirements of the individual purchaser.

The motor has four vertical cylinders cast en bloc and is of the L head type. The cylinders have a bore of three inches and stroke of five, giving a bore to stroke ratio of 1:1.66, and while the horsepower rating under the S. A. E. formula



New Buick 1500-Pound Delivery Wagon.

is but 14.4, it is maintained that the long stroke enables the motor to exceed this very materially. All valves are enclosed, making for a quietly operating motor, as well as protecting them from foreign elements. The crankshaft is extra heavy and has three bearings. The engine is fitted with a simple detachable head and the intake manifold passes through the water jacket, thus providing for heating the mixture before it reaches the cylinders. Cooling is by the thermo-syphon system. The radiator is of the vertical tube type and is assisted in its operation by a belt driven fan. Oil is circulated by a gear driven pump, with a constant level for splash lubrication, a sight feed being located on the dash. Ignition is by magneto with a set of dry cells as reserve. An adjustable sealed governor controls the speed of the motor to a predetermined maximum.

A feature of the construction is the mounting of the engine and transmission on a subframe, making possible the removal of either separately or as a unit by withdrawing four bolts. The clutch is of the cone type, faced with leather. The transmission is selective, giving three speeds forward and reverse, with direct drive on the third speed. Final drive is by shaft to the three-quarters floating rear axle mounted on Hyatt roller bearings. The driving shaft is enclosed in a large torque tube, the forward end of which is supported by a large yoke coupled to the centre cross frame member. Stout radius rods from the rear axle to the yoke maintain the relation of the former.

The frame is of pressed steel of rugged construction, and is strongly braced and reinforced with gusset plates where necessary. The front springs are semi-elliptic and the rear full elliptic. Two sets of brakes are provided, the foot or service member being of the external contracting type and the hand or emergency, internal expanding. Both sets operate on the rear wheel drums. The driver is located at the left with centre control.

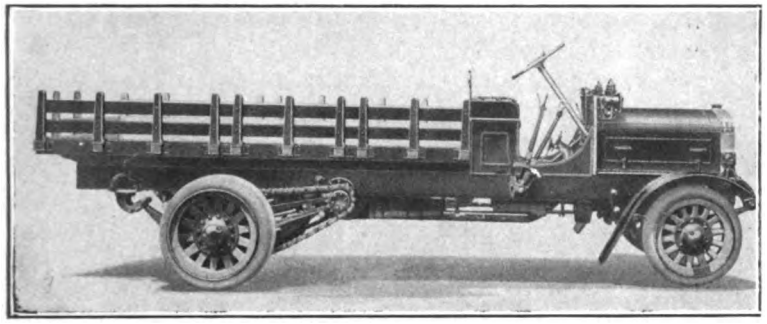
The standard body designs include: Flare board express, panel side closed door, wire screen and side and stake. Both sizes are fitted with pneumatic tires, the larger utilizing 34 by five-inch shoes and the smaller 34 by 4.5. The body length of the No. 3 is 60 inches back of the driver's seat, while on No. 4 it may be 90 to 96 inches. The speed is from 18 to 25 miles an hour, dependent upon road conditions and the service demanded.

SEVEN-TON VULCAN TRUCK.

One of Several Models Introduced by Well Known Automobile Parts Maker.

One of the largest commercial motor vehicles thus far produced in this country is the seven-ton Vulcan, made by the Driggs-Seabury Ordnance Corporation, Sharon, Penn. This concern also manufactures wagons of three, four, 4.5, five and

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Seven-Ton Vulcan, Produced by Driggs-Seabury Ordnance Corporation.

six tons capacity, and it is understood that it is planned to add machines of one and two tons. This policy has been decided upon in order that the purchaser may make such selection as will best meet his needs. The reputation of the Driggs-Seabury company in the automobile parts field for a number of years is such as to insure that it has the equipment and facilities to produce trucks of the highest standard.

The design of the seven-ton Vulcan has been very carefully thought out and it presents very large factors of safety. The motor is a four-cylinder, water-cooled unit of the L head type, with cylinders cast in pairs. The bore is 4.75 inches and the stroke 5.5, giving a rating under the S. A. E. formula of 36.1 horsepower. The crankshaft is mounted on three annular ball bearings. The cooling system has a capacity of 18 gallons, the circulation being by centrifugal pump. The radiator may be either a tubular or a cellular member mounted on trunnions on the chassis frame, and cooling is further aided by a belt driven fan. The lubrication is by a combination of force feed, utilizing a gear driven pump, and splash. Ignition is by Bosch dual system, using magneto and battery. The carburetor is of the automatic float feed type.

The clutch is a leather faced cone member, and the transmission is assembled as a unit with the jackshaft, being contained in a case carried on three points of support on two frame cross members. The gearset affords four forward speeds and reverse, and the large shafts and gears are mounted on annular ball bearings. The differential is fitted with a lock. The drive from the jackshaft to the rear wheels is by side chains. The service brake operates on the jackshaft and the emergency on the rear wheels.

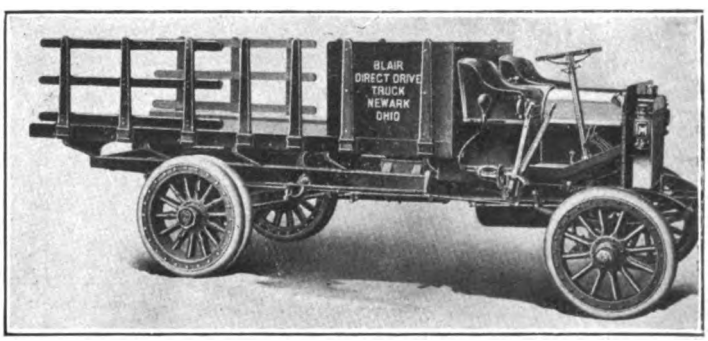
The frame is a steel channel section nine inches in width and 2.5 inches in depth, and is mounted on semi-elliptic springs 48 inches long in front and 55 in the rear, the latter being underslung and having 22 leaves. The forward axle is a drop forged alloy steel I section, and the rear a nickel steel drop forging. The wheels are 36 inches in diameter, fitted with seven-inch tires in front and six-inch dual members at the rear. The wheelbase is 156 inches and the tread 60 inches forward and 70 inches rear. The driver is located at the right and the steering gear is of the irreversible worm type. The chassis weight is 8000 pounds and its length 240 inches, 146.75 back of driver's seat.

THE WORM DRIVEN BLAIR.

Feature of the Design Is Found in the Use of Full Length Sub-Frame.

It recently was announced that the Blair Manufacturing Company, Newark, O., maker of the Blair worm driven models, was about to produce a five-ton machine, supplementing the 1.5, 2.5 and 3.5-ton vehicles previously presented and to follow the same general design. Not only is the Blair a worm driven machine, but it possesses another interesting feature in the use of a sub-frame of heavy channel steel extending the full length between the two axles.

This sub-frame is held to provide a three point suspension and to carry the weight of the power plant only. It is hinged to the main frame in front by means of steel castings and heavy hardened and ground steel hinge pins. It is cambered or "necked" at the rear, back of a large cross frame member, and this portion is hinged at right angles to the rear axle housing, extending across it. The two side members of the subframe at this point carry collars which support it on a heavy sleeve, containing the worm, and which are free to turn, although they have no



Blair Worm Driven Chassis with Stake Platform Body.

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longitudinal motion. Radius rods extend from the ends of the rear axle housing to the centre cross members of the sub-frame, and the tractive effort is transmitted through the sub-frame from the rear axle to the front cross member of the chassis main frame.

The motors are of the four-cylinder, water-cooled, L head type, with long stroke, large bearings and enclosed mechanism, fitted with governors and utilizing dual Bosch ignition. With each the motor is mounted with the cone clutch in the sub-frame, while the transmission is carried in a heavy case suspended between the sub-frame side members. There is a universal joint between the clutch and gearset and another in the shaft back of the central cross member. The transmission is selective, giving three forward speeds and reverse, the gears always being in mesh and idle only on the direct drive.

The rear axle is of the full floating type with a heavy housing. The main chassis frame is suspended on a platform of springs. It is maintained that no matter what the position of the axle through variance of road surface no excess stress is brought upon the frame or the power plant and the system of transmission, and that there is always the same position of the shaft with relation to the motor and gearset. Both brakes act on drums on the rear wheels. The seats are arranged on either side of the motor.

MAKERS' CENSUS OF TRUCK INDUSTRY.

AS THE result of a census of the industry taken by the commercial vehicle committee of the National Association of Automobile Manufacturers, that body has issued a statement that at least 50,420 machines of this type had been produced prior to 1913. An estimate of the product for the current year is placed at 56,744. In this connection it is of interest to note that the reports of registrations in the various states secured by The Automobile Journal early in the present year indicated that there were in use in the country, 50,000 commercial motor vehicles.

The committee sought information from 280 makers of gasoline machines and 32 electric vehicle producers, and reports were received from 170. It has been assumed by the committee that the remainder either were not very active or important. Eighty-five concerns made report in 1912. As a result of its knowledge of conditions, the committee feels justified in adding 25 per cent. to the figures as received prior to 1912, and 10 per cent. to those for 1912, and to the estimates for 1913, in order to allow for the machines manufactured by the concerns who failed to make report. The figures are tabulated as follows:

Reported output prior to 1911	10,374 + 25%	= 12,968
Reported output during 1911	10,655 + 25%	= 13,319
Reported output during 1912	21,939 + 10%	= 24,133
Totals	42,968	50,420
Estimated output for 1913	51,586 + 10%	= 56,744

Analysis of the reports shows that the largest and most rapid increases in numbers have been made in the 1000, 1500, 3000, 4000, 6000 and 10,000-pound gasoline machines, and in the 1000, 2000, 4000 and 7000-pound electrics. Taking into account only the companies making full reports for both years, 1912 and 1913, it is found that 35 models have been dropped by the gasoline makers and 44 new models added, while the electric producers have dropped 12 models and added five. The mean average price of all the commercial vehicles produced in 1912 was $1957.37; that of gasoline cars $1868.95, and of the electrics, $2465.18. In 1911 the average value of all gasoline trucks sold appeared from the records to be $2079.16, and for all preceding years combined, it was $1955.70; while in 1911 the average price of all electrics was $2759.66, and for all preceding years, $3369.72.

The reports of the 170 companies received in February and March, 1913, are tabulated:

	1912		1913	
	No. Cars	Aggregate Value	No. Cars	Aggregate Value
Gasoline vehicles	20,052	$37,474,308	44,245	$83,073,200
Same, value estimated*	100	162,357	1,775	2,620,847
Fire apparatus	140	843,900	232	1,422,250
Same, value estimated*	135	813,760	260	1,595,200
Gasoline tricars	58	23,610	1,500	662,500
Gasoline tractors	42	122,500	800	2,125,000
Electric vehicles	1,351	3,330,568	2,736	6,627,750
Mixed systems	59	163,800	25	108,125
Steam vehicles	2	8,025	13	54,000
Grand totals	21,939	$42,942,828	51,586	$98,288,872

*Production reported with no values given; values calculated on average prices of other vehicles of same kind and capacity.

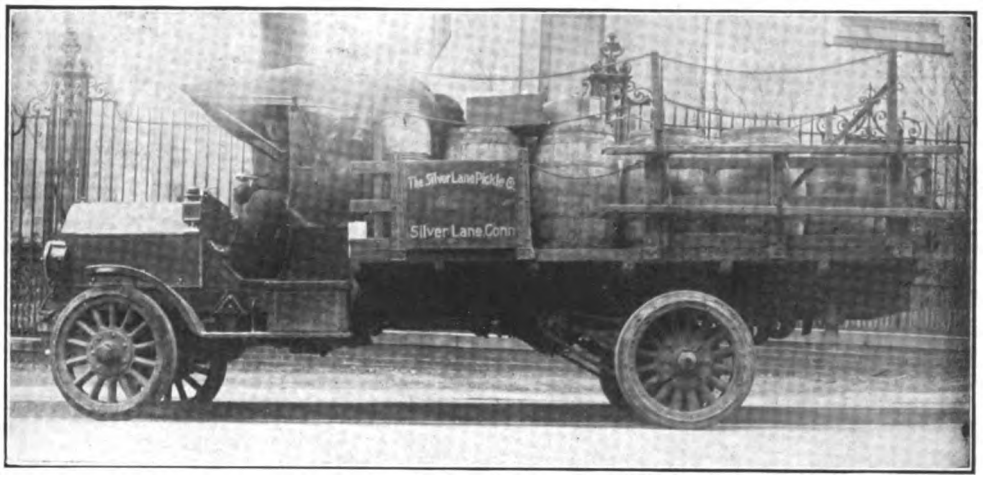
Shortly before the tornado in Omaha and the floods in Ohio and Indiana, a severe sleet storm in Chicago and vicinity necessitated the use of some 400,000 pounds of hard drawn copper wire and much line hardware for the telephone and telegraph lines in that section. This was supplied by the Western Electric Company, motor trucks being used to great advantage in hauling the material in quick time.

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TRUCK COMPETES WITH RAILROAD SERVICE.

AN INSTANCE of competing with steam or electric railroad service, in which the motor truck is able to present decided economy and efficiency, is noted in the experience of the Silver Lane Pickle Company, Silver Lane, Conn. The machine is a three-ton KisselKar, made by the Kissel Motor Car Company, Hartford, Wis., and has been in service since April, 1912.

The factory of the concern is between four and five miles from Hartford, and from this point distribution is made. The vegetables from which the pickles are manufactured are grown on the farms in Vernon and Rockville, and are hauled to the plant by the company. The business has extended until it includes customers in many of the cities and towns of Connecticut and Massachusetts, and barrels formerly were taken from the factory to the trolley or railroad freight stations. Under this arrangement the shipments were double tagged and on their arrival at their destination it was necessary for local expressmen to deliver, collect the empty containers, bring them to the freight station and reship them to the company.



KisselKar Three-Ton Truck Utilized in Delivery System of Silver Lane Pickle Company.

Under the new plan the truck is utilized in making deliveries up and down the Connecticut valley as far as Northampton, Mass., on the north, a distance of about 50 miles, and to New Haven and Bridgeport on the south. The run to Bridgeport is the longest thus far attempted, and while the round trip covers some 108 miles, the incidental deliveries and collections will bring this approximately to 120. It has been found that the run to Northampton or Bridgeport and return can be made in a single day.

More than 10,000,000 pickles were made by the company during 1912. After the purchase of the KisselKar it was used to haul the vegetables, as well as deliver the orders. It was used practically 24 hours a day in the harvest season, two crews manning it. The approximate cost of operation is $12.50 a day, as indicated by the following estimate for the year, the figures bei based upon the actual expense for a given peri·

Fuel, lubricants, etc.	$60(
Repairs, 10 per cent.	340.(
Tires, 10,000 miles guaranteed.	250.0(
Wages, driver and helper.	1456.00
Depreciation, 20 per cent.	680.00
Interest, 5 per cent.	170.00
Insurance and taxes.	199.00
Total.	$3695.00
Daily cost, 300 working days.	$12.32

To understand the value of direct delivery it is only necessary to state that with the railroad service delays not only were frequent, but at times were of extreme length. An instance that well illustrates this condition occurred when a shipment of sauer krout was sent by freight from Hartford to Rockville, a distance of 14 miles, because the truck was not that day available for the delivery. Eight days later the salesman called on the Rockville customer just as the expressman drove up with the order, which could have been sent out by the machine in less than two hours.

The company does a large business with firms in Worcester, Mass., and for the coming year it is intended to send the machine to that city, a distance of 90 miles. This will be made a two-day trip, and the Bridgeport route also will be covered in two days, because long drives mean hard work for the crew. Wherever the business will justify and within a radius of 100 miles the truck will be used for delivery and collection. Experience of the company has been such as to indicate in a thorough manner the wisdom of this decision.

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MOTORING LAWS AND THEIR ENFORCEMENT.

New Jersey's Motor Vehicle Commissioner Has Plan for Scientific Interstate License System---What Various State Legislatures Are Doing.

INASMUCH as New Jersey has occupied a position of prominence in the matter of automobile legislation, motorists undoubtedly will be interested in the opinion of Job H. Lippincott, state commissioner of motor vehicles, who believes that he has a plan for an interstate license system which will solve the problem of interstate touring and its application to the maintenance of state roads. Mr. Lippincott has outlined his position in Suburban Life of New York City in part as follows:

The relation of the state toward automobile regulation has been neither well defined nor reasonable. A strange lack of scientific treatment has been apparent, with the result that motor vehicle laws generally are little better than a series of expediency rules and class legislation. The causes which have brought about this condition are partly political and partly due to the modernity of the subject.

In each state the automobile has engendered a class and sectional feeling, both of which are just disappearing. The farmer has opposed the automobile and the man of the city has favored it, thus creating a legislative situation which has caused motor vehicle laws to be a patchwork of concessions and compromises. Motor vehicles have now so rapidly increased in number, and have recently been placed to such diversified uses that all opposition is disappearing, thus making it possible for state governments to adopt a proper and reasonable method of licensing and regulating.

Motor vehicles, to a greater degree than any other class of road vehicles, are interstate in their use; yet, under our laws, the licensing power, and thereby much of the power to regulate, rests in the state in which the owner is resident. The great number of business and pleasure machines passing from one state to another has raised questions of a very grave nature concerning the relations which the several states should bear toward machines licensed by a sister state. The result has been a system of retaliatory laws, euphoniously called reciprocity; or, to be specific, an exchange of privilege without an exchange of regulation or revenue.

As the sole possible basis for licensing cars and drivers is, first, to obtain revenue for the building and the repairing of the roads necessary to motor vehicle travel, and second, by revoking the license to provide a summary method of dealing with those abusing the privilege, it is difficult to understand why the states have drifted so far from the fundamental principles. The present laws, allowing free passage of machines from one state to another, disregard both of the above fundamentals.

The increased use of our roads for motor vehicle travel, and the increased difficulty of maintenance and added expense of road building, make it necessary that every machine using the roads of any state bear a just share of the cost of construction and maintenance. On this generalization a system should be constructed that will automatically meet the foregoing requirements.

Reciprocity, as now established, is a failure. It provides for privilege without regulation; it increases expenses and decreases revenues. Its provision for a set number of days of free touring is practically unenforcible without a vast and expensive machinery of inspection. Its authors never intended that it should be enforced, and framed it for that purpose. Under it the road systems of states like New Jersey and Connecticut are fast approaching ruin, without the necessary money to reconstruct. It has benefited no state, and it has injured all. Yet the nature of the motor vehicle travel demands that the motorist, whether for business or pleasure, be not subjected to constant annoyance and inconvenience, by being compelled to conform to repeated registration.

The system, therefore, which should be evolved must be automatic, both as to regulation and revenue; entailing only one registration, and granting sufficient privilege to make interstate travel possible without annoyance or delays. The suggestion which is recommended for discussion is an interstate license system. In the elaboration of the interstate license the following fundamentals are suggested as a basis for the drafting of a model license law:

1—Establish an interstate license to be issued by the motor vehicle department of the state in which the owner of the vehicle so licensed is resident.

2—Have the registration tags used on cars bearing such license, through color scheme, numbers, series, initials or otherwise, indicate the states in which such privilege is granted.

3—Charge for such license on the basis of horsepower. Appropriate such fee to the use of the state in which the owner is resident, and charge an additional fee computed on a percentage of the regular fee for each additional state to which the license privilege is extended.

4—The department granting such interstate license would then notify the departments of all the states comprised in such privilege, giving character of the registration tag issued, and forwarding a check for such additional fee charged on a per state basis.

5—The department of any state comprised in such interstate license to have the power to revoke, cancel or suspend such license, insofar as it extended to the state taking such action.

6—The revenue so derived from such license to go into the general motor vehicle fund of each state, and to be used by such state for the repair of the roads.

ZONE RECIPROCITY SYSTEM.

New Hampshire Legislators Working Out New Plan for Border Owners.

Several amendments to the motoring law in New Hampshire are under consideration by the present legislature. These include a new schedule of registration fees for "non-passenger carrying" motor vehicles, which may be interpreted to mean motor trucks, as follows: Not over one ton, $10; one to two tons, $12.50; two to five, $15; more than five, $20. Machines used solely for hire are to be registered at a flat rate of $10. Motorcycles are to be permitted to utilize an attachment bearing an additional wheel.

The chief item of interest is a new reciprocity provision for residents of border states, which has been styled a zone system. The wording of the amendment is given below, and it may be added that the fee is placed at $2:

A motor vehicle owned by a non-resident of this state who has complied with the laws of his state relating to registration and licensing of motor vehicles, who has a bona fide actual residence in a state granting like privileges to residents of this state, which residence is located within 15 miles by highway of the border line of

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this state, may be operated upon the ways of this state distant not more than 15 miles from the border line of his state, if application for the registration thereof is made in accordance with the provisions of section 2 and the proper fee, provided for in section 26, is paid, and the said motor vehicle is duty registered by the secretary or his authorized agent.

FIFTY CENTS A HORSEPOWER.

New Michigan Law Takes Automobiles from Jurisdiction of Local Tax Officers.

Under the old motoring law in Michigan a registration fee of $3 was required, but automobiles were subject to local taxation. The Senate has passed the Allswede bill, which takes the cars from the jurisdiction of the local taxation officers and imposes a state tax of 50 cents a horsepower, the money thus raised going to the state highway fund.

It is estimated that the income from this source will net between $600,000 and $800,000. Some objection to the bill has developed in certain quarters because it has been figured out that a $3000 car of 40 horsepower would bring an average of $60 in taxes, but only $20 under the proposed law. Good roads enthusiasts are particularly anxious that the bill shall be enacted and receive the governor's signature.

NEW INDIANA LAW.

Motorists of Hoosier State No Longer Able to Register at Nominal Fee.

After July 1 owners of automobiles in Indiana will be compelled to pay an annual registration fee of from $5 to $20, instead of being able to secure a perpetual registration at a cost of $1. A chauffeur will be required to pay $2 a year after passing examination. Cities are not permitted to exact a local fee. The schedule for vehicles is as follows:

Motorcycles, $2; automobiles of 25 horsepower or less, $5; 25-40, $8; 40-50, $15; over 50, $20; electric machines, $3; commercial vehicles, $5; manufacturers and dealers, $25, and $1 for each duplicate marker. It is anticipated that a good roads fund amounting to several thousand dollars will result.

TO AID GARAGE KEEPERS.

Senator Bailey of Maine Legislature Explains Need for His Measure.

The bill introduced in the legislature of Maine by Senator Bailey, seeking to protect garage owners, failed to pass both branches and has gone into conference. The text of the bill is as follows:

Whoever puts an automobile in a public garage or any other place where automobiles are stored for hire, and without having an express agreement for credit, procures supplies, accessories or accommodation for himself or said automobile, and with intent to defraud the owner or keeper of said garage, removes or causes to be removed any such automobile from such garage without paying the proper charges due for repairs, supplies, accessories and accommodations furnished thereon, shall be punished by imprisonment not exceeding three months or by a fine not exceeding $100.

In explaining the need for this legislation Senator Bailey cited the fact that the courts of this country have held that a public automobile garage is practically in the same position as a public inn keeper, and must receive any person who comes there with his automobile for accommodation. The supreme court of Michigan has expressly stated that this is the law. Senator Bailey holds that with the increasing number of motoring tourists it has become necessary to afford the garage keeper protection in this respect.

LEGISLATIVE BRIEFS.

Motorists in Illinois are seeking the passage of an act prohibiting local ordinances respecting the speed of automobiles, and the examination and licensing of chauffeurs.

One of the bills enacted by the Missouri legislature at its recent session was that making it a felony to take, use or tamper with a motor vehicle without the consent of the owner.

Delaware has joined New York in authorizing the governor to appoint a commission to confer with similar commissions from other states in the matter of securing uniform motoring laws.

The circuit court in Jackson, Miss., has decided that the Mississippi motoring law, requiring registration of automobiles, is constitutional. The action was brought against H. C. Lawrence, and is in the nature of a test case. The matter has now been appealed to the supreme court.

The Massachusetts senate has killed the bill to provide that in collection of automobile damages proof that the injury was done by a particular car should be evidence that the machine was being operated by the owner or his servant. This provision appears to be similar to that which recently was declared unconstitutional by the Michigan supreme court.

Amendments to the motoring law in New Jersey, passed recently, include the following provisions: All rear lights shall shine on the rear number plates so that the number may be visible for at least 50 feet, identification markers shall be placed so as not to swing, and motor vehicles bearing licenses of other states which violate the law in New Jersey may have the reciprocity privilege suspended against them and they are not to be permitted to enter the state again.

After a failure to secure reciprocity with Maryland, the commissioners of the District of Columbia recently promulgated a rule that non-residents should be compelled to pay the same registration fee that their home states charged against residents of the District of Columbia. It was not discovered until later that this rule would act against all members of Congress and officers of the federal government, who are of course legally residents of the states they represent. An amendment has been passed construing these persons as residents for the purpose of securing automobile licenses, the fee for which is $2.

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FRENCH MOTOR STARTS COLD ON KEROSENE.

M. BELLEM, a French engineer, has produced a four-cycle motor, which is claimed to operate equally well on kerosene or crude oil and to start as easily on heavy fuels when cold as does the conventional engine utilizing gasoline. It weighs approximately the same as the ordinary automobile motor and a feature of the invention is that it may be applied to the standard designs; in fact, most of the experimental work has been accomplished on converted units.

The usual carburetor or vaporizer is dispensed with, the fuel being pulverized by being injected into a vacuum formed by allowing the intake valve to open only after the piston has completed a certain portion of the suction stroke,

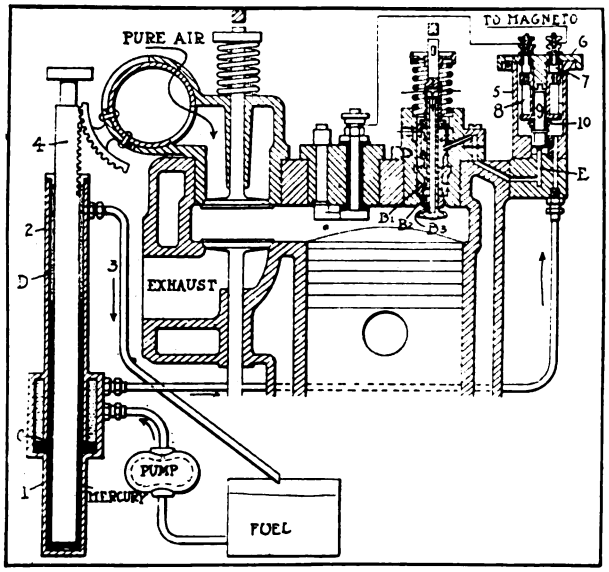


Fig. 1—General Plan of Bellem Heavy Fuel Motor, Utilizing Distributor and Magnetic Coil—The Feature of the Invention Is Pulverization of the Fuel by Injecting It into Vacuum.

and instead of admitting a mixture, pure air is allowed to flow through. The valve does not open until 30 degrees before lower dead centre and it closes about 30 degrees after lower dead centre. Both the intake and exhaust valves are mechanically operated, the latter having the usual timing.

The intake valve mechanism comprises two principal parts, a pressure regulator and a distributor. The pressure is controlled through varying the height of a column of mercury and the amount of pressure utilized does not affect the quantity of fuel. The distributor, the opening of which is independent of motor speeds, is controlled by a magnetic coil, current to which is supplied by a low-tension magneto. This electrical control renders the opening of the distributor dependent on the weight of a needle valve and the strength of a spring.

The intake valve is of the automatic type and is in combination with the pulverizer. With the main valves closed there is considerable depression in the cylinder during the first part of the intake or suction stroke. The automatic valve shown in detail at Fig. 2 B is opened by the suction of the piston. The charge of fuel is brought up to the valve under pressure. At the same time a certain amount of air and the liquid are brought in from A and B, through the openings B 1 and B 2 respectively. Pure air is then drawn through the stem of the valve, which is hollow, and holes B 3, completely pulverizing the fuel.

The delivery of the fuel under pressure is accomplished by the utilization of the pressure regulator and the distributor. The former is illustrated at Fig. 3, and is supplied from the tank by a pump. It comprises a metal vessel 1, containing mercury, and welded to it, a metal tube the lower end of which is level with the top of the mercury. Located in the tube is a plunger 4, capable of being raised and lowered in any convenient manner, and, according to its position it varies the height of the column of mercury d in the tube 2. The pressure of the fuel in the chamber c is regulated by the column of mercury.

The overflow or excess of fuel passes through the mercury column and down an overflow pipe 3 to the tank. The feed pump has a capacity slightly greater than that of the motor under full power. The quantity of fuel flowing through the return pipe is negligible and no mercury is carried through with the fuel. The plunger is connected to the air valve, and a single operation, controlled either by a governor or by hand, determines the pressure of the fuel to the distributor and the amount of air admitted to the motor.

A feed pipe connects the pressure chamber with the distributor at the right of the automatic valve. As the pressure is variable the distributor is not called upon to regulate the quantity of fuel as its opening must be constant and independent of motor speed. An aperture which would permit of the passage of the proper amount of fuel at 1000 revolutions a minute would be too large at 500 or less if a mechanical control were utilized. There would also be a possibility of the

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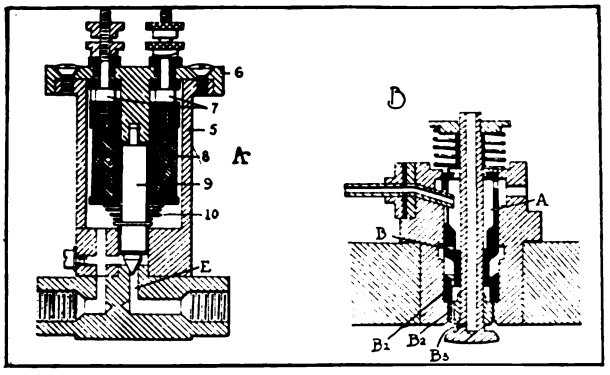


Fig. 2—Details of the Bellem Motor: A, Magnetic Control, Current to Which Is Supplied by Low-Tension Magneto; B, Automatic Valve and Ports for Fuel and Air.

engine stopping with the valve open if a mechanical member were employed and the fluid would continue to flow until the pressure fell.

As previously mentioned the control is magnetic and the device shown at Fig. 2 A comprises a soft iron core 5, with a cover 6, to which is secured the coil 8, by means of insulated terminals 7. In the centre of the coil is a needle valve 9, which is held on its seat by a coil spring 10. At the instant of breaking contact on a low-tension magneto the needle valve is raised from its seat and the fuel under pressure in the feed pipe passes through E to the pulverizer. The opening of the valve is practically instantaneous and depends on the weight of the needle valve and tension of the spring. The length of the opening is obviously constant, whatever the speed of the motor.

The models employed in experimental work were equipped with an ordinary type of high-tension magneto and a low-tension instrument was utilized for supplying current to the magnetic distributor. The strokes of the motor are the same as with the conventional engine and those converted have generally been between 60 and 70 pounds a square inch.

Strong claims are made for the pulverizer, and in a recent test a single-cylinder demonstrating model was cranked with the ignition cut off and the engine cold. Tests made of the exhaust showed that the vapor contained no traces of condensation. The inventor claims he obtains cold vapors. Among the tests to which the motor was subjected was that of supplying the circulation system with cold water from the city mains and after the power plant had stood over night. It started on the quarter-turn and the test was repeated several times with intervals between the starts and after flooding the water jackets with cold water.

A single-cylinder Bellem motor, having a 3.9-inch bore and 5.9-inch stroke, compression 71 pounds to the square inch, was tested at the laboratory of the Automobile Club of France. The engine was started cold on kerosene and the first test lasted two hours. The second was on alcohol and the third on crude oil. The last named tests were of one hour each. The acceleration from 183 revolutions a minute to maximum speed under load was particularly easy. The rotative speed with kerosene was from 811 to 820 revolutions a minute and the effective horsepower was from 4.9 to 5.1 with a fuel consumption of 1.42 gallons a horsepower-hour. The specific consumption of kerosene, gallons an hour, was .142.

With alcohol the motor was run at 773 revolutions a minute, developing 5.1 horsepower, and the fuel consumption an hour was 1.2, gallons a horsepower-hour .214. A lower rotative speed was observed with crude oil, 760 revolutions a minute and the effective horsepower was 4.25, consumption gallons an hour .396 and specific consumption gallons a horsepower .920. The Bellem motor is adapted to marine, stationary or automobile use and as previously pointed out the invention can be applied to conventional motors. It is claimed that licenses to construct it have been secured by Delaunay-Belleville, and by Sautter & Harle, a French firm that is employed largely on the work for the army and navy.

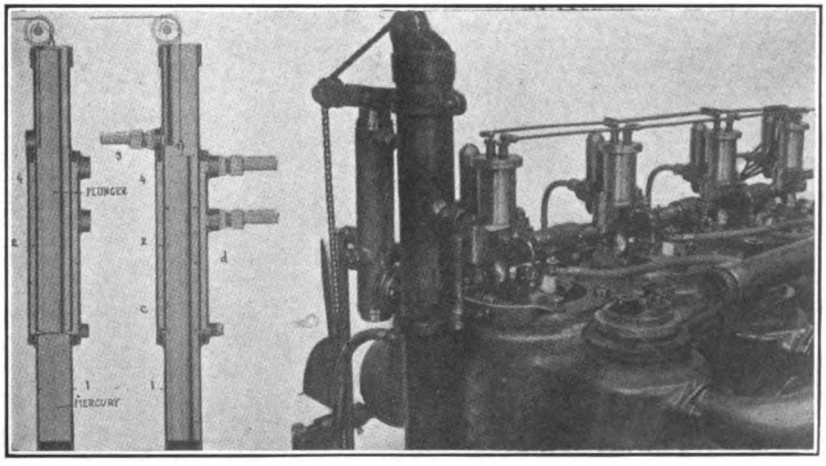


Fig. 3—At Left, Details of Fuel Pressure Device; at Right, Top Appearance of Engine When Equipped with Fuel Pulverizing Apparatus Utilized by Bellem.

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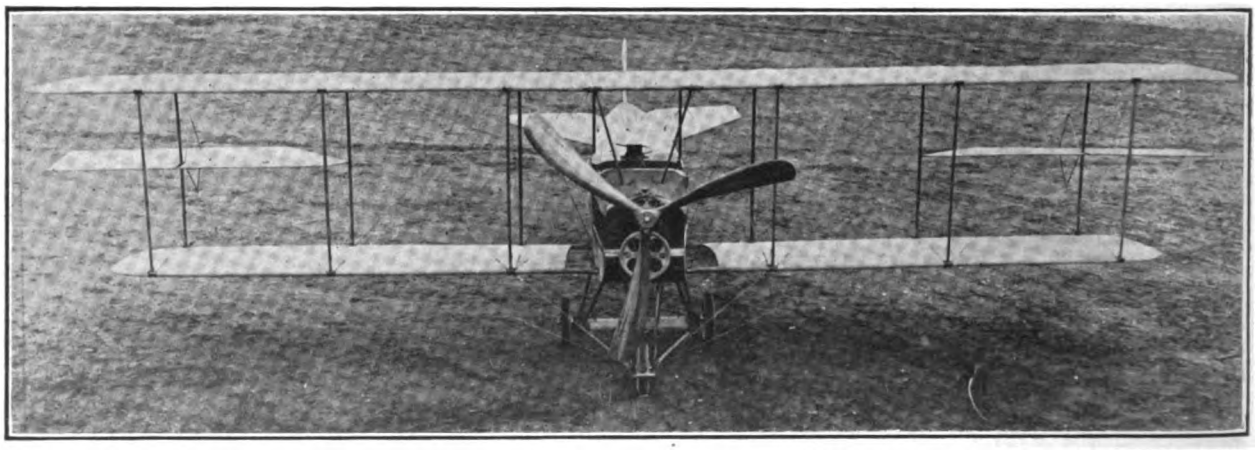
CURTISS MILITARY TRACTOR BIPLANE.

HEREWITH are presented illustrations of the new Curtiss military tractor biplane, which differs in many respects from the standard Curtiss machine. The installation of the engine, radiator and screw at the front would be sufficient to change the appearance of the assembly very materially, but it will be noted that the screw is three-bladed instead of two, the fuselage has been entirely enclosed and the main plane formation has been arranged so as to be folded against the side for easy transportation over the road. The empennage follows closely that adopted for the Curtiss flying boat, described in detail in a recent issue.

The wings are made in one piece on either side of the chassis. The beams are very strong, heavy at the inner end and tapering all the way to the tip, calculated to give maximum strength proportioned to the load at each point and at the same time to reduce the weight. The chassis is but 42 inches wide, and when the wings are removed and folded along the side the overall width is about 65 inches. With a tread of 56 inches it readily may be seen that the chassis accommodates itself conveniently to the standard highway.

The fuselage is constructed of four members of white spruce, tapered from the rear beam to the extreme end. A new system of wiring and bracing is used, this requiring no holes through the corner members, so that a lighter piece may be utilized and the same strength secured as with a larger one fastened in the ordinary manner. The tail surfaces and elevators, with demountable stabilizers and vertical fins, are easily detachable for packing. The entire fuselage is covered to reduce head resistance, and the seats are placed side by side. In order that a good downward angle of vision may be obtained, a space of 12 inches is left alongside the fuselage, out to the first rib on either side.

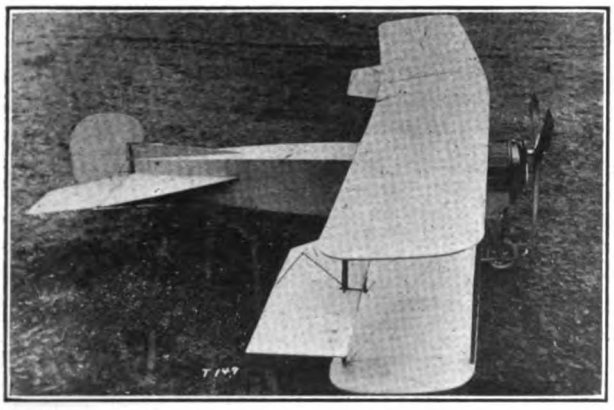
The engine is located directly in front of the operators and the carburetor projects through the dash into the cockpit, where it may be adjusted by either occupant and where it is at all times under observation. The gasoline tank is located under the seats and has a capacity of 40 gallons. A two-gallon auxiliary tank on the dash is kept supplied from the main tank by a pump operated by the motor. A plate glass window in the auxiliary tank answers two purposes: The level of the supply may be noted and also the stream of gasoline coming from the main tank. If for any reason the pump should stop working, it is only necessary to throw over a small lever, controlling a distributing valve, and a few strokes of a hand pump will restore the level.



Front View of Curtiss Military Biplane, Showing Three-Bladed Tractor or Screw, and Provision for Folding Main Plane Formation.

The three-bladed tractor screw, nine feet in diameter, is driven by a roller chain from the engine shaft. The motor is fitted with a 22-pound flywheel, and the Diamond roller chain is of .75 inch width and 1.25 inches pitch. This runs over a 16-tooth sprocket on the engine and a 30-tooth sprocket on the propeller shaft. The chain pull and propeller thrust are cared for by a large sized Shafer ball bearing and the rear end of the propeller shaft is carried by a Hess-Bright radial bearing. The engine is mounted low and the centre of thrust is located at the centre of resist-

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Three-Quarter Top View of New Curtiss Tractor Biplane, Presenting Fuselage and Tail Formation.

ance. The centre of gravity is slightly below the centre of lift. The radiator is on the forward end just back of the screw.

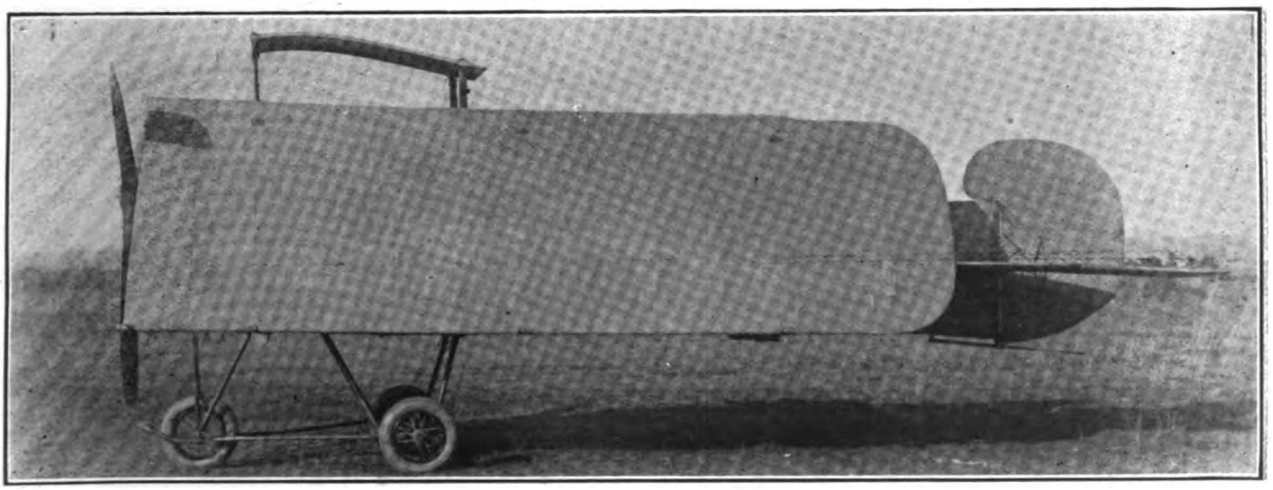
The principal outside dimensions are: Spread, overall, 28 feet four inches; spread, top plane, 37 feet four inches; chord, five feet one inch; distance between planes, 66 inches; length, 24 feet; approximate weight, 1050 pounds; approximate speed, 50-55 miles an hour; approximate climbing speed, 150 feet a minute; carrying capacity, 600 pounds.

Interest in trans-Atlantic flying has been renewed by the offer of a prize of $50,000 by Lord Northcliffe of London, England, for the first aviator to make this trip in 72 hours. It is understood that no less than five aviators have signified their intention of competing for the award. This makes the third aviation prize offered by Lord Northcliffe, his first being for a flight from London to Manchester, and his second for one from London to Edinburgh. Some criticism has been offered in this latest instance, because of the time limit. The entrants include Gordon England and Col. Cody of Great Britain, Bleriot of France and Rumpler of Germany.

A grand prix of some $80,000 is offered in France for the apparatus which in the minds of a committee is considered of exceptional merit from the point of view of improving the stability of aeroplanes. The competition is to be international, and is to be conducted under the auspices of the French government, which is to have an option, until Jan. 1, 1915, on the purchase of the invention. To qualify the apparatus must have been continuously employed during a flight of 100 kilometers (about 62 miles) over a closed circuit and at a minimum speed of 60 kilometers an hour.

The Aero Club de France is to offer another prize of $2000 for the longest flight without alighting during 1913. The first 1000 kilometers must be made over an out-and-home cross country course, after which the competitor may continue as long as he sees fit over a closed course, only completed circuits to count. Each competitor must carry two sealed barographs, and one record must be complete or the flight will not be recognized.

It is understood that Harold F. McCormick, son-in-law of John D. Rockefeller, is the first American civilian to secure an hydraeroplane for his private use. He has purchased a Curtiss flying boat, which he will utilize in making trips between his office in Chicago and his home at Forest Lake, 25 miles distant, along the shores of Lake Michigan according to the announcement.



Side View of Latest Curtiss Product, with Wings Folded Ready to Be Towed Along the Highway.

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LATEST REPORTS FROM FLOODED DISTRICTS.

WHILE the early reports from the flooded districts in Ohio and Indiana, as published in the last issue of The Automobile Journal, were highly reassuring, subsequent information places the industry in a still more favorable light. One concern, the Republic Motor Car Company, Hamilton, O., which was reported from Fort Wayne, Ind., as a serious loser, writes that while the city was badly devastated by the flood the Republic factory was not at all damaged. Shipments were delayed for a week or 10 days, but the company was in a position to resume regular deliveries before traffic conditions had returned to normal.

The Esterline Company, Lafayette, Ind., maker of electric lighting and starting systems, was able to remove thousands of dollars' worth of valuable material, through the enterprise of its engineers. At 7 in the morning a gauge was established and hourly readings were taken until 10, at which time the engineers predicted that the levee would overflow between 2 and 3 in the afternoon. The overflow came on schedule time and at 6 in the evening the factory buildings were under 18 feet of water.



The Esterline Plant at Lafayette, Ind., as It Appeared When Under 18 Feet of Water.

In the meantime, the company took from its buildings about $100,000 worth of merchandise and tools, all its records and office furniture and fixtures. The belts were removed from the machines and the latter painted with heavy grease. It is estimated that this precaution saved a loss of at least $60,000. The finished goods removed from the plant were sufficient to take care of customers for three weeks, and the tools and machinery were shipped to Indianapolis, where the new plant was opened April 15.

The Motor Car Manufacturing Company, Indianapolis, Ind., maker of the Pathfinder, adopted a course somewhat similar. When the officials of the company learned that the levee was in danger the entire day was spent in elevating office furniture, files, desks, etc., and finished cars, uncompleted chassis, complete stock of parts, tools and all movable machinery were taken to the second floor. When the flood came it was unable to damage the company seriously.

The Speedwell Motor Car Company, Dayton, O., appears to have escaped serious loss in a somewhat miraculous manner. The pressure of the flood upon the Big Four railroad bridge and embankment, about a quarter of a mile from the plant, was so great that they gave way as the water reached within two squares of the Speedwell factory. This proved sufficient to retard the rise.

Forty employees of the Dayton Engineering Laboratories Company, maker of Delco systems, were caught in the building and were prisoners for 48 hours. During that time they rescued 30 men, women and children, who floated to them on wreckage. By establishing a wire trolley across streets and over the tops of buildings, and with the aid of people marooned on the roofs of other factories, they were able to secure a food supply, this being cooked by electricity generated by an automobile motor. The finished stock was on the third floor and was undamaged.

The Maxwell Motor Company, successor to the Dayton Motor Car Company, reports a loss of $50,000 as a result of the flood in its Dayton plant. The American Tank & Pump Company, with main offices in Cincinnati, has a Dayton factory which was in the heart of the flooded district, approximately 12 feet of water being in the plant. It reports no serious damage, although its patterns, etc., were covered with mud, necessitating considerably delay. It resumed operations, under difficulties, previous to April 8.

The water in the plant of the Brown Commercial Car Company, Peru, Ind., averaged about

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two feet deep, and while the property damage was but little and the stock loss was not great, the concern was inconvenienced through the necessity of thoroughly cleaning the factory. Part of the goods damaged was of a character which could easily be replaced, and the company was not seriously handicapped.

The Model Gas Engine Works, Peru, Ind., foresaw the flood and oiled all its machinery in preparation therefor. Being located on the highest point of ground in the city, the water only reached a depth of 10 inches, as against 30 feet in some sections, and three days afterward the plant was working with full force.

The Northwestern Chemical Company, Marietta, O., reports four feet of water in the top story of its factory and a heavy merchandise loss. It expected to resume operations before April 15 and hoped that deliveries would not be delayed longer than a week or two.

The Arbenz Car Company, Chillicothe, O., maker of Arbenz cars, had some water in its plant, but expected to resume normal operations within a short time. The Crescent Motor Truck Company, Middletown, O., reports no damage, as the water did not reach its plant.

Some mention was made in the last issue of the excellent work done by automobiles in the work of rescue and rehabilitation. Motor trucks were particularly valuable in this respect. In Dayton these vehicles removed over 1000 dead animals and hundreds of tons of debris from the streets in one week.

Although several dealers lost heavily, there is every evidence of optimism in the reports from these. In Dayton, where the dealers were the heaviest losers, preparations were soon made to continue the business. The Twyman Motor Car Company, Studebaker distributor for southern Ohio, opened its Dayton store as refuge station No. 1, within 20 minutes after the receding water made entrance possible. For several days tween 500 and 600 people were fed there. Another concern was early in the field with the following announcement of its future policy: "Hurrah for Greater Dayton. Orders promptly filled here."

QUALITY, NOT QUANTITY.

Mercer Automobile Company Believes in a Policy That Leads to Specializing.

Maintaining that automobile manufacturing development, particularly during the past two years, has proven the existence of a market for cars of a distinct class, each selling at a different price and appealing to buyers having individual tastes, the Mercer Automobile Company, Trenton, N. J., believes in a policy that leads to specializing. Since its organization some five years ago this concern has followed the plan of building machines of quality rather than in quantity, and its entire attention is focussed upon the production of two chassis models, both of which are calculated to meet the demand for a medium weight car. One of these chassis is fitted with four and five-passenger touring bodies and the other as a roadster.



Packard Trucks Engaged in Relief Work in Dayton, O., Taking on Supplies at Memorial Hall.

The company points to the fact that Mercer cars have won an enviable reputation in this field, and while this is due in a measure to the success which they have achieved in contest work, it is worthy of note that even in racing many of the victories have been won by owner's machines, entered without the knowledge of the factory organization. The officials of the company state as their belief that the future of the automobile industry will see greater attention to specialization on the part of those makers who expect to become permanent factors in the motor car field.

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THE REPAIR SHOP AND GARAGE.

Running In Bearings with Motor Operating on Coal Gas—Removing Carbon from Cylinders by the Ozo Process—New Motor Fuels.

AFTER fitting new bearings to a motor it is considered good practise to "run" them in on the block before replacing the power plant in the chassis. While this may be accomplished by utilizing the flywheel of the motor and a belt drive, or by operaitng the engine under its own power, the former may not always be convenient. The latter plan involves expense owing to the present high price of gasoline. Coal or illuminating gas is utilized by several English car manufacturers, who give their motors a thorough testing before the road work. The methods employed are presented at Figs. 1 and 2, respectively, and are of interest in that expensive fittings are not

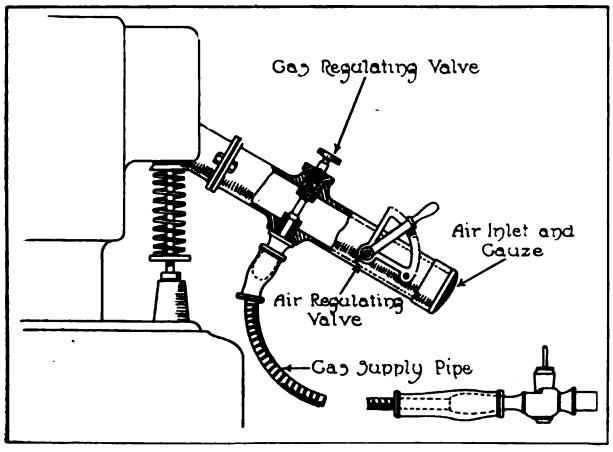


Fig. 1—Utilizing Coal Gas When Carburetor Is Equipped with an Auxiliary Air Intake.

required and that considerable economy is effected.

The drawing at Fig. 2 illustrates a simple method in that the existing carburetor is retained and the plan may be utilized where all of the air passes through it. As will be noted by the sketch a tapered wooden plug is fitted to the air intake of the vaporizer. Six holes of .125-inch diameter are drilled in the plug member, into which the rubber supply pipe is inserted. The supply of gas is controlled by a stop cock, the latter permitting of regulating the mixture. The conventional throttle is utilized for controlling the motor speed.

The plan outlined at Fig. 1 is adaptable where the carburetor is equipped with an auxiliary air intake in addition to the fixed or low speed member. When this form is employed the intake pipe is removed and a short pipe fitted in its place, this having one end covered with a fine gauze. The latter serves as the air intake. Between this and the motor is a simple butterfly throttle valve, which controls the supply of air. The gas enters the pipe member by a nipple, the outlet of which is adjustable by another valve. Connection between the source of supply and the nipple is by a flexible tube.

The motor is operated under a partial load and the saving in fuel expense is said to be considerable, especially when it is remembered that in manufacturing the engine is "run in" for some time. It is estimated that about 200 cubic feet of illuminating or coal gas corresponds to a gallon of gasoline. As the cost of gas is approximately $1 for 1000 cubic feet, the economy of the methods outlined is manifest.

NEW MOTOR FUEL.

A new motor fuel called parol has been invented by two men in Johannesburg, South Africa, and it is held to be superior to gasoline in efficiency and much cheaper. It is made from kerosene, its conversion being accomplished by a chemical process and without the use of heat. Aside from the chemicals employed the only accessories required for the preparation of the fluid in large quantities are tanks, pumps and mixers. It is claimed that by means of the chemical process utilized that property which creates carbon and soot is removed, and that the strong odor of kerosene is also eliminated when the motor is operating on the fuel.

The kerosene utilized in tests is of 150 fire test and the cost of parol as a finished product is estimated at about 50 per cent. more than kerosene and 25 per cent. less than gasoline, measured by the present prices. In addition to being more economical, greater efficiency is claimed than with gasoline, while it is stated that the motor may be started as easily as with the conventional fuel. It is adaptable to any ordinary type of carburetor and motor.

A test was made of parol with a model T Ford car carrying five persons from Johannesburg to Pretoria, 36 miles over exceptionally hilly roads.

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The distance was covered in 1:40:00 and 72 miles were completed on two and two-thirds gallons, or about 27 miles to a gallon. It is stated that

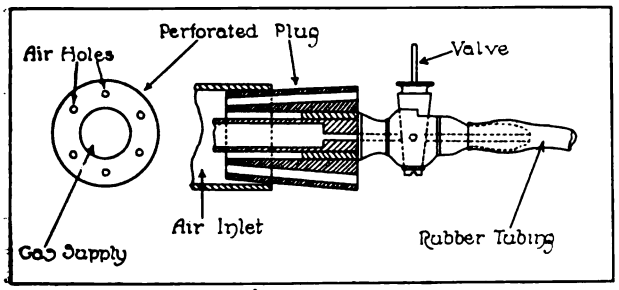


Fig. 2—Method of Supplying Coal Gas to Carburetor and Operating Motor When "Running in" the Bearings.

the motor ran much cooler than with other fuels and that no odor or smoke was noticeable. The new fuel is attracting considerable attention in motor circles because of its withstanding all tests successfully.

OZO, A CARBON DESTROYER.

The progressive repairman does not hesitate to install time and labor saving devices. Not only is he benefited, but the customer as well, in that the latter is saved considerable expense. The cost of removing carbon from the cylinders of a motor varies, but in the majority of instances it is necessary to displace the cylinders to clean out the deposits, and the entire work not only takes time, but the labor is costly.

A carbon removing outfit, which not only is said to be practical, but capable of doing the work at slight expense and in short time is the Ozo, marketed by the Ozo Company, 18 Tremont street, Boston. Its principle feature is that the accumulations may be removed without any other work than taking out the spark plugs or valve caps, and the maker states that an ordinary four-cylinder motor may be cleaned in 20 minutes.

The system does not include chemicals or liquids, a harmless gas being introduced into the cylinders where it burns the carbon and without any accompanying flame. At Fig. 3 is presented the outfit and the sketch shows the method of operation. The gas stored in a container provided with suitable valves, etc., passes through a retarding chamber or regulator, which is employed for the purpose of reducing the pressure to the required number of pounds.

It then flows through a rubber hose to the automatic torch, attached to which is a flexible tube. The latter is inserted through the spark plug or valve cap opening into the cylinder and the gas uniting with the carbon destroys the latter entirely. Suitable controls are provided for the workman and it is stated that the operation is so simple that the work may be accomplished easily by the most inexperienced.

The Ozo method has been adopted by a number of garages and service stations and its principle is similar to that employed by leading gas engine manufacturers abroad. Complete details will be forwarded by the company on request.

FITTING WIRES OR CABLES.

In rewiring the car and when the leads pass through the battery box, floorboards, etc., it is sometimes difficult to start the wire through the opening because the diameter is less than that of the lead. The usual practise is to ream the hole larger. When wires are slightly smaller than the opening they may be started by placing the end to be inserted on a flat, hard surface and rolling the insulation with another piece of hard, flat material. This will constrict the end of the insulation so that it may be readily inserted and drawn through.

TESTS OF BENZOL.

According to tests conducted by the maker of the Napier, an English car, benzol is more satisfactory as a fuel than gasoline. Brake horsepower tests with a 15 horsepower Napier showed that 28.3 horsepower was developed with gasoline and 28.6 with benzol. Although the gain appears slight the fuel consumption worked out

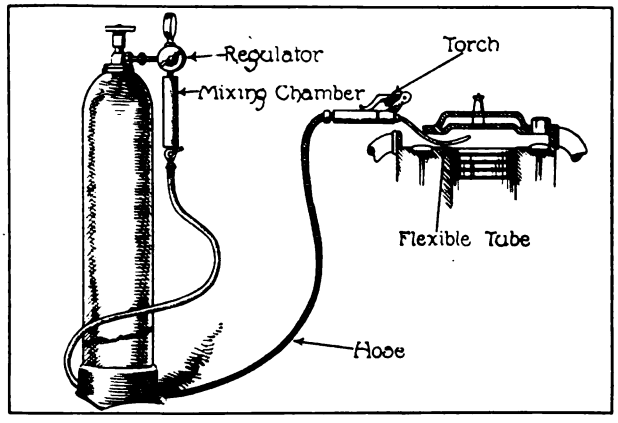


Fig. 3—Ozo Carbon Destroying Outfit, Utilization of Which Removes Deposits Without Displacing Cylinders, Etc.

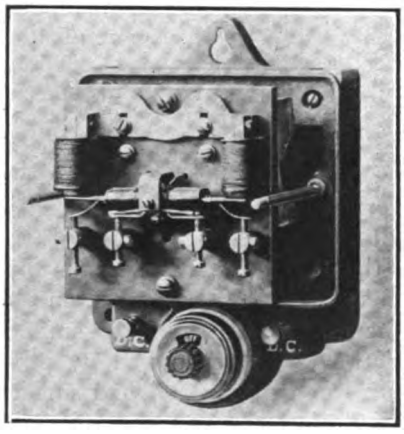
at .75 pint of gasoline for each horsepower developed for an hour, only .7 pint was required with benzol.

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GARAGE AND REPAIR SHOP EQUIPMENT.

WESTINGHOUSE RECTIFIER.

A number of small garages have customers utilizing storage batteries for ignition or lighting and when the car is not equipped with a dynamo these must be sent to a charging station unless the garage has a charging panel. The amount of such work does not warrant the installation of a large panel, consequently when attention is needed the batteries are carried to the nearest service station.



Westinghouse Type G Vibrating Rectifier.

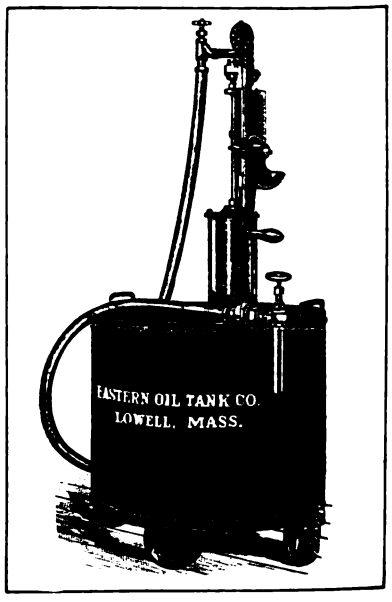
The Westinghouse Electric & Manufacturing Company, East Pittsburg, Penn., is producing what is termed its type G vibrating rectifier, designed for charging three-cell lead batteries from an alternating current circuit. The rectifier can be operated on any 60-cycle alternating current lighting circuit of 100 to 120 volts, and will charge three cells at a rate of six to eight amperes. The apparatus is simple to operate, requiring no other attention than connecting the attachment plug to a lamp socket and the lower binding posts to the battery. Polarity need not be observed. The interruption of the flow of current does not interfere with its operation as the rectifier will restart as soon as the power comes on again. This makes for convenience, especially when the cells are to be charged during the night.

The rectifier shown in an accompanying illustration consists practically of a polarized relay acted upon by two alternating current magnets, so that it vibrates in synchronism with the alterations of the current, and arranged to reverse the connections of the circuit as the current reverses. The vibrating arm is magnetized by current from the direct current side, so that one end is permanently north and the other south, depending on which way the battery is connected. When the alternating current is in one direction the upper poles of both stationary magnets are north, attracting the south end of the vibrating arm and repelling the north end. When the current reverses, the poles of the magnets become south, attracting the north end of the vibrating arm and repelling the south end. This reverses the connection of the alternating current to the direct circuit, but as the direction of current has also been reversed, it flows into the direct current circuit in the same direction as before. The reversal of the connections thus takes place every time the current reverses, so that the result is a pulsating direct current. A transformer reduces the voltage to the proper value.

Five feet of lamp cord and an attachment plug are furnished, and six feet of similar cord with connecting clips for use between the battery and the rectifier, also a snap switch.

EASTERN RUNABOUT FUEL OUTFIT.

The Eastern Oil Tank Company, Lowell, Mass., maker of oil and gasoline storage systems, tanks, cabinets, etc., is manufacturing the Eastern runabout system, especially designed for service in garages. As will be noted by an accompanying illustration it is of the portable type and being fitted with ball bearing, rubber tired wheels, may be moved easily about the garage and even to the sidewalk. The wheels are of the swivelling type, mounted beneath the tank proper and suitable handles are provided. Its capacity is 60 gallons.



Eastern Runabout Gasoline Outfit.

The pump is of the double-acting type, discharging a continuous stream of gasoline and one turn of the crank pumps half a gallon. A dial is incorporated, registering accurately the amount of fuel discharged, and the discharge nozzle is well adapted to any type of fuel tank. It is also fitted with a shut-off valve, preventing waste from overflowing.

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FORMULAE AND USEFUL MECHANICAL TABLES.

To Remove Old Enamel.

To remove old enamel lay the articles horizontally in a vessel containing a concentrated solution of alum and boil them. The solution should be just sufficient to cover the pieces. In 20 or 25 minutes the old enamel will fall into dust, and the article may be polished with fine emery.

Testing Solder.

To test solder to learn whether it is of good quality, hold it up near the ear and bend it. If it cringes or makes a crackling noise, it is good. If not, it is poor, having too much lead and not enough tin in the composition.

Rust Joint Composition.

A rust joint composition or cement may be made of sal ammoniac one pound, sulphur one-half pound and cast iron turnings 100 pounds. The whole should be thoroughly mixed and moistened with a little water. If it is desired to have the joint set very quickly, add one-quarter of a pound more sal ammoniac. Care should be taken not to use too much of the last named material, or the mixture will deteriorate.

Sweating Aluminum to Other Metals.

Aluminum may be sweated to other metals by the following method: First coat the aluminum surface to be soldered with a layer of zinc. On top of the zinc is melted a layer of an alloy of one part aluminum to 2.5 parts of zinc. The surfaces are placed together and heated until the alloy between is liquified.

Soft Alloy.

A soft alloy which will adhere tenaciously to glass, metal or porcelain, and which can also be utilized as a solder for articles which cannot be subjected to a high degree of temperature, is made as follows: Obtain copper dust by precipitating copper from the sulphate by means of metallic zinc. Place from 20 to 36 parts of the copper dust, according to the hardness desired, in a porcelain mortar, and mix well with some sulphuric acid of a specific gravity of 1.85. Add to this paste 70 parts of mercury, stirring constantly, and when thoroughly mixed, rinse the amalgam in warm water to remove the acid. Allow it to cool from 10 to 12 hours, after which time it will be hard enough to scratch tin. When ready to use, heat to 707 degrees Fahrenheit and knead in an iron mortar until plastic. It can then be spread on any surface, and when it has cooled and hardened will adhere most tenaciously.

Tempering Tool Steel.

The following gives the temperature in degrees Fahrenheit necessary to produce the required color, when tempering hardened steel: Lathe, shaper and planer tools, 430 degrees, very light straw color; 450 degrees, light straw color. Taps and dies, 470 degrees, dark straw color; 490 degrees, very dark straw color. Chisels, 500 degrees, brownish yellow; 520, yellow tinged with purple; 530 degrees, light purple. Springs, etc., 550 degrees, dark purple; 570 degrees, dark blue.

Proportional parts of lead to one pound of pure block tin which when melted will have the temperature in degrees Fahrenheit necessary to produce the required color on hardened steel, by simple immersion, are given below:

Color	Temperature degrees	Pounds of lead to one of tin
Very light straw color	430	1.750 to 1
Light straw color	450	2.125 to 1
Dark straw color	470	2.500 to 1
Very dark straw color	490	3.500 to 1
Brownish yellow	500	4.750 to 1
Light purple	530	7.500 to 1
Dark purple	550	12.000 to 1
Dark blue	570	25.000 to 1

TETZLAFF DISCUSSES LUBRICATION.

Some of the Reasons Which Impelled Him to Select Dixon's Graphite.

Teddy Tetzlaff, holder of the world's road racing record, has made a somewhat extensive study of automobile lubrication, testing one make of oil after another in the various bearings of his car, and watching the effect upon the machine. its speed, etc. He has adopted the line of graphite greases made by the Joseph Dixon Crucible Company, Jersey City, N. J., and some of his reasons for this action are set forth by him as follows:

The most essential thing in the successful operation of an automobile is proper lubrication, and the lack of knowledge upon this subject displayed by the average car owner and driver is astonishing. You cannot run your machine without lubricant, but the difference between oil and oil, and grease and grease, is not understood by every owner. Different makes of cars require different kinds of greases; different parts of the same car require different greases. The owner does not know this because he has never gone to the trouble to post himself upon the subject.

The average car owner believes that his gears and bearings are smooth. But if he will look at them under a powerful microscope he will see that these so-called smooth bearings look very much like a nutmeg grater, showing little pin points sticking up in the metal, tool marks and other abrasions. These little pin points lock and interlock, producing when the bearing surfaces slide over one another what is called friction. When you realize that at least 20 per cent. of the power generated in your engine is lost because of friction before it is delivered to the rear wheels, you will understand the importance of using lubricants which will cut down this friction as much as possible.

Oil or grease is supposed to keep these bearing surfaces sufficiently apart so that these irregularities cannot interlock. Under normal conditions it does this to some extent, but when the heavy pull comes with the car in operation, the oil or grease squeezes out from between the working parts and we have little or no lubricant left when we need it most. But if there is a little flake graphite mixed with the oil or grease, it first fills up the pores and irregularities in the bearing surfaces and buries the pin points under a veneer like surface of remarkable smoothness and endurance.

At one time I experimented for five days with various greases in my transmission and wheel bearings. but found that my gearbox heated up with all of them. When I substituted Dixon graphite grease No. 677, my bearings ran cool and all trouble was eliminated. At another time I made a comparative test on the one-mile motordrome at Los Angeles, being accurately timed by three stop watches. By an application of Dixon's graphite I was enabled to increase my speed one second a mile at 90 miles an hour, which proved to me that graphite brought the friction down to the minimum.

The Cadillac Motor Car Company, Detroit, claims the first sale of an automobile in Dayton, O., since the flood. It was one of the Cadillacs handled by H. M. McCord, which although it had been entirely submerged for 30 hours, aside from the deposit of mud, was found to be none the worse for its experience.

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IN THE REALM OF THE MOTORCYLIST.

Manufacturers Escape All Damage in Recent Floods---Denver Seems to Be Favored as F. A. M. Convention Seat---News Notes of the Industry and the Clubs.

SO FAR as it has been possible to learn but two motorcycle manufacturers were affected in any manner by the recent floods in Ohio and Indiana, these being the Miami Cycle & Manufacturing Company at Middletown, O., and the Davis Sewing Machine Company at Dayton. In neither case was the plant at all damaged, but the employees lost heavily.



General View of the Miami Cycle & Manufacturing Company's Merkel Plant in Middletown, O.

The Merkel factory in Middletown is located on the highest point in the city and was a long way from the stricken region. However, many of the officials of the company, as well as the workmen, lived in the section which was badly flooded. Of course, shipments were badly delayed, owing to the inability of the railroads to offer transportation, but the company continued the work of production, storing the machines until such time as they could be moved.

The Davis Sewing Machine Company's factory, where Dayton machines are produced, is similarly situated, and the flooded portion of the city, which perhaps was as badly affected as any in the entire district, was about one mile distant. It follows that the company is in practically the same condition as the Merkel.

Denver to Get Convention?

At the recent meeting of the board of directors of the Federation of American Motorcyclists at the Auditorium Annex hotel, Chicago, Directors Sauer and Collins gave their views of the California situation, where the Western Federation of Motorcyclists is waging war on the older body. The board, from reliable information in its possession, is of the opinion that the matter will soon be cleared up satisfactorily to all concerned. It was voted the sentiment of the board that means be devised to bring about such a distribution of the F. A. M. directorate as to insure all parts of the United States equal representation.

The competition committee recommended that the 1913 convention be awarded to Denver, Col., during the week of July 28. It was decided that where three or more sanctions are issued in a week to a promoter that the chairman of the competition committee be empowered, at his discretion, to place all such sanctions on one sanc-

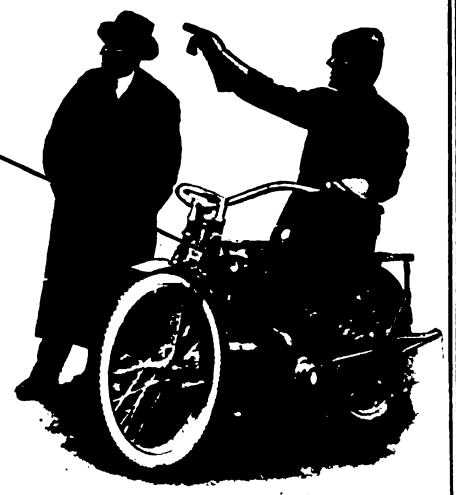


Factory of Davis Sewing Machine Company, Dayton, O., Maker of Dayton Motorcycles, So Located That It Was Not Affected by Recent Flood.

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The Sign of MERKUALITY



On the road this summer you will often notice this trade-mark on the tanks of motorcycles that scoot past you on the road and run away from you on the hills. Whenever you see this "Yellow Jacket" you will not be able to help thinking: "There GOES the only motorcycle in the world with a Self-Starter." You will envy the rider of that machine, for you will know that he rides the best motorcycle made. That little trade-mark of quality will indicate that he is a fortunate rider of

THE SELFSTARTING—TWO SPEED—SPRING FRAME
FLYING MERKEL
MOTORCYCLE

Why wait until the riding season to have it demonstrated to you that the Flying Merkel "Yellow Jacket" models are the snappiest, fastest and most powerful vehicles on two wheels? It may be too late then. Our season's output is entirely contracted for now, but your dealer may be able to supply you. Better see him today. There are just four things to remember: 1st—No more laborious, back-breaking pedalling to start your motor. The Merkel Self-Starter positively starts the motor every time with both wheels on the ground by simply depressing a small lever with the left foot. 2nd—The Two-Speed Gear will enable you to climb any hill that nature ever evolved. 3rd—More than 300 inches of spring steel between you and the road absorbs every vibration and jolt and makes every rough spot seem like a parlor floor. 4th—Write today for our descriptive art catalog. It will be forthcoming in the next mail if you just address

The Miami Cycle & Mfg. Co.
320 HANOVER STREET.
MIDDLETOWN, OHIO
MEMBER M.M.A.

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tion blank and that for sanctions so issued it will be considered that the races are not concluded until Sunday night, when all prizes will be due.



Joseph Ebel of St. Louis, Mo., and His Emblem.

The board concluded it had not power to increase the fees of referees as they cannot change the printed rules for this year, which have been published. Numerous other minor matters were considered.

Many Girls on Kansas Tour.

So many young women have planned to participate in the annual tour of the Kansas Short Grass Motorcycle Club this summer that it has been arranged for one division of the tourists to be made up of girl riders entirely. The idea of a girl's division was conceived by Miss Inez Patterson, daughter of President B. J. Patterson of the F. A. M., and it is probable that she will be chosen captain of the section. Invitations have been sent to girl riders all over the country to join the tour.

Addition to Henderson Plant.

The Henderson Motorcycle Company, Detroit, has purchased property adjoining its present factory and will erect a three-story building. The company will increase its output to meet the demand for Henderson motorcycles.

Bosch in the Flood.

P. I. Haynes, the Harley-Davidson agent in Columbus, O., writes that during the high water mark in the flood Benjamin Ept's machine and a number of others of that make were completely covered with water, mud, etc., for over 48 hours. After their rescue, the carburetors were dismantled, the tanks refilled with gasoline, and on the first push of the pedals they were off. It appears that the Bosch magnetos, with which these machines were equipped, were in no way disturbed by the experience, which is particularly gratifying to the maker, the Bosch Magneto Company, New York City.

Merkels in Telephone Work.

Miami Cycle & Manufacturing Company, Middletown, O., reports the receipt of an order to equip the entire Bell telephone system of Cincinnati with seven horsepower Flying Merkel chain driven machines. The telephone company has been experimenting with a number of different makes, and the final selection naturally is very gratifying to the Miami concern.

A New Blue Streak.

S. A. Falor, manager of the motorcycle tire department of the Goodyear Tire & Rubber Company, Akron, O., announces a new Blue Streak tube. It is understood that this tube will be made 20 per cent. stronger than those formerly produced by this concern, and that it was designed especially for use with 1913 machines, which are being made heavier and faster than heretofore.

Merkel Defeats Indian.

Recently the motorcycle enthusiasts of Elyria, O., were treated to an interesting conflict between riders in a two-mile race on a local skating rink. The machines were both of seven horsepower, the Merkel being ridden by Robert Parker and the Indian by Carl Hiller. The former won by a margin of 10 feet.

Tourist Trophy Races.

Secretary-Treasurer Gibson of the F. A. M. has received from the secretary of the Interna-



Goodyear Tire Salesman Explaining Merits of His Product to Bernard Steere, Providence, R. I., a Harley-Davidson Rider.

tional Federation of Motorcycle Clubs, entry blanks for the senior and junior Tourist Trophy races to be held on the Isle of Man, England.

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June 4 and 6. It is desired that a team representing the F. A. M. in America compete. Entry blanks can be obtained of Secretary Gibson.

Annual Herring Run.

The Providence Motorcycle Club, Providence, R. I., held its annual herring run to Taunton, Mass., Sunday, April 20. Approximately 300 motorcyclists participated in the run, which was equal to any similar event ever held by the club. The roads were found to be in good shape and no untoward events occurred during the day. Save for the fact that the weather was quite cool, the conditions were ideal. On the arrival at Taunton the members of the Taunton Motorcycle Club met the Providence men and entertained them royally with a banquet in the club's quarters.

Harley-Davidson's Birthday.

The Harley-Davidson Motor Company, Milwaukee, Wis., recently celebrated its fifth anniversary. The growth of this company at Milwaukee has excited the admiration and wonder of every person acquainted with the facts. The three Davidson brothers and William S. Harley began building motorcycles in 1901, but it was not until five years ago that the company was incorporated. While many others have striven for greatly increased output, this concern has always concentrated its efforts to achieve the distinction of building quality motorcycles, and the reputation attained by these efforts will be preserved during coming years.

The company now has a most modern factory with 1277 employees, with a monthly payroll of $85,000. The 1913 output will be 17,000 machines, valued at $4,505,000. The factory has 59 departments and the floor space is now 224,150 square feet. These figures give some idea of the enormous growth since the beginning in 1901, although the most rapid strides have been accomplished during the five years since its incorporation.

Club Notes, Here and There.

The Fox River Motorcycle Club, Aurora, Ill., has been organized with the following officers: President, John Jamie; vice president, Joseph Slaker; secretary, Robert Horton; treasurer, William Healy; captain, George Rees.

The Englewood and Chicago Motorcycle clubs, Chicago, have been combined. President Purdy of the Chicago club was also elected president of the Englewood club and several of the members belonged to both clubs, so that it was decided that fusion would best serve the interests of all.

The Reading Motorcycle Club, Reading, Penn., is making arrangements for a reliability run the latter part of July. The route has not been selected, but probably will be to Pottsville and return, going by way of Harrisburg, Sunbury and Danville, the distance being 210 miles, to be covered in 11 hours.



Robert Parker, Merkel Winner, and Carl Hiller, Indian, a the Start of Recent Match Race in Elyria, O.

The Worcester Motorcycle Club, Worcester, Mass., will have a hill climb on Dead Horse hill, May 11.

The Indian Motorcycle Club of Cleveland, O., is planning a run to Niagara Falls some time in June, when it will be entertained by the Buffalo Motorcycle Club. A run will also be held to Cedar Point some time during the month of June.

1913 F. N. SHAFT-DRIVE MOTORCYCLES.

Lightweight Single, with Two-Speed Gear $275
Only Machine Built With Handle Bar Control of Clutch.
Four-Cylinder $300
With Handle Bar Control of Clutch $350
Two-Speed Gear, Extra $50
Equipment includes two brakes, footrests if desired, compound spring fork, combined luggage carrier and stand.

American F. N. Company, Boston, Mass.

Branch—415 Trumbull St., Hartford, Ct.

JOIN THE F. A. M.

which is the National Organization fostering the interests of motorcyclists along legislative and other lines. Cut this out, mail it, and you will get the reasons.

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NEW INCORPORATIONS AND MAKER'S NOTES.

The following concerns have been incorporated recently to manufacture and deal in automobiles, accessories, etc.:

Ivey Motor Truck Company, Inc., Buffalo, N. Y.; $10,000; Charles A. Ivey, A. L. Rustling, Frank S. Heller.

Lowell Buick Company, Lowell, Mass.; $15,000; Milo W. Hale, Jr., Fred B. Emerson, Daniel D. O'Dea.

Signal Motor Truck Company, New York City; to manufacture motor trucks, cars, coaches, etc.; $350,000; R. H. Grimes, L. B. Case, R. Gibson, Jr.

Hutchinson Motor Company, Woodbury, N. J.; $100,000; general automobile business; T. Hutchinson, J. A. Hutchinson, M. F. Cattell.

Rochester-Mais Commercial Car Company, Rochester, Ind.; $25,000; J. A. Mais, A. C. Davisson, Earle A. Miller, J. M. Ott, R. P. True.

Automobile College of Salesmanship, Indianapolis, Ind.; $10,000; Charles H. Hettinger, Turner D. Bottoms, Fred G. Braden.

General Auto Trucking Company, Inc., New York City; $25,000; G. W. Freeman, A. A. Benedise, T. G. Gannon.

Chicago Auto Painting Company, Chicago; $1000; M. H. Allen, Alexander Wolf, C. B. Staffner.

Smith Motor Car Company, Newark, N. J.; $25,000; J. L. Smith, J. W. Mason, L. W. Smith.

B. B. Motor Car Company, Conway, S. C.; $2000; T. J. Bell, E. T. Blecker, E. J. Sherwood.

Edwards-Knight Sales Company, Newark, N. J.; $125,444; Arthur J. M. Edwards, Howard Isherwood, W. Eugene Turton.

Pender Auto Compnay, Burgaw, Va.; $15,000; C. H. Sodergrist, I. N. Brown, F. M. Lewis, W. O. Sodergrist.

Stapleton Motor Sales Company, Okmulgee, Okla.; $2000; L. S. Skelton, J. Belford, E. M. Stapleton.

Church Motor Car Company, New York City; $1,000,000; H. E. Latter, W. J. Maloney, N. P. Coffin.

Easy Starter & Speeder Company of New York, New York City; $25,000; F. R. Hansell, G. H. B. Martin, S. C. Seymour.

Santa Ana Electrical Company, Santa Ana, Cal.; $10,000; J. G. Quigg, Anna Helen Neely, Thomas Neely.

Hampton Manufacturing Company, Indianapolis, Ind.; $35,000; to make automobile accessories; W. F. Hadley, S. B. Nusbaum, S. Rubens, M. Moskin.

Gustav Schaefer Wagon Company, Cleveland, O.; $55,000; to manufacture automobile bodies; Ernest Schaefer, Charles E. Moritz, Arthur Kruse, Henry G. Schaefer, Anna M. Schaefer.

Derrickson Manufacturing Company, Muncie, Ind.; $125,000; to make automobiles; Harry S. Osborn, H. L. Kitselman, R. C. White.

Auto-Signalite Company, New York City; $2000; D. E. Koblish, R. C. Norton, A. D. Chersan.

WITH THE MANUFACTURERS.

C. Arthur Benjamin has been appointed general sales manager of the American Locomotive Company, New York City, maker of Alco cars and trucks. Before joining the latter company he was for four years sales manager of the H. H. Franklin Manufacturing Company, Syracuse, N. Y., two years sales manager of the Babcock Electric Company, and subsequently a distributor for Packard and Hudson cars in Syracuse, N. Y.

Harold D. Bornstein, well known in Boston and New England motor car circles, is with the Premier Motor Car Company of New England, where he has joined the sales department and will assist in the advertising and publicity work. While connected with the Boston branch of the Velie Motor Vehicle Company, Moline, Ill., maker of Velie cars, he helped build up a large New England business.

T. J. Megear has been made branch manager and F. von A. Cabeen, Jr., sales manager of the new Philadelphia branch established by the American Locomotive Company, New York City, maker of Alco cars and trucks. Mr. Megear was formerly secretary and Mr. Cabeen vice president of the Longstreth Motor Car Company and both have long been connected with Philadelphia territory.

F. N. Schwab was recently placed in charge of the Chicago branch of the Speedwell Motor Car Company, Dayton, O., maker of Speedwell cars and motor trucks. He was formerly connected with the organization of the National Cash Register Company of Dayton.

Adolph Daimler, president and general manager of the Daimler Motoren Gesellschaft, Untertuerkkeim-Stuttgart, Germany, died recently at the age of 42 years. He was a son of Gottlieb Daimler, a pioneer in the automobile industry in Germany and one of the leading men in the industry in that country.

O. J. Rhode, treasurer and manager of the Splitdorf Electrical Company, Newark, N. J., maker of Splitdorf magnetos, has returned from a business trip to England, during which he established a branch in London. The new Splitdorf quarters are located at 6 City Road, Finsbury Square. Other Splitdorf stations are to be opened at Toronto, Can., and Atlanta, Ga.

The Cole Motor Car Company, Indianapolis, Ind., maker of Cole cars, has appointed the following distributors: C. E. Simmons, Adrian, Mich.; Enterprise Machine Company, Asheville, N. C.; Cole Sales Company, Baltimore, Md.; William H. Hopkins, Bath, N. Y.; Lahr Motor Sales Company, Bismarck, N. D.; Breese Garage, Breese, Ill.; J. E. Osborne, Carroll, Ia.; Thompson Anderson, Charleston, Miss.; Hitsch Bros., Chattanooga, Tenn.; Walter Haynie, Covington, Tenn.; Crestline Garage Company, Crestline, O.; N. R. Herrick & Co., Eustis, Fla.; Mrs. Laura Heintz, Hammond, Ind.; Patterson Auto Sales Company, Hamilton, Ont.; M. J. Bliss, Hartford, Conn.; S. J. Harrigan, Joliet, Ill.; Ayer Manufacturing Company, Keokuk, Ia.; N. B. Bronner, Little Falls, N. Y.; Cole Motor Company, Milwaukee, Wis.; John N. Taylor, Moberly, Mo.; Osmanson Bros., Morris, Ill.; Barngrover Auto Company, Newton, Ia.; W. J. Freeling, Oakland, Cal.; Ford Auto Company, Paterson, N. J.; Gulf Coast Garage & Sales Company, Pensacola, Fla.; I. A. Silvie, Jr., Port Richmond, L. I.; Tuler Auto Company, Pueblo, Col.; J. S. Casey, Sacramento, Cal.; Kinsey & Danielson, Sherrard, Ill.; Shean Auto Station, Springfield, Mass.; Burnham & Body, Watseka, Ill.; D. & H. Auto Company, Wilkesbarre, Penn.; Gate City Garage, Winona, Minn.

Louis M. Baker has been appointed sales manager for Clarence N. Peacock & Co., for whom he will direct the sales of the Ames shock absorbers. Two years ago Mr. Baker established the Baker Rim Company and retains his financial interest in that concern, although he will devote his entire time to the Peacock company's business.

J. F. Richman, for the past four years superintendent of the Hudson Motor Car Company, Detroit, maker of Hudson cars, has joined the Cole Motor Car Company as factory manager. Mr. Richman is thoroughly experienced in factory management and has made an enviable record in recent years.

The International Motor Company, New York City, maker of Mack, Saurer and Hewitt trucks, has made some changes in the executive personnel. They were announced by Chairman W. C. Dickerman of the directors' executive committee, as follows: First vice president, John Calder; second vice president, L. H. French; third vice president, E. C. Fink; assistant to first vice president, F. R. Phillips; general sales agent, R. E. Fulton, assistant general sales agent, George H. Hodges.

The Hupp Motor Car Company, Detroit, maker of Hupmobile cars, has found it necessary to establish a parts depot in central Europe to meet the demands of European motorists. This depot has been established at Hamburg, Germany, under the direction of C. H. Dunlap, export manager of the company, and is in charge of George Chailley of Paris, who was secured by John L. Poole, the company's export manager at Paris.

The Kissel Motor Car Company, Hartford, Wis., maker of KisselKar pleasure cars and trucks, has appointed the following new agents: Rio Grande Auto Company, El Paso, Tex.; P. H. Harrington, Slayton, Minn.; H. E. Webber, Fergus Falls, Minn.; Central Auto Company, Faribault, Minn.; O. H. Taralveth, Warren, Minn.; F. P. Smith, Missoula, Mont.; Holmes Garage, Miles City, Mont.; C. H. Buford, Virginia City, Mont.; George W. Delisle, Walhalla, N. D.; Aberdeen Auto & Supply Company, Aberdeen, S. D.

The King Motor Car Company, Detroit, builder of King cars, announces the following dealers who have taken King agencies: Monroe Motor Car Company, Buffalo, N. Y.; Holsman Sales Company, Des Moines, Ia.; Miller & Williams, Los Angeles, Cal.; M. G. Beckner, Indianapolis, Ind.; Isaac Pepper, South Bend, Wash.; Barclay Auto Company, Minneapolis, Minn.; Tice & Lasley, Canton, O.;

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Dyche & Duncan, Columbus Junction, Ia.; Diehl Motor Car Company, Medicine Hat, Alberta; King Motor Sales Company, Kansas City, Mo.

The Stewart Motor Corporation, Buffalo, N. Y., has appointed the following agents for the Stewart light delivery commercial cars: W. H. Heinzerling, Seattle, Wash.; Lougheed & Webster, Calgary, Alberta; George H. Hack, Saskatoon, Saskatchewan; M. Zilbermann, New Orleans, La.; Christiansen Company, Galveston, Tex.; Empire Automobile Company, Glens Falls, N. Y.; E. L. Jordan, Auburn, Me.; Syracuse Garage, Syracuse, N. Y.; John Van Benschoten, Poughkeepsie, N. Y.; Power City Auto Company, Niagara Falls, N. Y.; J. E. White, Jamestown, N. Y.

GARAGE AND DEALER.

The McAden Automobile Company, 106 Fayetteville street, Raleigh, N. C., has taken over the business of the Jackson Tri-State Motor Car Company, Louisburg, N. C., and will conduct it at Raleigh. The McAden company acquires the garage and accessory business and Jackson distributing agency for the same territory. R. Y. McAden is the sole owner of the company and has had many years' experience in the automobile business.

Samuel Weston Scott, who was for some time connected with the Boston branch of the Velie Motor Vehicle Company, Moline, Ill., maker of Velie cars, has joined the sales force of the W. H. Stevens Company, Boston distributor for National cars, made by the National Motor Vehicle Company, Indianapolis, Ind. Mr. Scott is well known in motor car circles and will make a valuable addition to the National force.

The Streuber-Mooney Company, Erie, Penn., and Buffalo, N. Y., has been formed to handle the sales of Keeton cars, made by the Keeton Motor Company, Detroit, for six counties, including Erie and five others in Pennsylvania, and six counties in New York State, including Genesee county, in which Buffalo is situated. The members of the firm are Lewis Streuber and Frank J. Mooney.

J. W. Willcox, Southern California distributor for Henderson cars, made by the Henderson Motor Car Company, Indianapolis, Ind., has occupied his newly completed garage and salesroom at 1053 South Olive street, Los Angeles, Cal. The building is one of the largest motor car structures in Los Angeles and is equipped with the most modern appliances. The accompanying illustration of the interior of the showroom indicates the excellent appointments now enjoyed by the Henderson.

The Detroit Auto Exchange has opened quarters at 676 Woodward avenue, Detroit, instead of at 292 Jefferson avenue, as at first intended.

The United Motor New York Company, New York City, has taken 20,000 square feet of floor space in the Galvin building at 13th street and East avenue, Long Island City, N. Y., for a service station. The latter can easily be reached by way of Queensboro bridge. Repair parts for Maxwell, Stoddard-Dayton, Brush, Everitt and Flanders cars and for Sampson trucks will be carried there.

C. W. Whitson and C. O. Usborne of Detroit have formed the Usborne-Whitson Sales Company to handle in Michigan the Keeton car, made by the Keeton Motor Company of Detroit. A large salesroom has been secured at 730 Woodward avenue, Detroit. Both men are well equipped by experience to handle Keeton sales successfully.

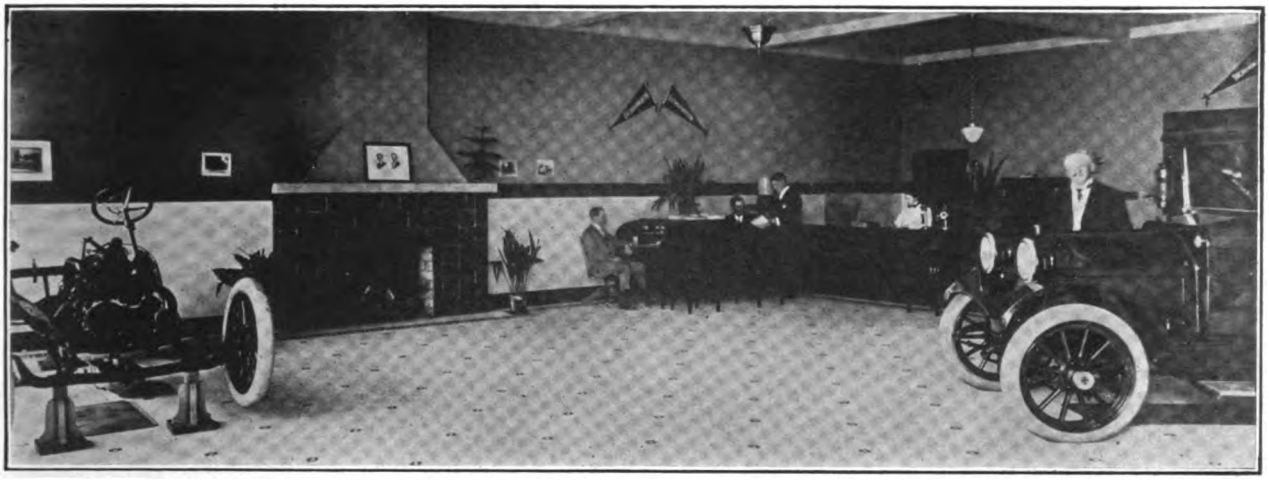
The M. B. M. Motor Company, Boston, Mass., a recently incorporated concern, has made final arrangements to handle the Maxwell car at 1116-1118 Boylston street, under the management of Charles Addison Malley, father of the present Massachusetts vehicle lighting law and other legislation of advantage to motorists.

E. R. Bennett and G. Lemaster have opened their garage at 113 North Main street, Ottawa, Kan., under the firm name of the Redlight garage. Modern machinery has been installed and a general automobile and repair business will be conducted.

R. A. Vos of East Saugatuck, Mich., has acquired the property formerly owned by the Holland Umbrella Company, Holland, Mich., and the building will be equipped for a first class garage, which Vos will conduct.

C. W. Evans and W. A. Rose have taken over the Boulevard garage at 29 Webster street, Brookline, Mass., and will conduct a general garage and repair business. A complete electric charging equipment has been installed and the firm will handle supplies.

The Garrett Garage Company, Wallace, Idaho, has started in business in a new garage on Pine street. The machine equipment is complete and shafting was installed of sufficient length to permit of extension of facilities from time to time.



Henderson Salesrooms, Recently Opened in Los Angeles, by J. W. Willcox, Southern California Distributor.

Johnson & Iverson Auto Company, Kiron, Ia., has established a repair shop in connection with its garage business.

The Schrup Motor Car Company, Dubuque, Ia., has leased four sections of the Conolly building on Seventh street, to be used as a salesroom for Premier, Locomobile and Studebaker pleasure cars and G. M. C. trucks. The four sections will be converted into one spacious room and the company will add a complete line of tires and supplies.

The Pittsburg Motor Service Corporation, Pittsburg, Penn., has opened a magnificent storage depot building, completely equipped for the care and maintenance of trucks, an institution that was badly needed in that city. Many business men failed to install motor equipment because of lack of storage facilities, but so fine an impression has the new building made that many of those already operating machines are said to be contemplating doing away with their private garages and availing themselves of its service. Pleasure cars can also be left there during the day instead of parking along the city curbs.

The Lawfer Auto Company, Allentown, Penn., is having its garage considerably enlarged to take care of increased business.

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RECENT PATENTS.

Combined License Bracket—William A. Schleicher, Cleveland, O., No. 1,050,395. Two sliding brackets are so constructed that the end of one overlaps the other, permitting of increasing or decreasing the length of the license number holder. Provision is made for securing the number tag by means of a locking screw. The holder is integral with the bracket carrying the lamp.

Cushion Tired Wheel, Norman Gratz, Boise, Idaho, No. 1,056,167. A wheel tire, comprising an inner rim having radial side flanges, an outer rim composed of segmental sections having inwardly extending side flanges formed with radial slots, means for pressing the outer rim sections outward yieldingly, channelled cross bars secured to the side flanges of the inner rim and extending through the slots in side flanges of the outer rim, rollers carried by the cross bars and arranged in said slots, and with which said channels communicate, a lubricant receptacle and connections between the receptacle and the channel of the cross bars.

Life Saving Apparatus, Clayton E. Frederickson, San Francisco, Cal., and Ivy Baldwin, Alameda, Cal., assignors of one-half to William H. Stenger, Berkeley, Cal., No. 1,056,271. A portable body catching apparatus, mounted on a motor vehicle, comprising a bed frame, arms rockably mounted at each side of the frame, a crankshaft, devices connecting said shaft to said arms at each side of their fulcrums for swinging said arms inwardly and outwardly in a plane at right angles to the frame, and a flexible body connected at opposite edges to the side arms and adapted when the side arms are swung out to form a net or apron for receiving a falling body thereon.

Valve Gear, Daniel Appel, East Cleveland, O., No. 1,057,399. In combination with the crankshaft and cylinder of an internal combustion engine, a valve adapted to control, both the inlet and exhaust of gases from the cylinder, a valve rod connected to the valve, and a valve gear comprising a member which has a connection with the valve rod, and means for operating said member so as to impart to the axis of said connection a hypocycloidal path of movement.

Tire Patching Device, Gustave J. Martel, Chicago, No. 1,057,440. In a tire patching device, the combination of a flexible patching strap; angular yokes having one leg secured to the ends of said straps, the other leg being curved to fit a rim flange; securing hooks adapted to engage rim flanges and having threaded shanks extending through said yokes, and nuts on said shanks, substantially as described.

Sleeve Type Two-Cycle Engine, Clarence D. Miller, Philadelphia, assignor of one-third to Harry F. Haviland and a like amount to Warren J. Miller of the same city, No. 1,057,442. In an internal combustion engine, a cylinder having in its walls an exhaust port, a sleeve within said cylinder, said sleeve provided with a pair of ports located in different horizontal planes whereby upon the reciprocation of the sleeve in the direction of its axis, the sleeve ports will register successively with the cylinder port, to provide initial and final discharge of the exhaust gases.

Tire Filling Machine, Elmer Oliver, Daytona, Fla., No. 1,057,451. A machine for filling tires comprising a hopper, a feed screw operating therein, a feed pipe leading from the hopper outlet, a manually operable cut-off valve in said pipe, a pressure controlled valve in said pipe between the hopper and the first named cut-off valve.

Carburetor, Elbridge W. Stevens, Baltimore, Md., No. 1,057,506. A carburetor for internal combustion engines, comprising a vertical tubular mixing chamber, a float feed, a throttle valve between the mixing chamber and the outlet to the engine cylinder arranged on a horizontal axis transversely to the mixing chamber, a rotary auxiliary air valve below the mixing chamber arranged on an axis longitudinally to and within the mixing chamber, a needle valve for fuel injection between the two arranged inclinedly and at an acute angle to the axis of both said valves and connections for all three said valves for operating them with a simultaneous and conjoint action.

Gear Shift Lever Device, Phares W. Brubaker, West Reading, Penn., No. 1,057,524. A lever working within a slot, one side of said slot being provided with a flexible portion, means for converting said flexible portion into a rigid portion, and means whereby said flexible portion controls the movement of said lever.

Vehicle Wheel, Thomas B. Jeffery, Kenosha, Wis., and Kate E., Charles T. and Harold W. Jeffery, executors, No. 1,056,278. In a vehicle wheel, the combination with the spokes thereof, a two-part spoke head secured to the end of each spoke, flanges on the upper ends of the two parts of each spoke head forming a dovetail channel between the same, a tire rim removably surrounding the spoke heads, dovetail lugs on the inner surface of the tire rim engaging the dovetail channel in the spoke heads and means for forcing the flanges on each spoke head toward each other and against the interposed lug.

Lamp Lighter and Controller, William C. Hamilton and William Lee Bird, Indianapolis, Ind., No. 1,057,638. A lamp controlling valve comprising a body having supply and delivery passages, a valve mounted in said body and controlling communication between the supply and delivery passages, a diaphragm chamber having a supply passage controlled by said valve, a diaphragm in said chamber, an exhaust passage co-operating with the valve to intermittently exhaust the diaphragm chamber, and an electric circuit terminal controlled by said diaphragm.

COMING EVENTS.

April.

April 29-May 2—Endurance run, Columbus, O.

May.

May 2—Secret time run, New York-New Rochelle.
May 5-8—Motor truck trials, Washington, D. C.
May 14-15—Scenic tour, West Hudson and Catskills, N. Y.
May 26-June 13—American visit, British engineers.
May 30—500-mile race, Indianapolis, Ind.
May 30—Inter-Club run, Chicago, Ill.

June.

June 19—Algonquin hill climb, Chicago, Ill.
June 25-28—Non-stop day and night run, Chicago-Boston.

July.

July 1—Manufacturers' tour, Indianapolis-San Francisco.
July 4—Track meet, Taylor, Tex.
July 4-6—Road race, Tacoma, Wash.
July 27-28—Road races, Tacoma, Wash.

August.

Aug. 29—Chicago Trophy race, Elgin, Ill.
Aug. 30—Elgin Trophy race, Elgin, Ill.
Aug. 30-Sept. 6—Reliability tour, Chicago, Ill.

September.

Sept. 1—200-mile race, Columbus, O.
Sept. 1—Fire chiefs' convention, Madison Square Garden, New York.

November.

Nov. 24—Vanderbilt Cup race, Savannah, Ga.
Nov. 26—Grand Prize race, Savannah, Ga.

FOREIGN.

April.

April 20-May 1—Show, Prague, Bohemia.
April 26-May 11—Show, Turin, Italy.
April 27—Hill climb, Limonest, France.

May.

May 1-15—Agricultural motor tractor show, Avignon, France.
May 1-31—Show, Barcelona, Spain.
May 7-21—Show, St. Petersburg, Russia.
May 8-12—De la Sarthe race meet, Le Mans, France.
May 11-12—Targa Florio race, Sicily.

June.

June 4- 6—Tourist Trophy race, Isle of Man, England.
June 10-16—Alpine trials, Vienna, Austria.
June 23-28—International road congress, London, England.

July.

July 1-16—Plowing competition, Winnipeg, Manitoba.
July 12—Grand Prix race, Amiens, France.
July 19-20—Grand Prix race, Belgium.

August.

August 10—Hill climb, Mount Ventoux, France.
August 15—Hill climb, Tonale, Italy.

September.

September 28—Hill climb, Mont Verdun, France.

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BROOKLYN'S AUTOMOBILE SCHOOL.

Features Which Helped to Give It an Enviable Reputation in This Field.

The automobile school conducted by the Bedford Branch Y.M.C.A., Bedford avenue and Monroe street, Brooklyn, N. Y., is one of the oldest in the country, having been organized in January, 1908, and it is one of the largest and best known. It graduates over 600 students a year, many of whom are owners or prospective owners, while others are garage mechanics, chauffeurs, salesmen, etc. Several are now holding responsible positions in the industry, a large percentage of these having been secured through the efforts of the school in behalf of the men.

The equipment is thoroughly in keeping with the reputation of the institution, the latest feature of automobile design and fittings being added as fast as their practicability has been established. Four and six-cylinder engines are kept in working order so that the students may wire, adjust and operate them; all types of ignition systems, both magneto and battery, and all kinds of carburetors, both mechanical and automatic, are utilized; even a 1913 electric motor starter is included, making everything complete and up-to-date.

The course recently has been lengthened to 17 three-hour shop sessions, in which everything is thoroughly explained, and the men have full opportunity to gain experience in taking off cylinders, grinding valves, replacing tires, adjusting carburetors and handling troubles of all sorts. After completing the shop work the men are given instruction in driving, in which the latest types of cars, both pleasure and commercial, are used. This comprises from eight to 12 one-hour lessons, covering from 100 to 150 miles.

A very interesting feature of the course is the Friday night lecture, for which the whole school assembles once a week to hear some expert. These talks often are illustrated with stereopticon views, and the men have opportunity to hear engineers who stand at the very forefront of their respective lines.

An accompanying illustration presents some of the instructors, the full list being as follows: Supervisor, Prof. Carl F. Schulz, M. A.; shop teachers, Prof. George Meyerhoff, M. E.; John Lettenberger, Jr., H. D. Webster and Frank Berry; road instructors, Frank Exner and W. Davies; registrar, W. G. Benjamin; school office assistant, John F. Ryan. Messrs. Schulz, Lettenberger and Berry are members of the Society of Automobile Engineers.



Faculty of the Bedford Branch Y. M. C. A. Automobile School: Left to Right, Standing, John F. Ryan, Frank Exner, Prof. George Meyerhoff, H. D. Webster, W. C. Benjamin; Sitting, John Lettenberger, Jr., Prof. Carl F. Schulz, Frank Berry.

Automobile speed records between Pittsburg and Philadelphia were reduced by more than three hours, when L. B. Ebb, driving his Packard car, made by the Packard Motor Car Company, Detroit, covered the distance in 10:12:00, elapsed time, defeating J. Fred Wren, in a Mercer, by 1:10:00 and winning a side bet of $1000. The racers left Pittsburg at 6 in the morning and Ebb registered at the Bellevue-Stratford hotel, Philadelphia, at 4:12 in the afternoon. Wren registered at 5:22. Ebb reported his actual running time as 7:15:00.

Emil Grossman, maker of Red Head spark plugs, offers a cash prize of $500, payable in weekly installments, to the winning driver in the Memorial Day, 500-mile international sweepstakes race on the Indianapolis motor speedway, providing the car uses spark plugs of this make exclusively.

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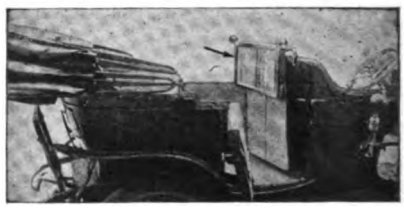


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Jubilee CHIME TONE Horn

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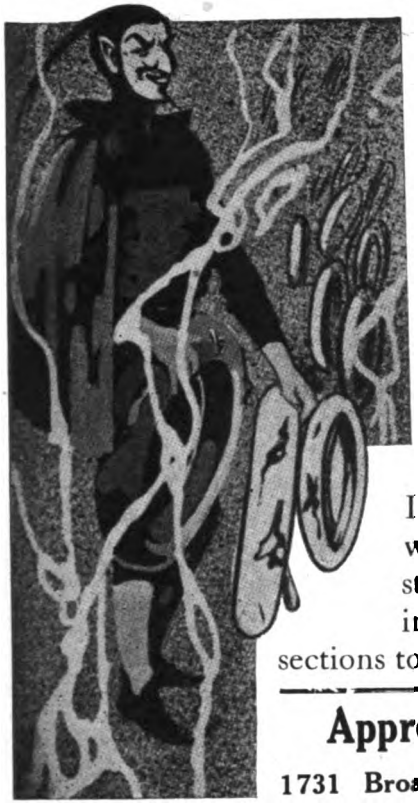


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1926 BROADWAY NEW YORK
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Goodman Tire Shields are **blow-out proof** and prevent punctures. Put new life in old tires and multiply your mileage in new ones. **Make us prove it. We will send a sample section which you can use as a blow-out patch. Test thoroughly in a weakened tire.** If it proves itself, order complete shields; If you are not satisfied return to us, and we will refund price paid. Send $1.00, stating size of casing, and we will send immediately, postpaid. Agents can use these sections to sell from. Liberal Proposition to Agents.



Approved Auto Specialties Company

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No substituto "just as good"
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THE TIRE REMOVER
that should be in every car. It acts on the rim, the ring, the tire, and helps take them off and put them on again.
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JONES SPEEDOMETER
Based on a Principle—Centrifugal Force
JONES SPEEDOMETER Broadway at 76th Street, NEW YORK
PLANTS { Bush Terminal Brooklyn, N. Y. / New Rochelle, N. Y.

Mosler **Spit Fire** Plugs
ARE THE BEST
A R MOSLER & CO
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REO THE FIFTH
Final and crowning achievement of R. E. Olds, pioneer designer of autos. A standard size 30 to 35 Horsepower four cylinder car of modern refinements priced at only $1,095
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TRADE MARK REG. U.S. PAT. OFF.

OILS

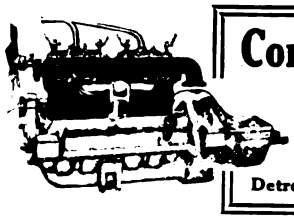
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They are QUALITY lubricants used by particular motorists who realize the value of PERFECT lubrication.



At all good dealers. Remember that "A little goes a long way and every drop counts."

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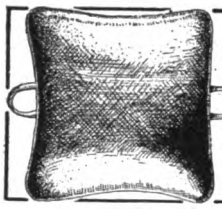


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THE WORLD'S STANDARD
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Continental Motor Mfg. Co.
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K-R-I-T

Five Passenger Touring Car, Fully Equipped - $900
Foredoor Roadster, Fully Equipped - - - $900
Underslung Roadster, Fully Equipped - - $1000
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K-R-I-T MOTOR CAR CO. Dept. N, DETROIT



Motorists Ride Comfortably
Shock-Absorbing Cushions

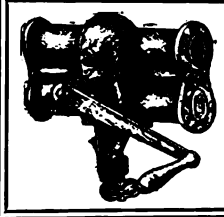
eliminate all strains and back aches and make your long rides perfectly enjoyable. A trial will convince you. Take up very little room in the car. Covered with genuine Spanish leather in brown, green or red. $3.50 post paid anywhere in the United States.
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CAMERON CARS $975

All Up-To-Date Features
Four cylinder, water cooled, 30 H. P. Four forward speeds. 112 in. wheelbase. Left hand drive, centre control. Starts from seat. Pointed hood, beautiful lines and finish. Equipment unsurpassed at the price.
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PRESERVES ROADS
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HAWTHORNE FOUR CYLINDER PUMP

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America's First Car—after twenty years of continuous successful manufacturing—*Still Its Foremost.* Wide Line of Models.
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The Shock Absorbers Which Save Your Car and Tires.
Nothing to Wear, Adjust or Require Attention.
They Take The "Sting" Out of Rough Roads.
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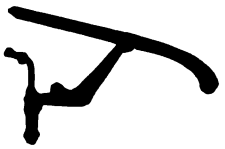


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THOUSANDS OF DOLLARS
Saved Annually by Use of Sager Bumpers.
Don't Wait for a "Smash-up" to Buy Protection.
DO IT NOW.

PRICES $6.00 to $27.50. Liberal Discounts.

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Clamped on Bumpers of Distinction. 30 Models. Attached in 10 Minutes.
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Electric Company

(With a country-wide system of branches and service stations)

Designers and Builders
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Makers of magnetos for fourteen years.
Our country-wide service is available to each user of Remy equipment.

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MULTIBESTOS

The Brake Lining of Quality.

BRINGS
Sales to the Dealer
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Adopted after test as regular equipment on Quality Cars. Woven of the purest of asbestos and treated by an exclusive formula. Multibestos has the highest co-efficient of friction and wears most uniformly through the longest life.

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The Fastest Riding Car in the World

MARMON

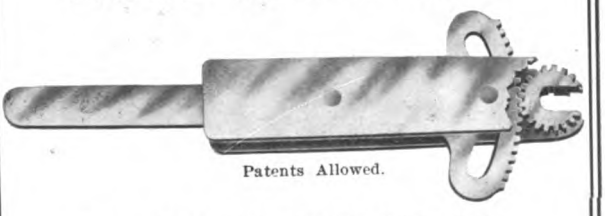
Thoroughly expressive of the highest development of automobile design, materials and construction.

NEW SERIES MARMON "32" $2850 to $4100
THE MARMON SIX $5000 to $6350

F. E. WING MOTOR CAR CO. "Motor Mart"
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A FORD VALVE GRINDER



Patents Allowed.

Will Grind Valves Without Removing Cylinder Heads.
Automatic Rotating Motion.
Attached in a moment and a child can use it. A new and practical guide for the owner and repairman. Will last a lifetime. Fully guaranteed. Write for circular and price list.

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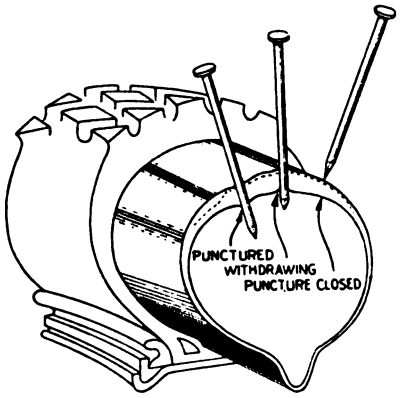
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SIMPLE IN CONSTRUCTION BUT SCIENTIFIC IN PRINCIPLE

WILL NOT DEFLATE WHEN PUNCTURED



Contains more than double the amount of rubber in ordinary tubes. Adds one-third to the life of the casing, due to the reinforced tread, which permits casing to wear practically through. THIS SPELLS ECONOMY.

Used and endorsed by leading merchants of New York and other cities.

Among our users and buyers are 14 of the most prominent manufacturers of motor cars.

Being an AIR FILLED TUBE, it does not interfere with the guarantee given by tire manufacturers.

NO DOPE—NO FILLER—NOTHING BUT AIR

Reliable Agents Wanted. References Required.

Brown Scientific Tube Distributors

Broadway and 72nd Street, NEW YORK CITY

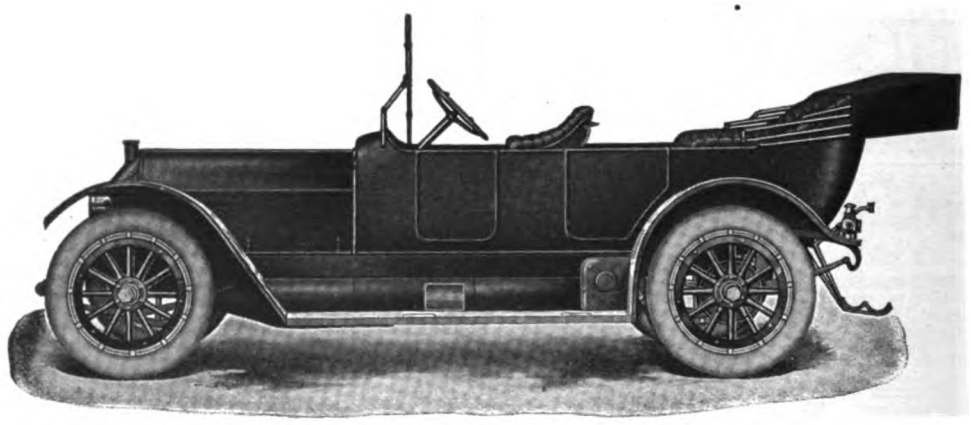
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Knox

Designed and built in accordance with the most approved American and European practice.



A distinctive model of exceptional merit.

BUILT IN NEW ENGLAND, AT SPRINGFIELD, MASSACHUSETTS

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Dover Soap Economizer



Saves over one-third soap consumption

Dover Electric Light Bulb Case

Safe and Very Compact



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DOVER SAVAL MEASURE AND FUNNEL



With Automatic Shut-Off Prevents Overflowing Oil Tank

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Brake Lining
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No Hill Too Steep
No Sand Too Deep

OLYMPIC - 4 cylinders - $1500
MAJESTIC - 4 cylinders - $1975
SULTANIC - 6 cylinders - $2500

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STOCK CHAMPION INTERNATIONAL CHAMPION

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Improved Series V---Five Models, $2750---$3400

NATIONAL MOTOR VEHICLE CO.,
138 E. 22nd St., Indianapolis, Indiana

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GUARANTEED "NO STONE BRUISE" TIRES
Walpole Tire & Rubber Co., Boston, Mass.

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AKRON, OHIO

This name on Automobile Tires and Rubber Accessories signifies inherent qualities of material and workmanship that insure the maximum of service at the minimum of expense.
THE GOODYEAR TIRE & RUBBER COMPANY, AKRON, OHIO (673)



"There's Where YOU Are Wise!

That Other Fellow is a Menace to Everyone's Safety"

Nine-tenths of all automobile accidents are caused by skidding and by foolish dependence on rubber alone. In these days of crowded streets and congested traffic, the motorist who does not take precaution to guard against every possibility of disaster is ***next to criminal.***

"The ever-present danger that is quite as much of a terror to the experienced driver as it is to the novice is **skidding.** There is nothing that makes a man lose his nerve so thoroughly or dread a repetition of the experience so keenly as a bad skid that ends in a broken wheel against a curb, or that makes matters far worse by 'side-swiping' a moving trolley car. To feel the car start to slide from under you, aiming directly at the nearest obstruction, despite all manipulations of the wheel and brakes---well, once is too often."

Weed Anti-Skid Chains

VS.

Slipshod Traffic

Traffic policemen, by the hundreds, interviewed in all the large cities throughout the country, express the unanimous opinion that their work would be **greatly reduced; that nearly all skidding accidents would be eliminated** if motorists would take the precaution of always carrying WEED CHAINS, and putting them on when the roads and pavements are wet, slippery and uncertain, or covered with snow.

Some of these **guardians of public safety** go so far as to say that the time is not far off when State Legislatures will make the use of **WEED CHAINS compulsory,** for the protection of life and property.

Make Safety Yours

Take no chances. Fully equip your own car with WEED CHAINS and **insist,** for your own protection, that other drivers do the same.

On the Rear Tires

they afford perfect traction and adequate brake control.

On the Front Tires

they act as ladders to enable the front wheels to easily climb out of mud-ruts, car tracks and all uneven places in pavements or roads, always insuring absolute steering control, eliminating all chance of the front wheel skid.

If you haven't a set of **WEED CHAINS,** or if you have a pair for the rear tires only, **get a full equipment now.** Delay is dangerous. Stop at your dealers today and **WEED CHAIN** your car to safety.

For Sale by all Reputable Dealers

WEED CHAIN TIRE GRIP CO.
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Would you like to make YOUR brakes safe, sure and certain?

The most important factor in any automobile is the brakes. The brakes in turn are dependent on the lining. If you've had trouble—if you NOW have, write us. We'll be glad to assist you in making your brakes safe. We are brake experts. We know more about brakes and brake lining than anyone else because we make the subject a study. Above all things, be sure YOUR brakes are lined with

TRADE MARK **Raybestos** REG. U.S. PAT. OFF.

"THE ORIGINAL AND BEST ASBESTOS BRAKE LINING"

Here is a REAL brake-lining. The minute your brakes are lined with RAYBESTOS you can go anywhere, anytime with absolute safety and freedom from brake trouble because RAYBESTOS stops ANY car instantly. It's the lining that made the automobile safe—name stamped in every foot for your protection.

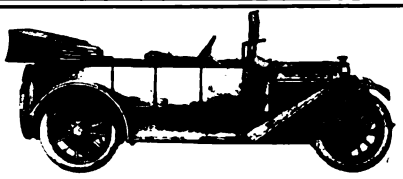
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We also make Duplex and Raymond Brakes and Gurex the Mixer.

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Electric Starting and Lighting

MERCER THE CHAMPION LIGHT CAR

When motor car efficiency, power, durability, and speed are mentioned, all eyes focus on the Mercer.

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Speedwell Series "G" Pleasure Cars

Option given of 60 H. P., 6 cylinder poppet valve motor or 60 H. P., 6 cylinder Speedwell Rotary-valve motor.

4 and 5 passenger models $2850. Fully equipped.

135 inch wheelbase, 36x4 1-2 inch tires, Electric starter Electric lighting and independent Bosch magneto ignition.

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STANWELD RIMS

Mechanically correct—easy to operate—perfect in material and workmanship. Used as standard equipment on the better cars.

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PAIGE "36"—$1275 "25"—$ 950

Leaders of popular-priced cars—thoroughly built, completely equipped, backed by a strong organization. Specifications and catalog on request.

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GASOLENE RULER FOR AUTO TANKS

ADJUSTABLE NUMBERED MARKERS

Price 50 Cents Postpaid

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The Best Built, Medium-Priced Car in America

WARREN MOTOR CAR CO. Detroit, Mich.

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Model 31
"The Little Aristocrat"

The Completely Equipped Empire five-passenger touring car $950—

Equipment includes Mohair Top and Top Envelope, Demountable Rims, Tire Irons, Extra Rim, Accelerator, Windshield, Prest-O-Lite Tank, Horn and Speedometer.

Completely Equipped $950 The Empire Automobile Co., Indianapolis, U. S. A.

"Quality of a Master"

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Four Cylinder $2000 Fully Equipped

Six Cylinder $2750 Fully Equipped

Electric Lighting and Starting---Long Stroke Motor---Large Tires ---Long Wheel Base---Left Hand Drive---Centre Control.
Write for booklet describing in detail the "Boston-Made" Car.
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WON'T BLOW OUT

3x3½ inch $1.00
4x4½ inch 1.20
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Accept no other of your dealer, or we mail postpaid upon receipt of price.
INVINCIBLE TIRE CO.,
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UNITED STATES TIRES
ARE GOOD TIRES



GEISZLER NON-SULPHATING STORAGE BATTERIES

Guaranteed perfect satisfaction or money refunded

SIZE 66 - $20.00

GEISZLER BROS. STORAGE BATTERY COMPANY
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New Departure
"TWO-IN-ONE
Ball Bearings

The only ball bearing that takes load from any direction with equal efficiency.

Catalog for the asking
THE NEW DEPARTURE MFG. CO.
Bristol, Connecticut

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A National Motoring Magazine Devoted Exclusively to the Commercial Field

12 ISSUES $1.00 THE YEAR

GET THIS AUTO TIRE BOOK FREE



Here is a handy little book brimful of practical points which every automobile owner wants to know. Gives all kinds of information about tires—how to prevent troubles, how to repair best, quickest and at least expense. Tells about the wonderful machine, the

SHALER Electric Vulcanizer



"It Makes One Tire Outwear Three." The Shaler repairs any kind of puncture, cut, blow-out, or tear in any outer casing or inner tube. Automatic—makes a perfect weld. Never burns or undercures. For garage or home use, direct or alternating current, or for road use with alcohol. $10 up. Costs ½c per hour to operate. Absolutely guaranteed. **Send Your Name Today** and we will mail our interesting tire book "Care and Repair of Tires." Gives a remedy for every tire emergency. It's free postpaid.

Garage and Repairmen should also write for our money making hand book.

C. A. SHALER CO., 953 4th St., Waupun, Wis.



Bay State Autokit, No. 1, $10
Bay State Autokit, No. 2, $7.50
Bay State Stickit, $3
GEO. A. CUTTER, Sales Agent
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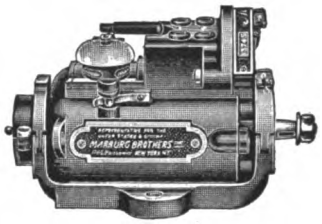
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Five-passenger touring car $1475 Two-passenger roadster $1475

The same chassis is used for both models.

Wide-a-wake dealers write or wire for our remarkable dealer's proposition.

CUTTING MOTOR CAR COMPANY
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Magneto
S. R. O. BALL BEARING

MARBURG BROS., Inc.,
Sole Importers
Detroit. 1790 Broadway, New York. Chicago.

KISSEL KAR Every Inch a Car

made complete in one factory, under a system of inspection that obtains a perfection of detail surpassed in no other car. Investigate.

KISSEL MOTOR CAR CO., 174 Kissel Ave. HARTFORD, WIS.

DIXON'S MOTOR GRAPHITE

Makes a Motor Run Easier, Faster, and Longer and Saves Lubrication Cost. Write for the Book "Lubricating the Motor," No. 210.

JOSEPH DIXON CRUCIBLE CO.
Jersey City (1) New Jersey

When Writing Advertisers, Please Mention The Automobile Journal.

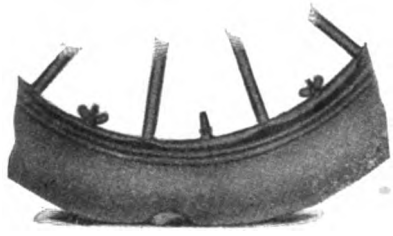
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You can get the whole idea of

Dayton Airless Tires

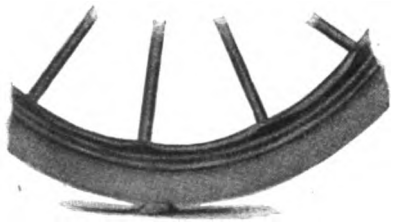
and why they ride smoothly from three pictures and three short paragraphs; here they are:

When a pneumatic tire strikes a stone—



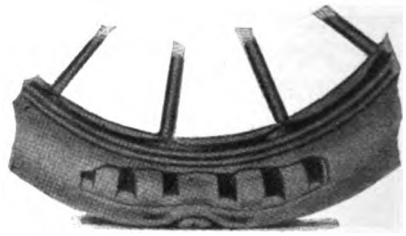
the stone sinks into the tire, air is displaced and the tire passes over the stone with a certain vibration or bounce GREATER, however, than the Dayton Airless.

When a solid tire strikes a stone—



the stone cannot sink into the tire because there is no place for the rubber to "go" or expand into, except on the outside, which is not sufficient, hence, inasmuch as the tire will not yield to the stone, it rides up over it and drops down with a sharp jar or jolt, causing great damage to the mechanism of the car.

But when a Dayton Airless strikes a stone—



the stone sinks into the tire, rubber is displaced and the pier or column of elastic high grade rubber squeezes down and bulges out into the open spaces between the piers and the tire passes over the stone with a very slight vibration or bounce.

You'll want more facts—more proofs and evidence; we've plenty of it; write today for our "Catechism" a book that shows the way out of tire trouble.

Read this reminder now: Dayton Airless Tires must not be mistaken for solid or "filled" tires; they fit all clincher rims; they're made in non skid and smooth tread

DAYTON RUBBER MFG. CO., 1011 Kiser St., Dayton, Ohio

20 Miles to Gallon

Lawrence, Mass., July 13, 1912.
Gentlemen:—Enclosed find check for carburetor. I feel perfectly satisfied. It does 20 miles and over on a gallon. Can recommend it to anyone. G. A. Schmidt.

19 to Gallon on Cadillac

Edgewater, N. J., May 21, 1912.
Planhard Co.:
I am very much pleased with my new Planhard Carburetor. I made a test of gasoline consumption from Edgewater to Hyde Park, N. Y., and return, and got a fraction over nineteen miles to the gallon. This is on my Cadillac.
John H. Hinners.

More Speed—Start Cold

Groton, Conn., Feb. 8, 1913.
Dear Sirs:—I put a Planhard on my single cylinder 6-8 h. p. Goshen engine. It gives 50 R. P. M. more than the ——— I took off. With the Planhard I can start cold or hot without priming, which few others can do.
Yours truly, E. A. Scriven.

3¾ More Miles

When Planhard Carburetors were put on the 6 cylinder, 4 cycle Frisbie motor of the fast boat Delphi II, she increased 230 R. P. M., and 3¾ more miles per hour.

Much More Power

Bath Marine Construction Co.—"The gasoline consumption at normal power was better than others and it would develop much more power when pushed." H. D. Bacon, President.
"Fifty miles without a miss."—Geo. E. Grosvenor, Crescent, Mich.
"To use the vernacular, 'some carburetor.' "—W. R. Fleming, 3311 Broadway, N. Y.

If you own a FORD!

Chicago, Ohio, July 1, 1912.
Gentlemen:—The Planhard Carburetor for my model S Ford Car is very satisfactory. I never bought anything for my car I paid so cheerfully for, as I have a smoother running engine with more power and get *more mileage per gallon* and my engine runs much cooler.
H. W. Grandon.

Gallon Less Per Hour!

on semi-speed boat
HARTFORD III

owned by A. N. Smith, Portland, Maine, who gets better control.

Old Glory II

had a Planhard on her Loew-Victor on her famous trip to Nova Scotia.

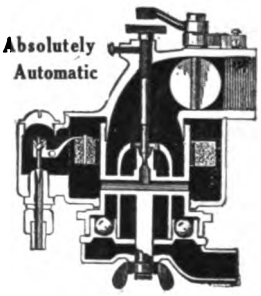
Valient II and Alfred S

took all their prizes with Planhards on their Metropolitan motors.

Emerson III

made a mile in 1 minute 8 seconds over the Washington government course with Planhards.

"Has them all beaten to a frazzle."—A. G. Linden, Cleveland, Ohio.



Note Simplicity.

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PRICES:			Standard Pipe Size		
¾	in...	$9.00	2	in...	$20.00
1	in...	10.00	2½	in...	24.00
1¼	in...	11.00	3	in...	32.00
1½	in...	12.00			

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Gentlemen:—Send at once your chart and book concerning Planhard Carburetor.
Name .....St.....
City .....State.....
Engine .....Carburetor....Size....in.
Threaded? Flanged? Horizontal? Vertical?

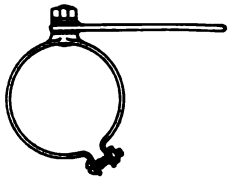
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For SPEED, POWER and ECONOMY



STEERING WHEEL CONTROL

Patented America

ECONOMY! The M&M is positively guaranteed to save from 40 to 50 per cent. of GASOLINE.

SPEED and POWER! The M&M is also guaranteed to increase the SPEED and POWER 20 per cent., WITH LESS GASOLINE AND LESS CARBON.

The M&M Economizer is made with one ground valve and six portholes, which when open, admit auxiliary air into the manifold. This will give you a uniform mixture, which is POSITIVELY NECESSARY to obtain Speed and Power. It is controlled by either friction foot pedal or steering wheel control. It requires a ¾" pipe tap to insert into manifold, but same can be reduced to ½" if necessary. The motorcycle size is ¼".

The M&M is the only known carburetor adjuster on the market, and can be used for priming the engine. It is also a safety valve in case of back-fire, and one of the greatest carbon eliminators on the market. With the throttle set at 12 miles per hour, by opening the M&M, your mileage will be increased to 18 or 20 miles, with the same amount of gasoline, and less carbon. What the Coaster Brake is to the Bicycle the M&M is to the Automobile going down grades.

READ THIS LETTER! Then watch for the next.

Harrisburg, Penn., March 3, 1913.

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Gentlemen:—Concerning the satisfaction given us by the M&M Economizer, we want to say that we have been enthusiastic users of the M&M from the very first, and that was when they were not perfect. The ones put out later are all that anyone can desire, and we think that anyone that does not equip their car with this device is very foolish. We firmly believe that if the automobile public knew the advantage of the M&M Economizer, there would be one placed on every car used. We have been able to get from four to six miles more from a gallon of gasoline. Yours Very Truly,

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The M&M Economizer will positively do what we claim, or money will be refunded in 30 days. (Reference—Citizens National Bank, Lewistown, Pa.) No dealer or jobber is authorized to sell without giving this guarantee.

Price of the automobile Economizer $3.50—17c extra for postage. (Complete with either foot pedal or hand control.) Price of the motorcycle Economizer, $1.25 prepaid.

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The M&M is the ONLY PATENTED air valve of its kind, placed between the carburetor and cylinders, on the market.

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FOR MOTOR CARS

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Remember that Pyrene is the only effective extinguisher of gasolene fires.

Pyrene is a combination of powerful gases in liquid form. As it touches the fire, Pyrene Liquid is converted into a dense white gas blanket which surrounds the fire and smothers it instantly.

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Any manufacturer can build a beautifully finished and luxuriously equipped car—but the real worth of a car comes in the construction.

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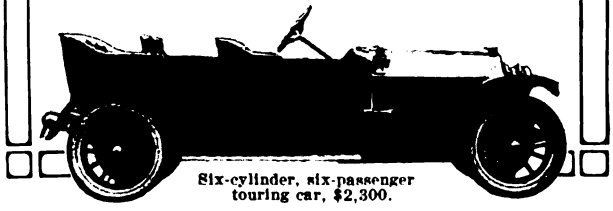
Every STUTZ car is exceedingly easy-riding and comfortable. The straight line low slung body, deep upholstery and luxurious appointments of the STUTZ give it that aristocratic design which lends dignity and quality to a high class motor car.

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Six-cylinder, six-passenger touring car, $2,800.
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Manufacturers of Stutz Cars
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The Repair Man Who Gives Good Advice

No one knows better than the mechanic in the repair shop that POOR LUBRICATION is the cause of worn out bearings and gears, and though NEEDED REPAIRS are the basis of part of the repair man's business, *preaching*, *practicing* or *providing* poor lubrication is the last thing he would think of doing.

His prosperity is built upon honest service, upon honest advice and honest workmanship. He gets more thanks, more good will and more business for his help in *minimizing* repairs than he does for his skill in *making* repairs.

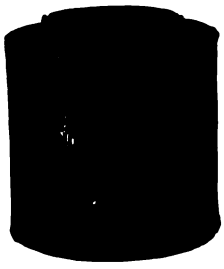
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NON-FLUID OIL
UNITED STATES PATENT OFFICE

for bearings and gears and sells NON-FLUID OIL to his patrons is the man to whom every motorist owes his consideration when repairs are necessary.

THE REPAIR MAN WHO SELLS THE BEST LUBRICANTS IS THE MAN WHO KNOWS THE PENALTY OF USING POOR ONES AND URGES YOU TO AVOID THEM.

Patronize the repair man who sells NON-FLUID OIL.



New York & New Jersey Lubricant Co.

165 Broadway, N. Y.

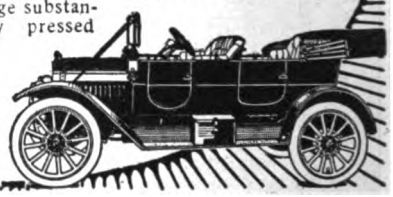
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The LAMBERT

Our Model 66 is a low priced car offering high priced service. It gives a big quality return on little money expended. It efficiently satisfies the requirements of the motorist only because it satisfies the efficiency requirements of the manufacturer. Equipped with 35 H. P. ball bearing motor, top, windshield, large substantial axles, heavy pressed steel frame.

Price, $1100

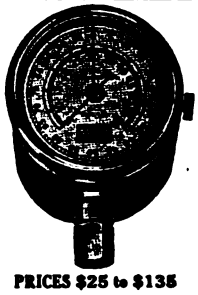
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Speedometer



Accurate, durable---the one speedometer with a daily trip register that can be set at any mileage at any time.

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The "Black Eagle" Spark Plug

PATENTED

50 Cents Is Enough

The "Black Eagle" Spark Plug has made good because it was designed and manufactured with this result in view.

A person in close touch with the supply and manufacturing ends of the trade was a visitor at our factory recently, and was shown the details of construction, including the machinery, testing, and assembling of the "BLACK EAGLE" Spark Plug. What he said we believe will be of interest to you, as it indicates the effort on our part to supply a high grade plug at a reasonable price. We therefore quote below his impressions.

"I am simply amazed at the workmanship, material, and construction of the 'BLACK EAGLE' Spark Plug. When I saw this plug advertised at a price of 50c to the consumer, I naturally supposed it was a cheap, common, plug such as you occasionally find in jobbing houses on the bargain counter. I am convinced, after seeing these plugs tested, and examining minutely the machine parts which enter into their construction, that **no better porcelain spark plug is offered by any one, regardless of the price they ask.**"



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Sent prepaid on receipt of price. Made in all standard threads.

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40-Horsepower Touring Car or Roadster, absolutely silent in operation. Oversize tires 35x4 1-2---cylinders 4 1-4x5 1-4 in.---118-in. wheel base---four-forward-speed transmission ---demountable rims---nickel mountings ---massive, straight-line body---big, roomy seats---electric lighting by generator---everything. Price $1585, includes full equipment. We also make a 33 H. P. model. Catalog on request.



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Electric self-cranking, electrically lighted.
Four Forward Speeds.

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Automobile Specialties

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Paint them twice a season with

THOMAS' ANTI RIM RUST PAINT

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STOP INFLATION AND SPARK PLUG TROUBLES

The Brown Impulse Tire Pump and the B'Co. Quick Detachable Spark Plug will do it.

Give a quarter turn and lift out the core of your spark plug, drop in the pump and give a quarter turn.

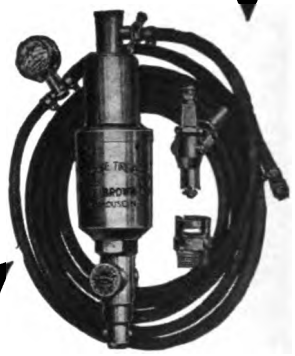
It's done in a jiffy—no wrench, no broken plugs.

The 1913 Brown Tire Pump is equipped with a B'Co. Quick Detachable Spark Plug, self opening valve connection, High Grade Recording Gauge and 12 feet of air hose.

You need this outfit as part of your 1913 equipment.

Sold by first class dealers everywhere. If you cannot be supplied locally, write us.

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Which will YOU buy?

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12 to 14 INCHES LONG, 7-PLY, EXTRA HEAVY
3 inch, **$1.00**; 3 1-2 inch, **$1.25**; 4 inch, **$1.50**
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Johns-Manville Co., H. W., Madison Ave. and 41st St., New York City.

CHAINS, TIRE, AND ANTI-SKIDDING DEVICES.

Weed Chain Tire Grip Co., 28 Moore St., New York. (Weed.)

CHAINS—TRANSMISSION OR DRIVING.

Boyd, F. Shirley, 903 Boylston St., Boston. (Baldwin.)

Miller, Chas. E., 97-103 Reade St., New York. (Brampton.)
Branches: See Accessory Manufacturers and Jobbers.)

CLOCKS FOR DASHBOARDS, ETC.

Boston Clock Co., 16 State St., Boston.

Chelsea Clock Co., 16 State St., Boston.

CLUTCHES—AUTOMOBILE FRICTION.

Brets Co., J. S., 250 W. 54th St., New York. (Hartford Cone.)

COILS.

Heinze Electric Co., Lowell, Mass.

CONTROLLERS AND ECONOMIZERS.

Moller Brothers Controller & Economizer Co., 700 Betz Bldg., Philadelphia. (M. & M.)

CUSHIONS.

Leavens & Co., Wm., 32 Canal St., Boston. (Leavens Shock Absorbing.)

CYLINDER CLEANING COMPOUND.

Milwaukee Auto Specialty Co., 128 Second St., Milwaukee.

Prest-O-Lite Company, 271 East South St., Indianapolis. (Prest-O-Carbon Remover.)
Branches: Atlanta, Baltimore, Boston, Buffalo, Chicago, Cincinnati, Cleveland, Dallas, Denver, Detroit, Indianapolis, Jacksonville, Kansas City, Los Angeles, Milwaukee, Minneapolis, New York, Omaha, Philadelphia, Pittsburg, Providence, San Francisco, Seattle, St. Louis and St. Paul.

FIRE EXTINGUISHERS.

Pyrene Co. of New England, 176 Federal St., Boston. (Pyrene.)

FUNNELS, AUTO.

Dover Stamping & Manufacturing Co., Cambridge, Mass. (Dover.)

GASKETS.

Brown Co., Inc., Chas. D., 49 Federal St., Boston. (Vellumoid.)

GAUGES.

Goodnow Manufacturing Co., 754 Old South Bldg., Boston. (Gasoline Gallon.)

National Motor Supply Co., 1911 Euclid Ave., Cleveland. (Tire Pressure and Gasoline Tank.)
Branches: In all principal cities.

GEARS, STEERING.

Ross Gear & Tool Co., 794 Heath St., Lafayette, Ind. (Ross.)

GUNS, GREASE. (See Oil Pumps.)

HEADLIGHTS.

Sumner, Geo., Inc., 1926 Broadway, New York City. (Diva.)

HORNS.

Dean Electric Co., Elyria, O. (Tuto.)

Randall-Faichney Co., Boston. (Jericho, Jubilee.)
Branch: 918 Eighth Ave., New York.

INSULATION.

Johns-Manville Co., H. W., Madison Ave. and 41st St., New York City.

LAMP COVERS.

Hopewell Brothers, Newton, Mass. (Hopewell.)
Branch: 1974 Broadway, New York.

LAMPS.

Hawthorne Manufacturing Co., 29 Spruce St., Bridgeport, Conn. (Old Sol.)

LICENSE NUMBER BRACKETS.

Hawthorne Manufacturing Co., 29 Spruce St., Bridgeport, Conn.

National Motor Supply Co., 1911 Euclid Ave., Cleveland, O.
Branches: In all principal cities.

LIGHTING SYSTEMS, ELECTRIC.

Apple Electric Co., Dayton, O. (Aplco.)

Dean Electric Co., Elyria, O. (Dynalux.)

Geissler Bros. Storage Battery Co., 514-520 W. 57th St., New York.

Remy Electric Co., Anderson, Ind. (Remy.)

LOCK SWITCHES. (See Switches.)

LUBRICANTS.

Borne, Scrymser Co., 80 South St., New York. (Colonial.)
Branches: Boston, Fall River, Philadelphia.

Dixon Crucible Co., Jos., Jersey City, N. J. (Graphite.)

Eagle Oil & Supply Co., 104 Broad St., Boston. (Eagleine No-Karbon.)

Harris Oil Co., A. W., 326 South Water St., Providence. (Harris.)
Branch: 143 No. Wabash Ave., Chicago.

Haws, Geo. A., 77 Pine St., New York. (Panhard.)
Branch: 899 Boylston St., Boston.

Indian Refining Co., 17 Battery Place, New York. (Distributors of Havoline Oil.)
Branches: Pacific Coast—Kohl Bldg., San Francisco; Western—People's Gas Bldg., Chicago; Southern—Title Guarantee & Trust Bldg., Birmingham, Ala.; First National Bank Bldg., Cincinnati, O.; Lynchburg, Va.; St. Paul.
Refineries: Georgetown, Ky.; Lawrenceville, Ill.

Invader Oil Co., 80 Broad St., New York. (Invader.)
Branches: 284 Columbus Ave., Boston; 113 Arch St., Philadelphia; 3556 11th St., N. W., Washington, D. C.

Miller, Chas. E., 97-103 Reade St., New York. (Pan-American.)
Branches: See Accessory Manufacturers and Jobbers.

New York & New Jersey Lubricant Co., 165 Broadway, New York. (MoToRol, Non-Fluid, Kejex.)

Standard Oil Co., New York. (Polarine.)
Branches: In all cities.

Texas Company, The, 7 West St., New York.
Branches: Boston, Philadelphia, Chicago, St. Louis, Norfolk, Atlanta, New Orleans, Dallas, El Paso, Pueblo, Tulsa, Houston.

Vacuum Oil Co., Rochester, N. Y. (Mobiloil.)
Branches: 49 Federal St., Boston; 29 Broadway, New York; Fourth and Chestnut Sts., Philadelphia; 154 Exchange St., Bangor, Me.; 406 Hitchcock Bldg., Springfield, Mass.; 117 Commercial St., Portland, Me.; Fisher Bldg., Chicago; Ford Bldg., Detroit; Indiana Pythian Bldg., Indianapolis.

Valvoline Oil Co., 27 State St., Boston. (Valvoline.)

MAGNETOS AND SUPPLIES.

Bosch Magneto Co., 223-225 W. 46th St., New York.
Branches: 119-121 E. 24th St., Chicago; 1250 Woodward Ave., Detroit; 357 Van Ness Ave., San Francisco.

Brets Co., J. S., 250 W. 54th St., New York. (U. & H.)

Marburg Bros., 1790 Broadway, New York. (Mea.)

Remy Electric Co., Anderson, Ind. (Remy.)

Splitdorf Electrical Co., 98 Warren St., Newark, N. J.
Branches: 10-20 W. 63rd St., New York; 1110 S. Michigan Ave., Chicago; 180-182 Massachusetts Ave., Boston; 1028 Geary St., San Francisco; 868 Woodward Ave., Detroit; 1228 S. Olive St., Los Angeles, Cal.; S. W. Corner Cherry and Juniper Sts., Philadelphia; 1823 Grand Ave., Kansas City; 1628 Broadway, Seattle, Wash.; London, Eng.; Buenos Aires.

MEASURES.

Dover Stamping & Manufacturing Co., Cambridge, Mass. (Auto and Savol.)

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CLASSIFIED BUYERS' GUIDE—Continued

MIXING DEVICES, GASOLINE.

Approved Auto Specialties Co., 1731-37 Broadway, New York. (Wolf.)
Royal Equipment Co., 422 Housatonic Ave., Bridgeport, Conn. (Gyrex.)

MOTORCYCLES AND SUPPLIES.

American F. N. Co., Boston. (F. N.)
Branches: 49 Union St., Providence; 415 Trumbull St., Hartford, Conn.
Emblem Manufacturing Co., Angola, N. Y. (Emblem.)
Branches: Los Angeles, San Francisco.
Hawthorne Manufacturing Co., 29 Spruce St., Bridgeport, Conn. (Old Sol Lamps.)
Miami Cycle & Manufacturing Co., 320 Hanover St., Middletown, O. (Flying Merkel.)
Swenson, B. A., 522 Broad St., Cor. Blackstone St., Providence. (Indian.)

MOTORING ORGANIZATIONS.

Federation American Motorcyclists, E. M. Batabrook, Bangor, Me.

MOTORS AND POWER PLANTS.

Continental Motor Mfg. Co., Detroit. (Continental.)
Rutenber Motor Co., Marion, Ind. (Rutenber.)

PACKING, FIRE.

Johns-Manville Co., H. W., Madison Ave. and 41st St., New York City.

PAINT, ANTI-RUST.

Anti-Rust Paint Co., Dept. 7, Akron, O. (Thomas.)

PATCHES.

Invincible Puncture Proof Tire Co., 53 Sabin St., Providence, R. I. (Invincible.)
National Motor Supply Co., 1911 Euclid Ave., Cleveland.

POLISH.

International Metal Polish Co., Quill St. and Belt R. R., Indianapolis, Ind. (Blue Ribbon.)
Johns-Manville Co., H. W., Madison Ave. and 41st St., New York City.

PUBLICATIONS, AUTOMOBILE.

The Automobile Journal, 24 issues, $1.00 the year.
The Motor Truck (Commercial Car) Monthly, $1.00 the year.
The Accessory and Garage Journal, Monthly, $1.00 the year.
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Maintenance and Repair of Motor Car Tires ..... .25
Sent Postpaid to any address in United States upon receipt of price. Address all communications to The Automobile Journal, Pawtucket, R. I.

PUMPS, OIL AND GREASE.

Randall-Faichney Co., Boston. (B-Line.)
Branches: See Horns.

PUMPS, TIRE.

Brown Co., Syracuse, N. Y. (Brown Impulse.)
Dewey-Anderson Co., Toledo, O. (Dewey Power.)
Hawthorne Manufacturing Co., Inc., 29 Spruce St., Bridgeport, Conn. (Hawthorne.)

RADIATOR CONNECTORS.

Johns-Manville Co., H. W., Madison Ave. and 41st St., New York City.

RIMS—REMOVABLE AND DETACHABLE.

Boyd, F. Shirley, 903 Boylston St., Boston. (Dorian.)
Firestone Tire & Rubber Co., Akron, O.
Branches: In all principal cities.
United States Tire Co., Broadway and 58th St., New York. (Continental and Whittlesey Demountable.)
Branches: New York, Chicago, San Francisco.

ROAD BUILDING MATERIALS.

Barrett Manufacturing Co., New York. (Tarvia.)
Branches: Chicago, Philadelphia, Boston, St. Louis, Cleveland, Pittsburg, Cincinnati, Kansas City, Minneapolis, New Orleans, Seattle, London, Eng.; Montreal, Toronto, Winnipeg, Vancouver, Can.; St. John, N. B.; Halifax, N. S.

SELF-STARTERS.

National Gas Engine Starter Co., 30-32 N. Dearborn St., Chicago. (National.)
Willard Storage Battery Co., 5716 Euclid Ave., Cleveland. (LBA.)
Branches: See Batteries.

SHIELDS, MOTOR.

Johns-Manville Co., H. W., Madison Ave. and 41st St., New York City. (Asbestos.)

SHOCK ABSORBERS AND SUPPLEMENTARY SPRINGS.

Boyd, F. Shirley, 903 Boylston St., Boston.
"J-M" Shock Absorber Co., 210 So. 17th St., Philadelphia. ("J-M.")
Branches: 218 W. 84th St., New York; 222 Elliot St., Boston; Teck Building, Buffalo; 10 W. Eager St., Baltimore; 41 Dexter St., Pawtucket, R. I.
Sager Co., J. H., 271 South Ave., Rochester, N. Y. (Peerless.)
Sumner, George, Inc., 1926 Broadway, New York. (Velvet Auxiliary.)

SOAPS.

Hopewell Brothers, Newton, Mass. (Paos.)
Branch: 1974 Broadway, New York.

SOLDERS.

Simplex Aluminum Solder Co., 108 Broadway, Long Island City, N. Y. (Simplex.)

SPARK PLUGS AND IGNITERS.

American Ignition Co., 319 Adams St., Dorchester, Mass. (Amico.)
Bosch Magneto Co., 223-225 W. 46th St., New York.
Branches: See Magnetos and Magneto Supplies.
Frontier Specialty Co., 734 Main St., Buffalo. (All-in-One.)
Heinze Electric Co., Lowell, Mass. (H. E. Co. Priming.)
Janney, Steinmetz & Co., Philadelphia.
Johns-Manville Co., H. W., Madison Ave. and 41st St., New York City.
Mosler, A. R., & Co., P. O. Box M, Mt Vernon, N. Y. (Spit Fire.)
Randall-Faichney Co., Boston. (Mac-Kae.)
Branches: See Horns.
Splitdorf Electrical Co., 98 Warren St., Newark, N. J.
Branches: See Magnetos and Magneto Supplies.
Standard Co., The, Torrington, Conn. (Black Eagle.)

SPARK PLUG TERMINALS.

Johns-Manville Co., H. W., Madison Ave. and 41st St., New York City.
Randall-Faichney Co., Boston. (Mac-Kae Blits.)
Branches: See Horns.

SPEEDOMETERS.

Hoffecker Co., The, Motor Mart, Boston. (Hoffecker.)
Jones Speedometer, New Rochelle, N. Y.
Branches: Broadway and 76th St., New York; 109 Massachusetts Ave., Boston; 1416 Vine St., Philadelphia; 1430 Michigan Ave., Chicago; 852 Main St., Buffalo; 253-255 Jefferson Ave., Detroit; 530 Golden Gate Ave., San Francisco; 1229 So. Olive St., Los Angeles, Cal.; 329 Ankeny St., Portland, Ore.; 917 E. Pike St., Seattle, Wash.
Warner Instrument Co., 1221 Wheeler Ave., Beloit, Wis. (Auto-Meter.)
Branches: 116 Edgewood Ave., Atlanta, Ga.; 925 Boylston St., Boston; 720 Main St., Buffalo; 2420 Michigan Ave., Chicago; 807 Main St., Cincinnati; 2062 Euclid Ave., Cleveland; 1518 Broadway, Denver; 870 Woodward Ave., Detroit; 330½ North Illinois St., Indianapolis; 1613 Grand Ave., Kansas City; 748 S. Olive St., Los Angeles, Cal.; 1902 Broadway, New York; 302 N. Broad St., Philadelphia; 5940 Kirkwood Ave., Pittsburg; 36-38 Van Ness Ave., San Francisco; 611 E. Pike St., Seattle, Wash.; 3923 Olive St., St. Louis; 559 Yonge St., Toronto, Can.

SPRINGS FOR AUTOMOBILE SUSPENSION.

Marburg Bros., 1790 Broadway, New York. (Marburg-Hagen.)
Perfection Spring Co., No. 1 Plant, 2414 Superior Ave., N. W.; No. 2 Plant, East 65th and Central Ave., Cleveland.
Sumner, Geo., Inc., 1796 Broadway, New York City. (Acme.)

SPROCKETS.

Boyd, F. Shirley, 903 Boylston St., Boston. (Baldwin.)

STEEL PARTS, SEAMLESS.

Standard Welding Co., Cleveland.

STORAGE SYSTEMS—GASOLINE AND OIL.

Janney, Steinmetz & Co., Philadelphia.
Scaife & Sons Co., Wm. B., Pittsburg, Penn.
Branch: New York City.

SWITCHES, LOCK.

Blackburn Specialty Co., 1120 Prospect Ave., S. E., Cleveland. (Autolock.)

TANKS, ACETYLENE GAS.

Prest-O-Lite Company, 271 East South St., Indianapolis. (Prest-O-Lite.)
Branches: See Cylinder Cleaning Compound.

TANKS FOR FUEL AND WATER.

Janney, Steinmetz & Co., Philadelphia.
Scaife & Sons Co., Wm. B., Pittsburg, Penn.
Branch: New York City.

TANKS, TIRE INFLATING.

Prest-O-Lite Co., 271 East South St., Indianapolis. (Baby Tire Filler, The Emancipator.)
Branches: See Cylinder Cleaning Compound.

TAPE, ASBESTOS.

Johns-Manville Co., H. W., Madison Ave. and 41st St., New York City.

THERMOS CASES.

Dover Stamping & Manufacturing Co., Cambridge, Mass.

TIRE ACCESSORIES.

Firestone Tire & Rubber Co., Akron, O.
Branches: See Rims—Removable and Detachable.
Shaler Co., C. A., Waupun, Wis.

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CLASSIFIED BUYERS' GUIDE—Continued

TIRE CASES.

Hopewell Brothers, Newton, Mass. (Hopewell.)
Branch: 1974 Broadway, New York.

TIRE CHAIN GRIPS. (See Chains.)

TIRE PRESERVATIVES AND PROTECTORS.

Approved Auto Specialties Co., 1781-87 Broadway, New York. (Goodman Tire Shield.)
Gray Specialty Co., 148 Avon Ave., Newark, N. J.
National Rubber Co., 4433 Papin St., St. Louis, Mo. (Tirenew.)
Page-Lester Co. 2644 Indiana Ave., Chicago. (Tite-Wad Rubber Putty.)

TIRE REMOVERS.

O-Tak-A Tire Remover, Le Roy, N. Y.

TIRES—CASINGS AND INNER TUBES.

Diamond Rubber Co., Akron, O. (Diamond.)
Firestone Tire & Rubber Co., Akron, O. (Firestone.)
Branches: See Rims—Removable and Detachable.
Fisk Rubber Co., Chicopee Falls, Mass. (Fisk.)
Branches: 811-813 Boylston St., Boston; 171½ Dorrance St., Providence.
Frontier Tire & Rubber Co., 1054 Main St., Buffalo, N. Y. (Frontier.)
Gaulois Tire Co., 1926 Broadway, New York. (Gaulois.)
Goodyear Tire & Rubber Co., Madison St., Akron, O. (No-Rim-Cut.)
Branches: In all principal cities.
Hood Rubber Co., Watertown, Mass. (Shawmut.)
United States Tire Co., Broadway and 58th St., New York. (Continental, G & J, Hartford, Morgan & Wright.)
Branches: See Rims—Removable and Detachable.
Vanderpool Tire & Rubber Co., Springfield, O.
Walpole Tire & Rubber Co., Walpole, Mass. (Walpole.)

TIRES—CUSHION.

Cataract Rubber Co., Wooster, O. (Cataract.)
Branches: Boston, New York, Providence.
Firestone Tire & Rubber Co., Akron, O. (Firestone.)
Branches: See Rims—Removable and Detachable.
Mots Tire & Rubber Co., The, Akron, O. (Electric Special Mots Cushion.)
Branches: Boston, New York, Philadelphia, Pittsburg, Chicago, Kansas City, Detroit, Cleveland, Los Angeles.

TIRES—MOTORCYCLE.

United States Tire Co., Broadway and 58th St., New York. (Morgan & Wright, G. & J.)
Branches: See Rims—Removable and Detachable.

TIRES—SOLID AND COMMERCIAL.

Diamond Rubber Co., Akron, O. (Diamond.)
Firestone Tire & Rubber Co., Akron, O.
Branches: See Rims—Removable and Detachable.
Fisk Rubber Co., Chicopee Falls, Mass.
Branches: See Tires—Casings and Inner Tubes.
Mots Tire & Rubber Co., The, Akron, O. (Mots.)
Branches: See Tires—Cushion.
Polack Tyre and Rubber Co., 246 W. 59th St., New York City. (Polack.)
Republic Rubber Co., Youngstown, O. (Republic.)
United States Tire Co., Broadway and 58th St., New York.
Branches: See Rims—Removable and Detachable.
Vanderpool Tire & Rubber Co., Springfield, O.

TOPS AND ATTACHMENTS.

Springfield Metal Body Co., 20 Medford Ave., Springfield, Mass.

TROUBLE FINDERS.

Hopewell Brothers, Newton, Mass. (Vibrator.)
Branch: 1974 Broadway, New York.

TRUCKS AND TRACTORS—See Cars, Commercial.

TRUNK RACKS.

Connecticut Steel & Wire Co., Hartford, Conn.

TUBING, GAS.

Johns-Manville Co., H. W., Madison Ave. and 41st St., New York City.

TURNTABLES.

Beach Co., T. C., 108 Ottawa St., St. Johns, Mich. (Beach.)

UNIVERSAL JOINTS.

Bretz Co., J. S., 520 W. 54th St., New York. (Hartford.)
Kinsler-Bennett Co., The, P. O. Box 124, Hartford, Conn. (Kant-Break.)

VALVE GRINDERS.

Wall, J. H., 290 Hope St., Bristol, R. I. (Ford.)

VULCANIZERS.

McVey Manufacturing Co., Third and Canal Sts., Dayton, O. (McVey.)
National Motor Supply Co., 1911 Euclid Ave., Cleveland. (Garage and Individual.)
Branches: In all principal cities.
Shaler Co., C. A., Waupun, Wis.
Vanderpool Tire & Rubber Co., Springfield, O.
Williams Foundry & Machine Co., Akron, O.

WELDING OUTFITS.

Prest-O-Lite Co., 309 W. South St., Indianapolis. (Prest-O-Welder.)
Branches: See Cylinder Cleaning Compound.

WELDING, STEEL.

Standard Welding Co., Cleveland.

WHEELS.

Eberly & Orris Mfg. Co., Mechanicsburg, Penn.

WIRES AND CABLES.

Diamond Rubber Co. of N. Y., Akron, O. (Diamond.)

WIRE MECHANISM.

Bretz Co., J. S., 250 W. 54th St., New York. (Bowden.)

WRENCHES AND COMBINATION OUTFITS.

Allen Wrench and Tool Co., Providence, R. I. (Allen Friction Socket Sets.)
Coes Wrench Co., Worcester, Mass.
Cutter, George A., Taunton, Mass.
Walworth Manufacturing Co., Boston. (Stillson.)

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Automobile Manufacturers Who Have Contracted for



Storage Batteries

For Starting or Lighting or Both

Abbott Motor Co	Detroit, Mich.
Allen Motor Car Co	Fostoria, O.
Alpena Motor Car Co	Alpena, Mich.
American-LaFrance Fire Eng. Co	Elmira, N. Y.
American Locomotive Co	Providence, R. I.
American Motors Co	Indianapolis, Ind.
Ames Motor Car Co	Owensboro, Ky.
Apperson Bros. Automobile Co	Kokomo, Ind.
O. Armleder Co	Cincinnati, Ohio.
Auburn Automobile Co	Auburn, Ind.
Bartholomew Co	Peoria, Ill.
Buckeye Mfg. Co	Anderson, Ind.
Canadian Standard Auto & Tract. Co	Ft. Wayne, Ind.
Cartercar Co	Pontiac, Mich.
J. I. Case T. M. Co. Motor Wks	Racine Jct., Wis.
Chadwick Engineering Works	Pottstown, Pa.
F. Coleman Carriage & Harness Co	Ilion, N. Y.
Columbus Buggy Co	Columbus, Ohio.
Commerce Motor Truck Co	Detroit, Mich.
Corbitt Automobile Co	Henderson, N. C.
Crawford Automobile Co	Hagerstown, Md.
Crescent Motor Co	Cincinnati, Ohio.
Crow Motor Car Co	Elkhart, Ind.
Croxton Motor Car Co	Washington, Pa.
Jas. Cunningham, Son & Co	Rochester, N. Y.
Cutting Motor Car Co	Jackson, Mich.
Geo. W. Davis Carriage Co	Richmond, Ind.
Elkhart Carriage & Harness Co	Elkhart, Ind.
Enger Motor Car Co	Cincinnati, Ohio.
F. I. A. T. Company	Poughkeepsie, N. Y.
Flanders Motor Co	Detroit, Mich.
H. H. Franklin Mfg. Co	Syracuse, N. Y.
Gramm-Bernstein Co	Lima, Ohio.
Gramm Motor Truck Co	Lima, Ohio.
Gramm Motor Truck Co	Walkerville, Ont.
Great Western Automobile Co	Peru, Ind.
Haberer & Co	Cincinnati, Ohio.
Havers Motor Car Co	Port Huron, Mich.
Haynes Automobile Co	Kokomo, Ind.
Henderson Motor Car Co	Indianapolis, Ind.
Herreshoff Motor Co	Detroit, Mich.
Ideal Motor Car Co	Indianapolis, Ind.
Imperial Automobile Co	Jackson, Mich.
Jackson Automobile Co	Jackson, Mich.
Kelly-Springfield Motor Truck Co	Springfield, O.
King Motor Car Co	Detroit, Mich.
Kline Motor Car Co	Richmond, Va.
Knox Automobile Co	Springfield, Mass.
Lenox Motor Car Co	Boston, Mass.
Lexington Motor Car Co	Connersville, Ind.
Little Motor Car Co	Flint, Mich.
Locomobile Company of America	Bridgeport, Conn.
Losier Motor Co	Detroit, Mich.
Lyons Atlas Co	Indianapolis, Ind.
Marathon Motor Co	Nashville, Tenn.
Maritime Motor Car Co., Ltd	St. John, N. B.
Marion Motor Car Co	Indianapolis, Ind.
Martindale & Millikan	Franklin, Ind.
Maxwell Motor Car Co	Detroit, Mich.
W. H. McIntyre Co	Auburn, Ind.
McLaughlin Motor Car Co	Oshawa, Ont.
Mercer Automobile Co	Trenton, N. J.
Metzger Motor Car Co	Detroit, Mich.
Michigan Buggy Co	Kalamazoo, Mich.
Midland Motor Car Co	Moline, Ill.
Moline Automobile Co	East Moline, Ill.
Moon Motor Car Co	St. Louis, Mo.
Motor Car Mfg. Co	Indianapolis, Ind.
Nance Motor Car Co	Philadelphia, Pa.
National Motor Vehicle Co	Indianapolis, Ind.
Nordyke & Marmon Co	Indianapolis, Ind.
Norwalk Motor Car Co	Martinsburg, W. Va.
Nova Scotia Carriage Co	Kentville, N. S.
Nyberg Automobile Works	Anderson, Ind.
Oakland Motor Car Co	Pontiac, Mich.
Packard Motor Car Co	Detroit, Mich.
Paige-Detroit Motor Car Co	Detroit, Mich.
Palmer & Singer Mfg. Co	Long Island City, N. Y.
Paterson Wagon Works	Flint, Mich.
Peerless Motor Car Co	Cleveland, Ohio.
Pilot Motor Car Co	Richmond, Ind.
Pope Mfg. Co	Hartford, Conn.
Premier Motor Car Co	Indianapolis, Ind.
Pullman Motor Car Co	York, Pa.
Regal Motor Car Co	Detroit, Mich.
Reo Motor Car Co	Lansing, Mich.
Reo Motor Car Co. of Canada	St. Catharines, Ont.
Russell Motor Car Co	W. Toronto, Ont.
Sayers & Scoville Co	Cincinnati, O.
Schacht Motor Car Co	Cincinnati, Ohio.
Seagrave Co	Columbus, Ohio.
Selden Motor Vehicle Co	Rochester, N. Y.
Simplex Automobile Co	New Brunswick, N. J.
A. O. Smith Co	Milwaukee, Wis.
Spaulding Mfg. Co	Grinnell, Ia.
Speedwell Motor Car Co	Dayton, Ohio.
Stanley Motor Car Co	Newton, Mass.
F. B. Stearns Co	Cleveland, Ohio.
Stegeman Motor Car Co	Milwaukee, Wis.
Sternberg Mfg. Co	Milwaukee, Wis.
Stevens-Duryea Co	Chicopee Falls, Mass.
Stoddard-Dayton Co. (Maxwell)	Dayton, Ohio.
Studebaker Corporation	Detroit, Mich.
The Tudhope Motor Car Co	Orillia, Can.
Velie Motor Vehicle Co	Moline, Ill.
Warren Motor Car Co	Detroit, Mich.
Wayne Works	Richmond, Ind.
Webb Co	Allentown, Pa.
Westcott Motor Car Co	Richmond, Ind.
White Company	Cleveland, Ohio.
Wichita Falls Motor Co	Wichita Falls, Tex.
Winton Motor Car Co	Cleveland, Ohio.
Zimmerman Mfg. Co	Auburn, Ind.

Need We Say More?

Willard Storage Battery Co.

Cleveland, Ohio

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The 8-DAY HIGH GRADE } **"BOSTON" AUTO CLOCKS**

☞ These superbly built 8-day, high-grade clocks have seven-jeweled escapements, Breguet hairsprings, cut steel pinions, compensation balances, dust and water proof cases, etc., and are dealt in and used by those demanding a first-class article.

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Ask Your Dealer for the "BOSTON" AUTO CLOCK

MODEL B



MODEL C



Adjustable to various angles by Ratchet and Nut at back. In general appearance it closely matches many makes of speedometers.

MODEL D



MODEL E



PRICE LIST— PER CLOCK	SIZE (Dial)	MODELS A, B, C.	MODEL D	MODEL E
	3-inch	$18.00	$21.00	$24.00
	3 1-2-inch . . .	20.00	24.00	27.00
	4-inch	22.00	27.00	30.00

For (Patent Applied for) Outside Stem Winding and Stem Setting Device, ADD $3.00 to above prices.

Superior to other devices. A great convenience for winding clock and setting the hands without opening the clock case.

☞ All sizes stated are the approximate diameters of the dials

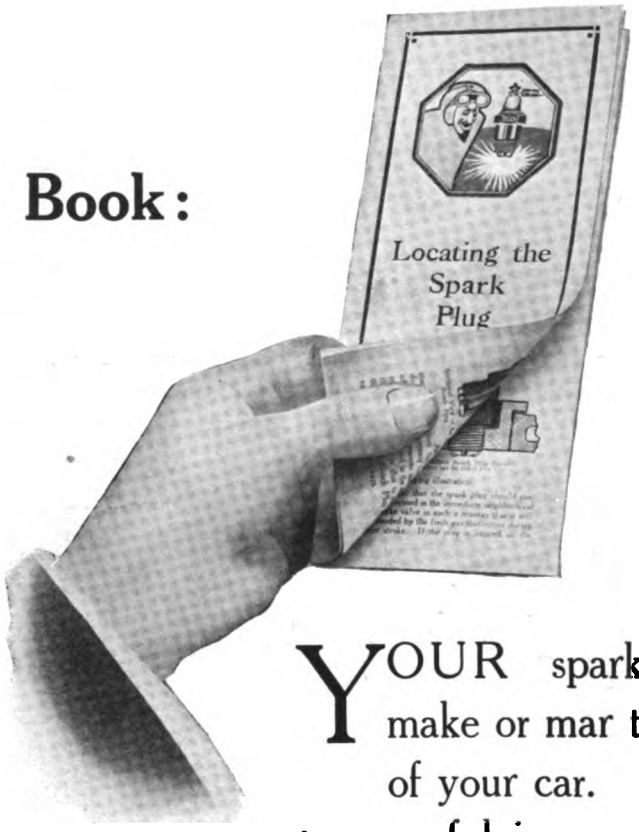
The 8-Day High Grade } **"BOSTON" AUTO CLOCK** { For AUTOMOBILES and MOTOR BOATS

On Sale By Leading Jobbers and Dealers.
If Not With Your Dealer Sent on Receipt of Price.

BOSTON CLOCK CO., 16 State St., Boston, Mass.

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for this Book: it's free



YOUR spark plugs can make or mar the efficiency of your car. You can't be too careful in your selection of them for they are the Keystone of the ignition system.

"Locating the Spark Plug" tells you all you should know about plugs; tells it in a way you can understand and profit by. In addition, it tells you about a perfect spark plug, the kind you need in your engine.

...Write for the Book today...

BOSCH MAGNETO CO.

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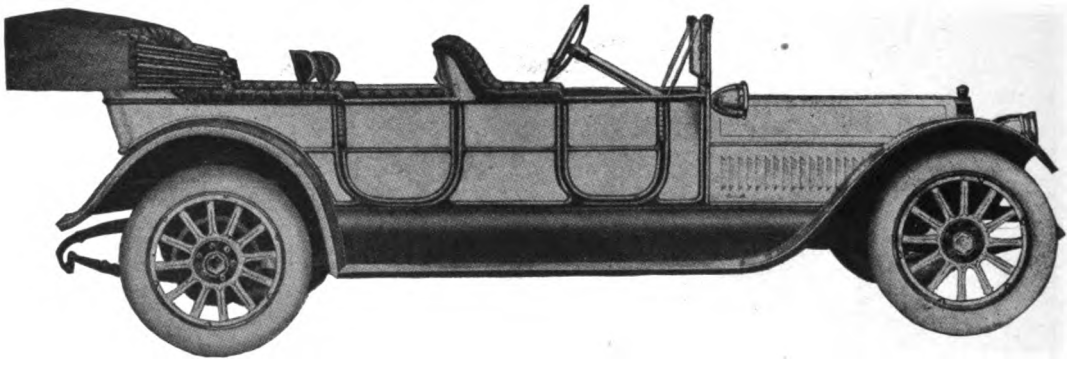
Our Exclusive Feature

We will (at small extra cost) furnish our Regular Models with the

AUSTIN

Two-Speed Axle

This axle provides two different gear ratios, both on direct drive, and in combination with a three-speed transmission gives six speeds forward and two reverse.



Model "77" has a Regular Direct Drive of 3 1-2 to 1, and a Special Direct Drive of 2 to 1.
Model "55" has a Regular Direct Drive of 4 1-2 to 1, and a Special Direct Drive of 3 to 1.

The Regular Direct Drive provides ample power and exceptional ease of control for hills, bad roads and crowded city traffic.

The Special Direct Drive for normal conditions, shows a gain of over 50% in mileage for the same fuel consumption and motor speed, eliminates the noise, wear and tear of running the motor at excessive speeds, adds materially to the life and durability of the car and pleasure of riding.

Model "77" Six Cylinders, 4 1-2 x 7 - - $6000.00
Model "66" Six Cylinders, 4 1-2 x 5 1-2 - - $5000.00
Model "55" Six Cylinders, 4 x 5 - - - $4000.00

MORE NEW, IMPROVED and **DISTINCTIVE FEATURES** than any other car. Two-speed rear axle, high pressure air self-starting system, complete electric lighting system, left hand steer, center control, two-spark magneto, four-speed transmission, both brakes controlled by foot pedals.

Write for complete description and any information you may desire in regard to our two-speed axle.

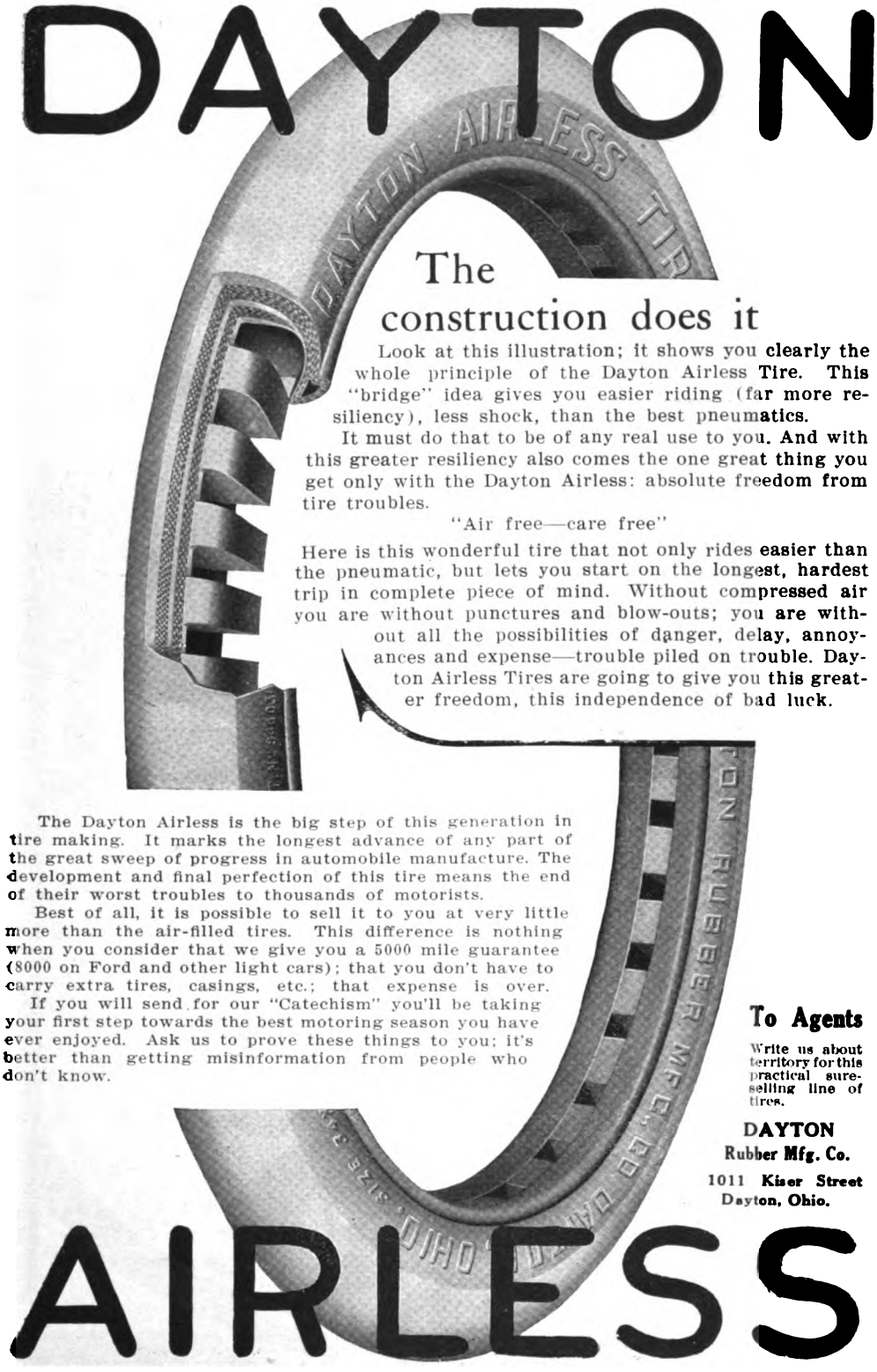
Austin Automobile Company

GRAND RAPIDS, MICHIGAN

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FACTORY RUNNING FULL BLAST

DAYTON



The construction does it

Look at this illustration; it shows you clearly the whole principle of the Dayton Airless Tire. This "bridge" idea gives you easier riding (far more resiliency), less shock, than the best pneumatics.

It must do that to be of any real use to you. And with this greater resiliency also comes the one great thing you get only with the Dayton Airless: absolute freedom from tire troubles.

"Air free—care free"

Here is this wonderful tire that not only rides easier than the pneumatic, but lets you start on the longest, hardest trip in complete piece of mind. Without compressed air you are without punctures and blow-outs; you are without all the possibilities of danger, delay, annoyances and expense—trouble piled on trouble. Dayton Airless Tires are going to give you this greater freedom, this independence of bad luck.

The Dayton Airless is the big step of this generation in tire making. It marks the longest advance of any part of the great sweep of progress in automobile manufacture. The development and final perfection of this tire means the end of their worst troubles to thousands of motorists.

Best of all, it is possible to sell it to you at very little more than the air-filled tires. This difference is nothing when you consider that we give you a 5000 mile guarantee ($8000 on Ford and other light cars); that you don't have to carry extra tires, casings, etc.; that expense is over.

If you will send for our "Catechism" you'll be taking your first step towards the best motoring season you have ever enjoyed. Ask us to prove these things to you; it's better than getting misinformation from people who don't know.

To Agents

Write us about territory for this practical sure-selling line of tires.

DAYTON
Rubber Mfg. Co.
1011 Kiser Street
Dayton, Ohio.

AIRLESS

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COES

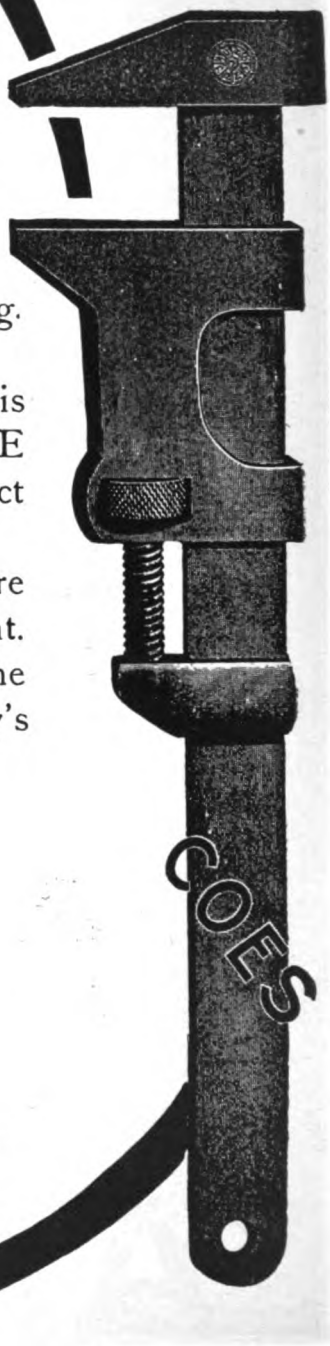
THE
Wrench Supreme

Strength without bulk or clumsiness.
Ease of handling without slipping or bruising.
Perfect balance and right grip

Everything the motorist desires in a wrench is to be found in the "COES" AUTOMOBILE MODEL, and you will never know perfect wrench service until you pin your faith to it.

It stands to reason that the 5 per cent. more you pay for a "COES" wrench goes for 60 per cent. more quality and service—put this wrench in the tool kit and shop. You will get your money's worth.

Send for Literature Now.



Coes Wrench Co.
WORCESTER, MASS.

J. C. McCARTY & CO.,
21 Murray St., New York City
JOHN H. GRAHAM & CO.,
113 Chambers St., New York City

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Starts — Lights — Ignites

REMY

Six Volt System-Does-It-All

WE do not furnish the same electrical system for all cars, but a reliable, efficient apparatus in combination for each car. This apparatus fulfills the logical desire of every motor car owner—to have one factory, only, responsible for the efficiency of all the electrical equipment on his car.

Remy silent, simplified starters are the simplest form of ball bearing series motors. They are wound to produce an enormous turning power. The requisites of each make of car are carefully analyzed by Remy experts. Such a policy insures a proper sized starting motor for the particular car. Thus the relation of each Remy starting motor to the car motor is so accurately gauged that a failure is impossible.

This accurate relation of starting motor and car motor eliminates all current waste. A common size starting motor for all car motors is ridiculous.

Remy Slow Speed Protected Generators produce sufficient current to carry the car lamp load at ten miles per hour. If the car is driven faster the output decreases as the speed of the car increases but never decreases below a determined value. Therefore, the battery is kept charged at a non-injurious rate. This current regulation is obtained inherently or in other words without automatic devices of any kind, no slipping clutches, relays or controllers.

The Remy magneto is manufactured for all classes and types of gasoline engines. It has been manufactured for fourteen years. In each of these fourteen years the demand has grown until the present year sees more Remys in use than all other makes combined. It is today the standard magneto of America.

See that your car is Remy started—Remy ignited—Remy lighted.

Remy starting and lighting equipment is sold only to car manufacturers. Write us about our Magneto Exchange offer. Liberal allowance for any make of old equipment.

Remy Electric Company,

General Offices and Works, Anderson, Indiana

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Service stations throughout the country

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No-Rim-Cut Tires 10% Oversize

No Petty Saving

Goodyear tires have become, in late years, the greatest sensation in Tiredom.

They far outsell all others. The demand has multiplied so fast that last year's sales exceeded our previous 12 years put together. This has not come about, as you must know, through any petty saving.

We Did This

We brought out the No-Rim-Cut tire, which we still control.

With old-type tires, rim-cutting ruined 23 per cent. This new-type tire wiped out that loss completely.

Its 10 per cent oversize, with the average car, adds 25 per cent to the tire mileage.

These two features together have saved tire users a good many million dollars.

Also This

We compared, by actual mileage, 240 formulas and fabrics to learn which served the best.

We compared by mileage, every material, every method and process.

We devised machines which give to every inch of every layer exactly equal tension.

We employ a curing process, very unusual. It adds to our cost this year about one million dollars—just to add more mileage.

And we spend each year, in learning ways to better tires, about $100,000.

That is Why

That is why the Goodyear tire holds top place in Tiredom. Legions of men have proved by meters its immense economy.

You can prove it in the same decisive way. You can see that these tires can't rim-cut. You can see the oversize. And you can see by mileage figures what they save on upkeep. Do this. The savings are too big to miss.

GOODYEAR
AKRON, OHIO

No-Rim-Cut Tires

With or Without Non-Skid Treads

Write for the Goodyear Tire Book—14th-year edition. It tells all known ways to economize on tires.

THE GOODYEAR TIRE & RUBBER COMPANY, AKRON, OHIO

Branches and Agencies in 103 Principal Cities—More Service Stations Than Any Other Tire
We Make All Kinds of Rubber Tires, Tire Accessories and Repair Outfits
Main Canadian Office, Toronto, Ont.—Canadian Factory, Bowmanville, Ont.

(1095)

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How the KisselKar is defended against vibration—the arch enemy of a motor car

Two kinds of vibration constantly attack an automobile—*road* vibration and *engine* vibration.

Vibration will crystalize metal and make it brittle It will shake open joints, it will make its irresistible attack on every part of the car.

In two ways a car can be defended—first by eliminating vibration as far as possible; second by employing Chrome Vanadium steel at points of vibration and strain.

Road vibration is due to inequalities of the road and the KisselKar's defence against it is the extra liberal wheelbase, every extra inch of which modifies vibration. Then come the big wheels and tires—the springs especially resilient because designed according to the weight of *each* model—also the shock absorbers. Road vibration has little chance of reaching a vital part of a KisselKar.

Chrome Vanadium steel is used at all points exposed to vibration and strain. Chrome Vanadium steel is crystallization-proof. It is analyzed in the KisselKar laboratories and heat-treated in KisselKar furnaces, and is uniformly the highest grade material put into any automobile.

KISSELKAR

KisselKar Service takes the mechanical side of motoring off your hands. It keeps your car "tuned"—and an automobile, like any other machinery, has much greater lasting quality when always run in perfect condition, than it has when run with little things out of adjustment.

In other words KisselKar Service is extra assurance of a long life to your car—a guarantee of completest pleasure. It modifies running cost, and retards depreciation. Specially equipped buildings are in all principal cities to serve KisselKar owners.

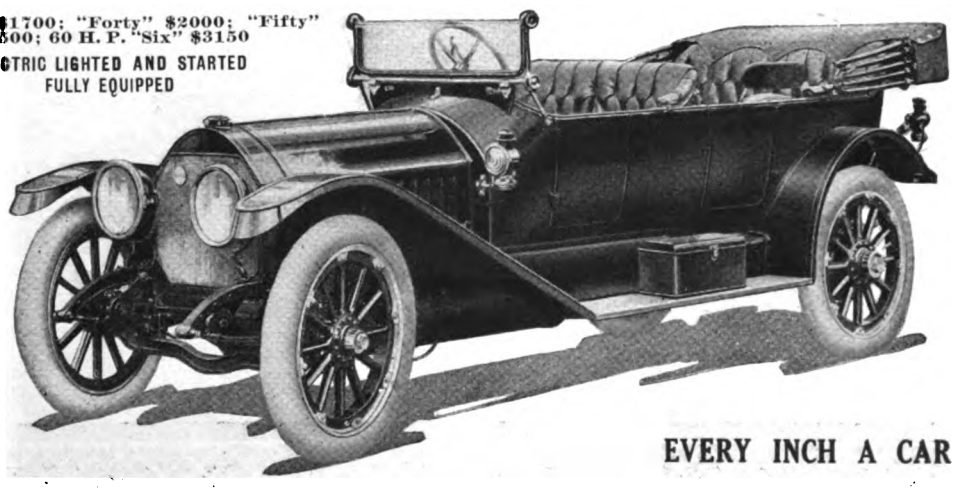
Let us prove to you the superior value of the KisselKar and the advantages of KisselKar Service. The KisselKar catalog fully describes the complete KisselKar line.

For economical delivery, investigate KisselKar Commercial Trucks
1500 lbs., 1, 1¼, 2, 3, 4, 5 tons.

KISSEL MOTOR CAR CO., 174 Kissel Avenue, HARTFORD, WIS.

Branches and Agencies:—Boston, New York, Chicago, Milwaukee, Kansas City, Los Angeles, Minneapolis, St. Paul, St. Louis, Dallas, Philadelphia, Cleveland, Detroit, El Paso, San Antonio, New Orleans, Baltimore, Omaha, Butte, Denver, San Francisco, Seattle, Portland, Duluth, Buffalo, Pittsburgh, Hartford, Conn., New Haven, Albany, Troy, Montreal, Quebec, Toronto, Winnipeg, Calgary, and 200 other principal points throughout America.

"Thirty" $1700; "Forty" $2000; "Fifty" $2500; 60 H. P. "Six" $3150
ELECTRIC LIGHTED AND STARTED
FULLY EQUIPPED



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F. O. B. Toledo

Completely Equipped

Self-Starter
30 Horsepower
5-Passenger Touring Car
110 inch Wheel Base
Timken Bearings
Center Control

Overland

$985

F. O. B. Toledo

Completely Equipped

Remy Magneto
Warner-Speedometer
Mohair Top and Boot
Clear Vision, Rain Vision
Wind Shield
Prest-O-Lite Tank

THE 28,000 Overlands built in 1912 were such startling good cars—that 24 hours after our 1913 announcement we had contracts for our entire 1913 output of 40,000 cars.

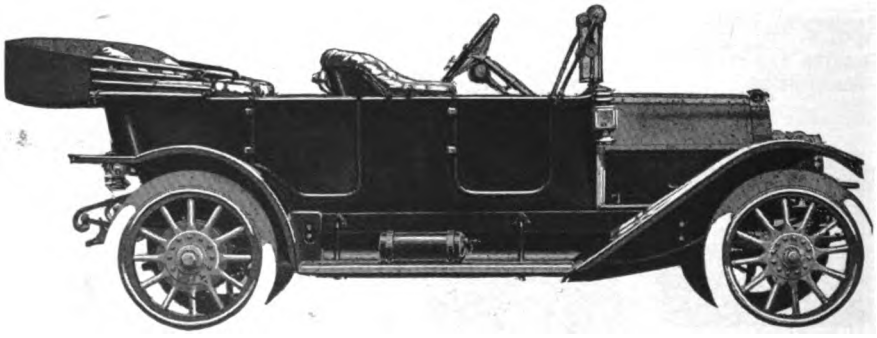
Here is our policy: The more cars we make the less each car costs us—and you. And the better we make Overlands the more we sell. It is just broad-gauged business.

Study the value above.

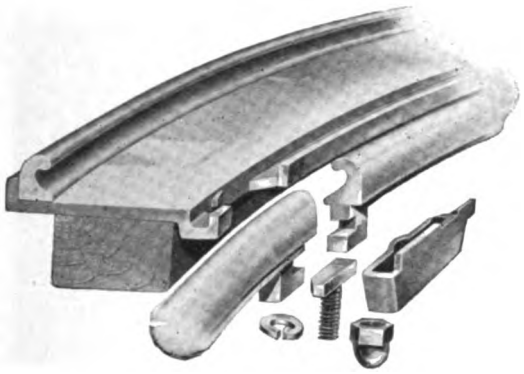
Catalogue on Request. Please address Dept. 52.

The Willys-Overland Co.

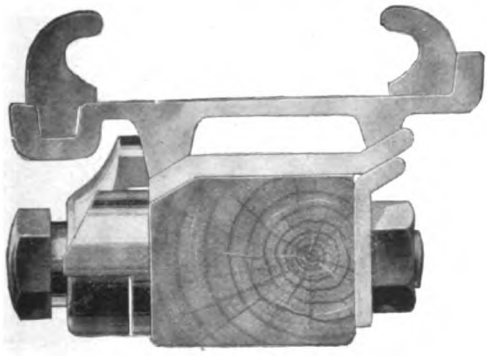
Toledo, O.



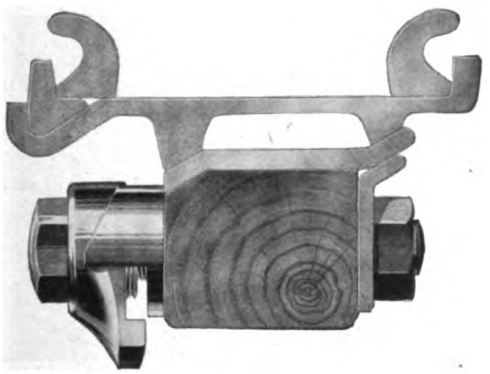
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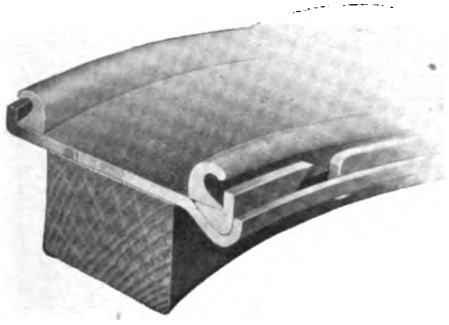
Standard Universal Quick Detachable No. 1



Standard Universal Quick Detachable Demountable No. 1



Standard Universal Quick Detachable Demountable No. 2



Standard Universal Quick Detachable No. 2

Announcement

TO those motorists and car manufacturers who may have need of

Spare Parts

for

Standard Universal Rims

Manufactured under License Granted by

The United Rim Company Akron, Ohio

We shall be able for a certain period of time to furnish such parts for the following types:

Standard Universal Quick Detachable

No. 1 and No. 2

Standard Universal Q. D. Demountable

No. 1, No. 2 and No. 3

(Gilbert-Continental)

These rims are known under several different names, and the design of some of the styles has been changed several times.

Therefore—

When writing, it is advisable to give as much information as possible concerning the type of rim for which extra or spare parts are desired.

To aid the purchaser, a few of the rims are shown on this page.

For further information, write to

The Standard Welding Company CLEVELAND

Offices in

New York Chicago Detroit

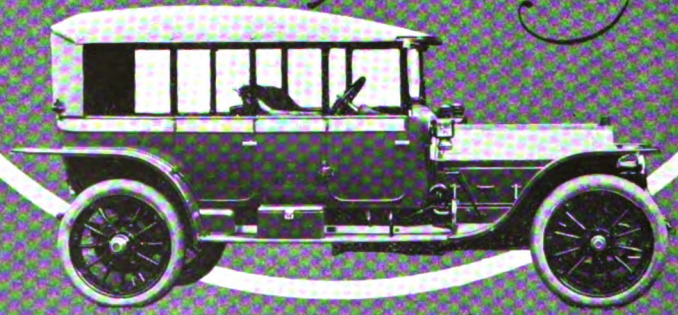
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SPRINGFIELD METAL BODY CO



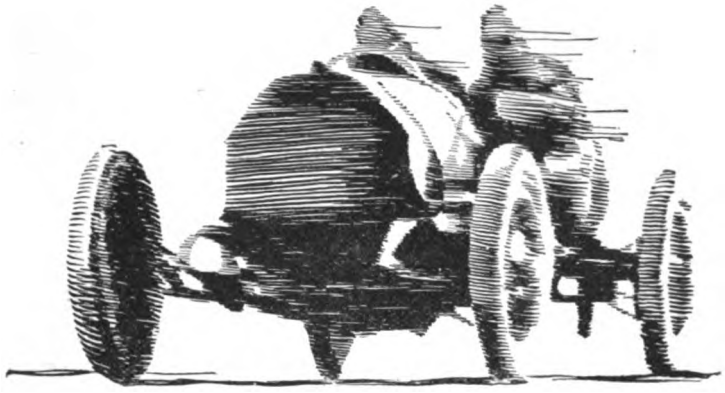
Springfield Convertible Bodies
A Construction Giving the Qualities of a Limousine & Touring Equipment That May Be Converted as Quickly as a Folding Top Can be Raised or Lowered. When Folded the Full Space of the Touring Car is Available — When Raised It is a Regular Top or It Can Be Glass Enclosed.

Dealers, Who Insist on Quality Equipment, Specify The Springfield Convertible Body.



SPRINGFIELD, MASSACHUSETTS

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From Start to Finish

Your engine runs like a watch when lubricated with

Polarine



the friction-killing oil for all makes of cars.

Burns cleanly, leaving no carbon deposit.

Flows freely down to zero temperature.

Speed from every drop of fuel.

Use Standard Oil Company's Gasoline



For Sale by All Dealers.

STANDARD OIL COMPANY OF NEW YORK

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Next Year's Cars

By R. E. Olds, Designer

Next year's cars at every price, will have left-side drive, like the leading cars of this year.

They will have the set-in electric dash lights, while some cars this year still retain the old projecting lamps.

They will be over-tired, where some cars this year are vastly under-tired.

In next year's cars you won't find levers blocking one front door. The driver will enter from either side, as he does now in Reo the Fifth.

Next year's cars will be better built than many cars of this year. Men are learning that skimpy cars don't pay.

They will use roller bearings instead of ball bearings. They will use far more drop forgings.

In Reo the Fifth of this year we use 15 roller bearings and 190 drop forgings.

And next year's cars, like Reo the Fifth, will have doubly-heated carburetor.

These are coming features. What the leading cars use this year, most cars will use next.

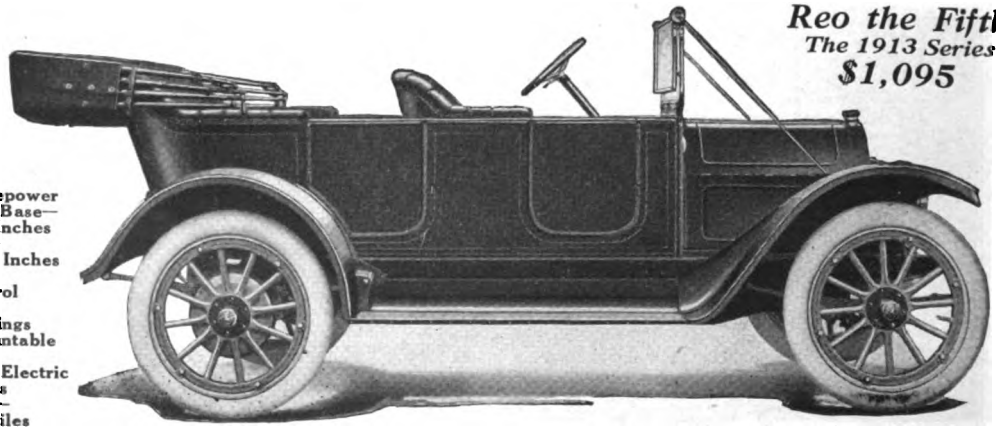
The right-side drive, the projecting lamps and the skimpy tires will then be out-of-date.

Consider these facts when you buy a car. And note that Reo the Fifth, as sold this year, has all these new features in it.

Please write for our catalog, then see this car at the nearest Reo showroom.

R. M. Owen & Co., General Sales Agents for **Reo Motor Car Co., Lansing, Mich.**

Canadian Factory, St. Catharines, Ont.



30-35 Horsepower
Wheel Base—112 Inches
Tires—34x4 Inches
Center Control
Roller Bearings
Demountable Rims
Three Electric Lights
Speed—45 Miles per hour
Made with 5 and 2 Passenger Bodies

Top and windshield not included in price. We equip this car with mohair top, side curtains and slip cover, windshield, Prest-O-Lite gas tank for headlights, speedometer, self-starter, extra rim and brackets—all for $100 extra (list price $170)

Gray & Davis Electric Lighting and Starting System at an extra price, if wanted. (198)

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F & S Ball Bearings



—this is it!

F & S
Blue Ribbon Retainer

THIS separtor is formed from a patented, one-piece, unit sheet steel stamping, drawn and formed without joints, welds or rivets in its construction. The separator itself is heavily corrugated and ribbed on one side for added stiffness, and finished in gunmetal blue; it is light in weight and frictionless.

It permits of unlimited high speed and vibration, besides which the retainer cannot be affected by heat.

The new retainer permits the use of larger balls, and in many of the sizes, a larger number of balls, which has always been a predominant feature of F. & S. ball bearings of every type on account of their transverse side entrance ball filling slot construction on the inner and outer rings on one side.

BRETZ COMPANY

Sole Importers

250 West Fifty-fourth New York

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Mosler Spit Fire Plugs Lead Again

TO THE TRADE:

Write for this valuable booklet giving the correct style of plug best suited to the engines of the cars now in use



Mr. CONSUMER:

Write us for the correct size and style plug best suited to the engine of your car

—

The Plug that will give mileage, speed, power and continued satisfaction

A. R. MOSLER & CO., P.O. BOX "M" MT. VERNON, N.Y.

WE OWN THE LARGEST FACTORY IN THE WORLD DEVOTED EXCLUSIVELY TO THE MANUFACTURE OF SPARK PLUGS

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Mosler SpitFire Plugs



After Fifteen Years
Devoted Exclusively
To the Manufacture of
MOSLER "SPIT-FIRE" PLUGS
We Carry in Stock
A Plug for Every Internal Combustion Engine Built.

OWNERS WOULD DO WELL
TO INVESTIGATE THEIR SPARK PLUGS
GET THE PLUG ESPECIALLY DESIGNED FOR YOUR MOTOR
IT MAKES A DIFFERENCE.

Only One Reason for Offering a Substitute for
MOSLER "SPIT-FIRE" PLUGS
A Substitute Is Cheaper

IF YOU WANT

A HOTTER SPARK
ENERGETIC IGNITION
GREATER POWER

INSIST ON MOSLER'S AS STANDARD EQUIPMENT IN YOUR MOTOR

Demand for Your New Automobile
MOSLER'S "SPIT-FIRE" PLUGS
Or When You Buy a New Plug from Your Dealer
Insist on a MOSLER Genuine "SPIT-FIRE" PLUG
Name on Every Porcelain, Base and Box.
THEY ARE THE BEST.

A. R. MOSLER & CO., P.O. BOX "M" MT. VERNON, N.Y.

WE OWN THE LARGEST FACTORY IN THE WORLD DEVOTED EXCLUSIVELY TO THE MANUFACTURE OF SPARK PLUGS

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There are 10 books in the series—800 pages of text—1500 illustrations—all fully indexed. Each book has been thoroughly revised and its contents have been brought right up to the minute. The subjects have been treated in a simple, non-technical manner, making the discussions as valuable to the novice as the engineer. Eighty per cent. of the automobile and technical schools in the United States and Canada use these works as text books, and more than 500,000 copies are sold annually. No similar expositions are to be compared with them—regardless of price. Every car owner and operator should have the full set.

Knowledge of your car means additional pleasure in its use and decreased cost in operation and maintenance. The practical instruction that you need is to be found in these books, and to acquire the same fund of information in any other manner would require years of constant study. You must understand your motor if you would adjust or repair it. The subject is fully treated in the Engine book. This applies as well to the Magneto, Carburetor, Battery, Lighting, Chassis and Tire books. When overhauling and rebuilding, read that discussion. The book on Motor Car Operation covers that subject with reference to all cars. No matter what the need, there is a book to meet it. No car or component is neglected, and all standard engines, magnetos, carburetors, batteries, lighting systems and vehicles are dealt with. The full set includes:

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Carburetor	.35	The Motor Car Chassis	.25	Motor Car Operation	.50
Lighting by Electricity	.50	Motorcycle Construction, Care and Repair	.35	Overhauling, Rebuilding and Repairing	.50
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Full Set, 10 Books.....$3.75

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We are publishing separately and in book form detailed mechanical specifications of all makes and models of pleasure and commercial vehicles. Every day in the year you have use for such mechanical information. You are constantly asking for constructional facts in connection with different makes of cars and as constantly confronted by similar questions from hundreds of other owners. With these forms in your possession you can learn in a moment any mechanical detail you wish to know.

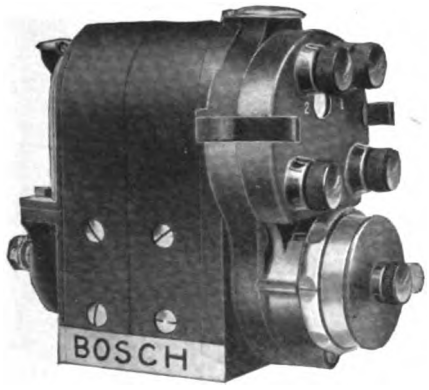
Pleasure Car Forms.....$ .50 Commercial Vehicle Forms.....$ .50

THE AUTOMOBILE PUBLISHING COMPANY,

Times Building, Pawtucket, R. I.

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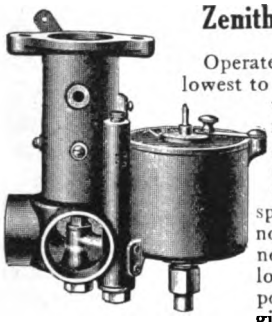
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OFFICIAL BOSCH DISTRIBUTORS



We carry at all times a full and complete line of all Bosch Ignition systems and Plugs. Our replacement department is at your immediate service for the duplication of all Bosch parts.



CONSULT US ON YOUR IGNITION PROBLEMS



Zenith Carburetor

Operates perfectly from lowest to highest speed on various grades of fuel, and is not affected by altitude—needs no adjustment. No springs to weaken, no valves to bind, no pistons to get loose. The compound spray nozzle gives motor constant mixture at all speeds—all air goes through the spray nozzle.

Leak Proof Piston Rings

Insures perfect compression, makes leakage a mechanical impossibility. No wasted power. They decrease Carbonization and black smoke by keeping back surplus oil. Made in all sizes for all requirements. Not necessary to make alterations in piston.



MILLER WRAPPED TREAD TIRES

Miller One-Cure Wrapped Tread Tires represent the most economical tire on the market today. By their exclusive process of construction they give the car-owner 25% more mileage, 25% more durability and 25% more Safety and Economy.

The Miller method of production keeps all weaknesses out of the tires, the finest materials and construction certified by inspection before and after completion guarantees the best produced.



MOTOR PARTS COMPANY,

PHILADELPHIA
818 NORTH BROAD ST.

BOSTON
185-187 COLUMBUS AVE.

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Index To Advertisers

Abbott Motor Co.....86
American F. N. Company.....75
American Ignition Co.....81
Anti-Rust Paint Co.....91
Apple Electric Co.....80
Approved Auto Specialties Co... 89
Austin Automobile Co..... 4

Barrett Manufacturing Co.....31
Beach Co., T. C.....90
Blackledge, J. W. Mfg. Co.....89
Borne, Scrymser Company.....84
Bosch Magneto Company..... 3
Boston Clock Co..... 2
Boyd, F. Shirley.....83
Bretz Company, The J. S.....15
Brown Company.....92
Brown Scientific Tube Distributors 84
Buckeye Manufacturing Co.....90

Cameron Mfg. Co.....88
Cartercar Company.....92
Cataract Rubber Co.....82
Coes Wrench Company..... 6
Cole Motor Car Company.....92
Continental Motor Mfg. Co.....82
Cutter, Geo. A.....87
Cutting Motor Car Co.....87

Dayton Rubber Mfg. Co..... 5
Dean Electric Company.....91
Dixon Crucible Co., Jos.....87
Dover Stamp. & Mfg. Co.....85

Eagle Oil & Supply Co.....92
Eberly & Orris Mfg. Co.....82
Edwards Mfg. Co.....85
Emery Mfg. Co.....16
Empire Automobile Co.....87

Federation Amer. Motorcyclists..75

Gaulois Tire Co.....86
Geiszler Bros. Storage Bat. Co....87
Goodnow Mfg. Co.....86
Goodyear Tire & Rubber Co..... 8
Gray Specialty Co.....92

Harris Oil Company, A. W.....85
Hawthorne Mfg. Co.....88
Herreshoff Motor Co.....91
Hoffecker Company, The.....90

Ideal Motor Car Company.....82
Indian Refining Co.....85
Invader Oil Co.....82
Invincible Tire Co.....84

Jackson Automobile Co.....85
Johns-Manville Co., H. W.....83
Jones Speedometer Company.....85

Kissel Motor Car Company..... 9
Knox Automobile Company.....87
K-R-I-T Motor Car Co.....82
Lenox Hotel.....88
Lenox Motor Car Company.....87

Marburg Bros.....87
McVey Mfg. Co.....90
Mea Magneto.....87
Mercer Automobile Company.....86
Miami Cycle & Mfg. Co.....73
Michigan Motor Car Co.....91
Miller, Chas. E.....Cover
Milwaukee Auto Specialty Co....92
Moller Brothers Controller & Economizer Co.....86
Mosler & Co., A. R.....16-17
Motor Parts Co.....19

National Motor Vehicle Co.....85
New Departure Mfg. Co.....81
Nordyke & Marmon Co.....83
N. Y. & N. J. Lubricant Co.....90

O-Tak-A Tire Remover Co.....87
Owen & Co., R. M.....14

Paige-Detroit Motor Car Co.....86
Perfection Spring Co.....92
Pierce-Arrow Motor Car Co..Cover
Pilot Car Sales Co.....90
Planhard Mfg. Co.....88
Pyrene Co. of N. E.....89

Randall-Faichney Co.....91
Remy Electric Company..... 7
Reo Motor Car Company.....14
Royal Equipment Co.....80

Sager Company, J. H.....83
Shaler Co., C. A.....87
Speedwell Motor Car Co.....86
Splitdorf Electrical Co.....88
Springfield Metal Body Co.....12
Standard Co., The.....91
Standard Oil Co.....13
Standard Welding Co.....11
Standard Woven Fabric Co..Cover
Stewart-Warner Speedometer Corp. .....Cover
Studebaker Corporation.....92
Sumner, George, Inc.....91

Texas Company, The.....86

United States Tire Co.....21

Vacuum Oil Co.....Cover
Valvoline Oil Company.....91

Waite Auto Supply Co.....91
Wall, J. H.....83
Walpole Tire & Rubber Co.....23
Weed Chain Tire Grip Co.....80
White Co., The.....24
Willard-Storage Battery Co..... 1
Willys-Overland Company.....10

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New York

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	Page
*How Tar Macadam Roads Endure	25
*Returns to Fisk Concern	32
Employees Share Profits	32
McCue Resigns Presidency	32
Floods Affect Schacht	33
Spring Wheel Concern	33
Is Located in Detroit	33
Richman Leaves Hudson	34
To Produce Motor Hearses	34
Testing Kerosene Carburetor	34
Geddes Succeeds Kelly	34
Erecting New Factory	35
*New and Novel Accessories	36
Alcohol as a Decarbonizer	39
Market of the Future	39
*Youngest Automobile Dealer	39
*Obtaining Efficiency from Tires	40
Lubricating Valve Stems	42
Home Made Metal Polish	42
*Correspondence with the Reader—	
Large vs. Small Wheels	43
Brake Horsepower	43
Belt and Pulley Transmission	44
Noisy Transmission	44
Auxiliary Mixing Devices	44
Wiring Bosch D U 4 Magneto	45
*With the Motoring Interest Abroad—	
Features of Helios Wire Wheel	46
Isle of Man Race	46
Electric Lighting Tests	47
Whose Shoe Pinches?	48
Chamber of Motor Experts	48
Notes from Foreign Lands	48
American Tires in Europe	49
Keeton in Foreign Lands	49
*Protecting Car's Equipment	49
Editorial, Transportation and Good Roads	50
*Concrete Blocks for Private Garages	51
*Langelier's Swaging Machine	55
*In the Commercial Vehicle Field—	
Changes in Radius Rod Design	56
Seeking Economical City Delivery	58
Winnipeg Motor Competition	59
Abandon Truck Show	59
Motor Trucks in Service	59
Motoring Laws and Their Enforcement—	
Truck Bill in Rhode Island	60
New York's Proposed Ordinance	60
Gives Good Advice	61
To the Supreme Court	61
Law Is Unconstitutional	61
Legislative Briefs	61
*The Repair Shop and Garage—	
Construction of S. U. Carburetor	62
Motor Starting Devices	63
Repairing Cracked Cylinders	63
*Garage and Repair Shop Equipment—	
The Ford Tribloc	64
Gasoline Storage Outfits	64
Hill-Stage Tube Vulcanizer	65
Formulae and Useful Mechanical Tables	65
*Aviation in America and Abroad—	
Burgess Folding Flying Boat	66
Dunne Biplane Stability	66
Aviation Notes	67
*Havers Line Includes New Six Chassis	68
*National Contents and Racing News—	
Itinerary for National Tour	70
The Sweepstakes Event	70
Overland Wins Secret Run	71
Fifth Grand Prize Race	71
Contest News Briefs	71
*In the Realm of the Motorcyclist—	
Secures Indianapolis Factory	72
Convention Dates Selected	72
Details of Merkel Starter	74
Racing League's Plans	74
Salt Lake City Tracks	75
Merkel on Foreign Tour	75
Brown Becomes Sales Manager	75
Official F. A. M. News	75
Club Notes, Here and There	75
*News of Manufacturer and Dealer	76
Recent Patents	78
Coming Events	78
New Books Received	78
Mercer Wins Twice	79
Next Year's Boston Show	79
*Sumner Enlarges Line	79
Appoints Foreign Delegates	80

*Indicates article is illustrated.

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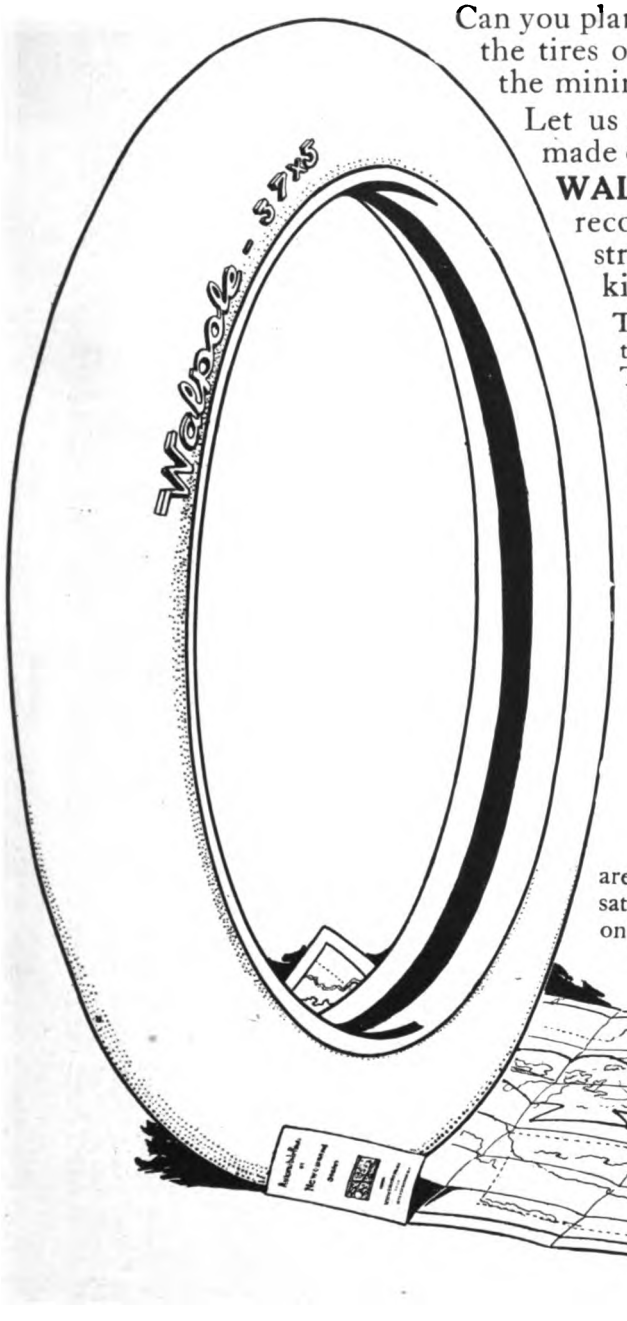
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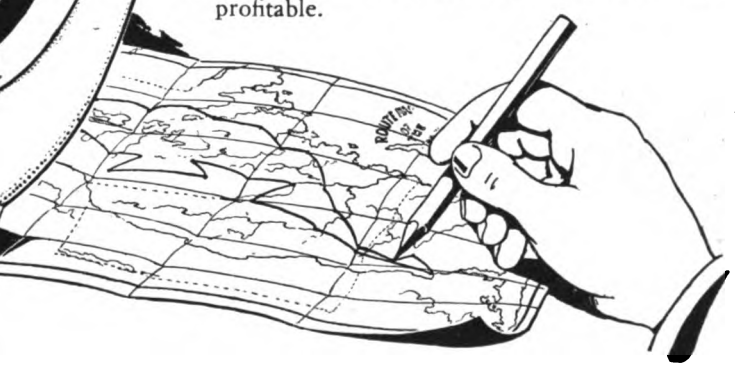
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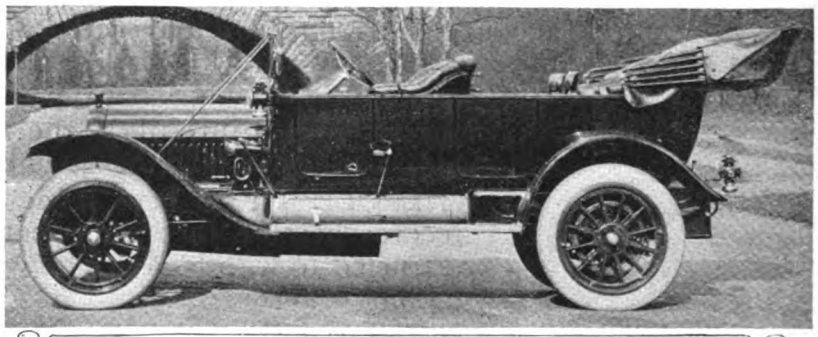
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The discriminating purchaser should protect himself against the possibility of his car becoming obsolete in design shortly after his investment.

It is not enough that the car he chooses measures up to the prevailing standards of the day. Undue depreciation is bound to occur unless the car embraces every one of these fundamental features of design:

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CLEVELAND

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THE AUTOMOBILE JOURNAL

VOL. XXXV, No. 7 MAY 10, 1913 Price, $1.00 the Year

HOW TAR MACADAM HIGHWAYS ENDURE.

Those Built with Refined Binding Material Last Year in the Rhode Island State System, the First Construction of the Kind, Show Marked Resistance to Combined Heavy Traffic and Unusually Severe Winter.

THE State of Rhode Island last year added 57.25 miles of bituminous macadam to its mileage of improved roads. Of this mileage 35 miles was new construction from the base up, the remainder was bituminous surfacing consisting of the application of two inches of bituminous mix over an old macadam. A considerable area of the resurfacing developed into a thorough reconstruction, as it was found that in many cases the old macadam was so thoroughly worn out that nothing was left to properly support the resurfacing.



Beginning of State Road at Rumford Station, East Providence, R. I., Built in 1912, Old Unimproved Way in the Foreground.

In The Automobile Journal of July 25, 1912, was given some little description of the methods used in the extended work undertaken by the board of public works. In the present article are given illustrations of the completed roads, which were last year shown under construction.

In Europe, highways have been built and maintained by the national governments for a century and a half. They were a military necessity and the government undertook the financing and the construction of highways. In France especially the system has been worked out in great detail and the cost of each road is paid for by the central government

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Nayatt Road, Barrington, R. I., Built with Tarvia in 1912, Showing the Heavy Character of Traffic on This Highway.

directly in proportion to its military value.

In the United States, military considerations have had no weight and it has been left to private initiative to stimulate public opinion and develop systems of roads. First came the bicyclists, who started the ball rolling, then came the autoist, who added much impetus to the good roads movement. Today the good road movement has gained the support of the farmer and the large commercial interests with the advent of the motor truck, are now clamoring for roads that will carry loads economically at all seasons of the year.

In all the United States, the percentage improved of the total of 2,500,000 miles of road is woefully small and very unequally distributed. The little State of Rhode Island leads all the rest with more than 50 per cent. of its 2120.75 miles of public roads improved. Of this mileage 294 or 13.86 per cent. is built and maintained by the state. Massachusetts has but 920 miles out of 17,222 or only 5.34 per cent.

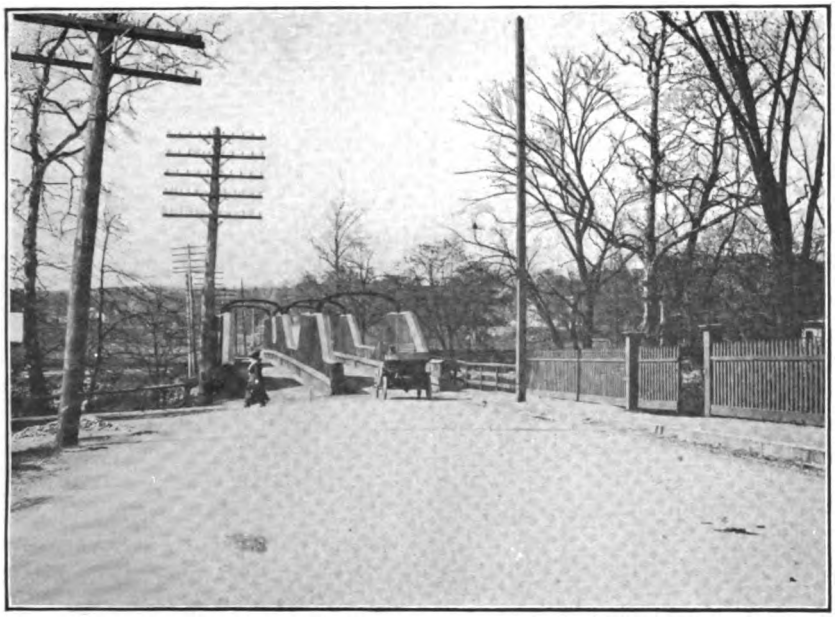
Since its creation on Feb. 1, 1902, the Rhode Island board has sought some improvement over the ordinary water bound macadam. The rising tide of automobile travel was beginning to be felt and macadam roads were beginning to feel its effects. In 1906 the first of a series of experiments was begun at Charlestown, R. I. A section of road was built with a bituminous top using a mixture of tar and stone, hand mixed on board platforms. The road still stands as an example of good road work adapted to the requirements of a through automobile route.

An experimental period ensued during which a wide variety of bituminous materials was tried under widely varying conditions of soil, moisture, traffic and climate. Although the State of Rhode Island is small it has both seashore and upland and has every variety of traffic from the dense heavy teaming near Providence to the sparse traffic of the Connecticut border line. By 1909 the board was so well satisfied with the bituminous binder that it contracted for 21 miles. This type of road eliminated dust, got rid of the mud and so far improved the sanitation as to make the bituminous roadways much more desirable for residence. Users of the roadways were able to haul greater loads and the roads were good the year through.



State Road, Saunderstown, North Kingstown, R. I., Tarvia Mixed Construction of 1912, in Perfect Condition.

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Lonsdale Avenue at Whipple's Bridge, West Lonsdale, Lincoln, R. I., Another Section of the Tarvia Work of 1912.

In 1911 no appropriation was available, but in 1912 the bituminous work was resumed. By this time the tar experiments had proved so far successful that the board determined to use refined tar as a binder. The board said (annual report 1911):

Without entering the many details of applying some 10 different ingredients in their various combinations employed in our experimental tests—these having been given in former reports—suffice it to say that we have been forced to the conclusion that the straight tar in a crude or a refined state is the most effective and economical binder to be used in building a macadam road surface and best suited to the climatic conditions and requirements of travel in our own state.

The work authorized under the 1912 contracts consisted of 19 sections varying in length from .5 mile to 18 miles. Of this mileage 35 was completed. In addition the board undertook to resurface a considerable area of plain macadam with a two-inch bituminous top. Almost 23 miles of this resurfacing was done, bringing the total of tar construction in the state up to 84 miles. The board issued the following specifications covering the work:

Bituminous Surface.

The stone for this course shall be one-quarter inch to one and one-half inch in size and shall be dry and free from dust and dirt. The bituminous material will consist of refined coal tar furnished by the state board of public roads at the railroad freight station nearest the site of the work, in tank cars of approximately 8000 to 10,000 gallons capacity, fitted with steam coils. * * *

The tar shall be heated in kettles to a temperature of 200 degrees Fahrenheit, and mixed with the stone either by hand on dumping boards or by machine satisfactory to the engineer. Approximately 15 gallons of tar shall be used with each cubic yard of stone, and the whole mass shall be turned until the stones are thoroughly coated. The mixing shall be done at such place or places as may be agreed upon between the engineer and the contractor.

After being thoroughly coated with the tar the stone shall be placed upon the foundation or lower course prepared as hereinbefore described and thoroughly rolled satisfactorily to the engineer or inspector, with a roller whose weight shall not exceed 10 tons.

Seal Coat.

After the course has been prepared as above described, a flush coat of about one-half gallon of tar or asphalt (to be furnished by the board) to the square yard shall be applied to the surface, and clean, sharp and dry sand, free from loam, clay and foreign matter of all kinds spread upon it to a depth of one-half inch. The whole surface shall then be rolled as directed by the engineer or inspector.

At places where the bituminous material appears excessively on the surface more sand shall be added.

Without Seal Coat.

Upon the bituminous course, thoroughly rolled, shall be spread a layer of clean, sharp and dry sand, free from loam, clay and foreign matter of all kinds, to a depth of one-half inch. The road shall then again be rolled as directed by the engineer or inspector.

At places where the bituminous material appears excessively on the surface, more sand shall be added.



Elmwood Avenue, Warwick, R. I., One of the Most Travelled Main Roads of the State, Constructed of Tarvia in 1912.

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Stretch of State Road at Tiverton, R. I., a Much Travelled Route to Newport, Constructed with Tarvia in 1912.

No bituminous material shall be laid later than the date designated by the engineer.

The price per square yard for bituminous work as specified above will be over and above the cost of an ordinary water-bound macadam road.

A finished road six inches in depth, four inches of this in the foundation and two inches of tar macadam, has been the usual construction. On excessively heavy travelled town streets the thickness of the tar mixed course is increased.

The previous experiments by the state board convinced the members that owing to the great variations found in crude tar, it was much better to use a refined coal tar product, and Tarvia A was called for in the specification. In the actual carrying out of the work the base course was well rolled and then spattered with .25 gallon of Tarvia a square yard. This coat was in some cases omitted. Upon the base thus prepared a two-inch layer of stone coated with Tarvia A was used. The stone was coated either in mechanical mixers or by hand on mixing boards.

The experience of the state quickly proved that the mechanical mixer was far more economical and speedy, and during the last of the season practically all work was done by the mixing machine. After the two inches were spread it was thoroughly rolled in order to consolidate it and to force it into close union with the base. On the work done by contract the surface was then covered with pea stone and opened to traffic. It was the intention of the board to delay the seal coat on this surface until 1913. On the work done by the state itself the seal coat was in most instances applied at once. About a half gallon of Tarvia A was used.

The mixers adopted were of several different types, but a cube mixer furnished with an oil torch for heating the stone was most universally used. Eighteen mixers altogether were on the work at the last of the season. The mixers proved very satisfactory when carefully handled, but new men showed a tendency to overheat the stone and Tarvia, causing a burning of the batch. This is noticed at one or two places in the work of last year and causes a break in the road of the width of a single batch. On the whole, this trouble was negligible and the work done by these machines was excellent. Some of the mixers were



Tower Hill Road, South Kingstown, R. I., a Part of the Most Direct Route Between Providence and New York, Built with Tarvia in 1912.

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Narragansett Pier Road, North of Wickford, R. I., Very Heavily Travelled, a Part of the 1912 Tarvia Mixed Work.

stationed at the crushers and the plants so arranged that the crusher delivered stone directly to the mixer. This proved very economical where the stone was crushed at or near the job. When the stone was brought in on the railroad, it was found more economical to use a portable plant and move it along the road as the work progressed.

It is interesting in this connection to compare the cost of work by the machine and by hand methods.

The following figures, based on careful observation of the various jobs, are a close approximation of the relative costs by the two methods:

No. 1—Portable plant on resurfacing—two inches thick, 440 square yards.

	A day
Foreman, one-half time	$2.50
Engineer	2.50
Six laborers at $1.85	11.10
Kettle man	2.25
Two men spreading at $1.85	3.70
Total	$22.05

This gives a cost of $0.05 a square yard for labor of mixing and spreading stone and Tarvia. The mixer turned seven to eight batches an hour, which covered 50 square yards of surface. Observation of two other portable plants gave approximately the same labor cost.

No. 2—Hand mixing on board platform: Resurfacing two inches thick, 280 square yards.

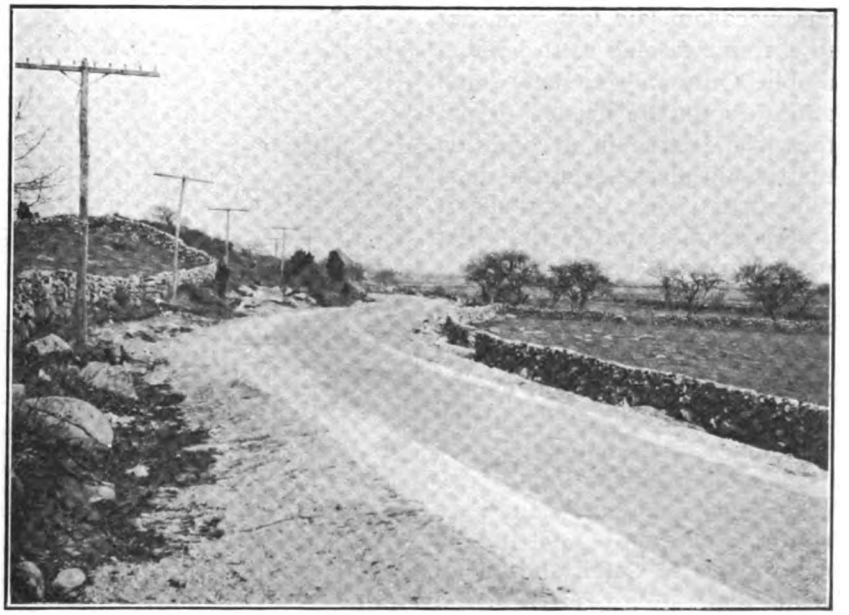
	A day
Foreman, one-half time	$2.50
Ten laborers at $1.85	18.50
One kettle man	2.25
Total	$23.25

This gives $0.085 a square yard as the cost for labor of mixing and spreading.

A comparison of these costs shows the advantage of the mixer. It must be remembered, however, that these are labor charges only and that the cost of the work using the mixer is increased by the interest and depreciation for the machinery and the cost of installing and moving the plant.

The winter of 1912-1913 has been a particularly hard one on the roads of the state. There was practically no snow to protect the roads and in addition there was an unusually large fall of rain with a temperature alternating between thawing and freezing.

An inspection trip of the state roads during the last week in April demonstrated that in spite of the unusually severe winter the new highways built during 1912 have stood under trying condi-



Section of the Providence-New York Highway, Charlestown, R. I., Subjected to Very Heavy Automobile Traffic, a 1912 Tarvia Road.

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Mosaic Surface, Built with Tarvia A in Elmwood Avenue, Warwick, R. I., a Surface Equally Good for Automobiles and Horses.

tions extremely well. After a period that ought to develop any possibility of failure either in the foundation or in the surface, the roads built with Tarvia are smooth and even, and with complete absence of ravelling even in the shoulders. The only signs of failure in any place are where the absence of a seal coat failed to protect a surface left somewhat weak by the burning of batches of Tarvia as has been explained in the operating of the mixing machine. These areas, however, in the total 57.25 miles of bituminous macadam laid last year, are so extremely small as to be negligible. Only an extremely small outlay would be needed to put the whole area in a condition that would please even the most critical user of a good road.

An examination of the other roads built in preceding years by the state board of plain macadam and with bituminous materials of other kinds, shows the wisdom of the slight expenditure a mile called for in the bituminous macadam.

The old macadam roads have been badly affected by the hard winter conditions and are in many cases so rough and out of shape that riding over them is a distinctly unpleasant experience. Many sections of the experimental roads built with a variety of bitumens have shown signs of stress during the prevailing hard winter conditions, and should be repaired at once in order to put them in good condition and save future expense.

The Rhode Island people will have the opportunity of voting at a special election on a propositon for the state to issue bonds to the value of $700,000 for highway construction, and the legislature has made appropriations in addition which, with the fund from motor vehicle licenses will probably place in the hands of the board of public roads about $500,000 more. During the past session of the General Assembly 20 resolutions were passed extending the mileage under the jurisdiction of the state board, and even these appropriations will hardly be sufficient to complete the work projected. Up to the present time the state has expended $2,853,933.79 in the betterment of roads. This is represented by 61 miles of bituminous macadam, 23 miles of rebuilt macadam, 37.65 miles of bituminous macadam contracted for but not completed and 210 miles of macadam road. The work for 1913 will be begun this month.



Power Mixer, Such as Was Used in the Construction of the Major Part of the Rhode Island Bituminous Roads in 1912.

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Tarvia

Preserves Roads
Prevents Dust~



Dudley Avenue, Westfield, N. J.

A Tarvia Town

THERE are many towns in this country which began with Tarvia years ago and finding it successful have extended its use on their roadways year by year as a matter of fixed policy. Such a town is Westfield, N. J., which now has 19 miles of tarviated streets.

Mr. A. W. Vars, the town engineer, reports that the "Tarvia B" treatment on all these streets averaged 1 ¾ c. per square yard for the season of 1912; compared with the cost of keeping down the dust and maintaining the road surface by any other method, this is a very low figure.

The roads have been free from dust and have not been seriously impaired by automobile traffic.

Tarvia acts as a binder and cements the road surface firmly together in a plastic matrix. Automobiles do not hurt such a surface but roll it down smoother.

The amount of new stone screenings needed for surface maintenance is greatly reduced by the Tarvia treatment and the road keeps in better condition. The longer the Tarvia treatment is maintained, the less the annual cost.

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RETURNS TO FISK CONCERN.

E. H. Broadwell Becomes Vice President upon Retiring from Hudson Motor Car Company.

E. H. Broadwell, who recently resigned as vice president of the Hudson Motor Car Company, Detroit, maker of Hudson cars, has assumed the vice presidency of the Fisk Rubber Company, Chicopee Falls, Mass., maker of Fisk tires, with whom he was for many years associated before going to the Hudson company. Mr. Broadwell's headquarters will be at the main office of the Fisk company at Chicopee Falls, and he will devote his personal attention to the direction of the sales department.

Mr. Broadwell has made a successful career for himself in the automobile industry and his knowledge of tire manufacture was gained by years of connection therewith, during which he made the business a serious study. His work at Detroit for the Hudson company gained him recognition as a progressive, indefatigable worker and no details of his department were neglected. His acquisition by the Fisk staff, while in the nature of a return to his former scene of activity, is a decided source of gratification to that company, the organization of which is decidedly strengthened thereby.



E. H. Broadwell, Vice President Fisk Rubber Company.

EMPLOYEES SHARE PROFITS.

Studebaker Corporation Adopts Plan Which Permits Them to Become Shareholders.

Operating large plants at Detroit, Mich., and South Bend, Ind., the Studebaker Corporation, maker of Studebaker pleasure cars and trucks, has put into effect a plan whereby certain of its employees may become stockholders and share in the profits of the concern. The plan, which was adopted at a meeting of the board of directors, is ample. It provides, after dividends shall have been earned on the common and preferred stock, that a fund shall be set apart for the purchase, at market prices, of common stock of the corporation to be held in trust for three-year periods and then distributed with its earnings among participating employees.

Details of the plan explain rules affecting employees who might die, retire on account of age or leave the service of the corporation. An equitable system has been devised whereby the rights of all are conserved. The fund is to be set apart from the assets of the corporation and is to be administered by a board composed of the first vice president, the general manager, treasurer and assistant general manager at Detroit, the manager of the works at South Bend and an official selected from the officers of the trust company that may be selected as custodian of the fund.

McCUE RESIGNS PRESIDENCY.

Understood That Manufacture of McCue Wire Wheels Will Be Under New Policy.

C. T. McCue, former president and founder of the McCue Company, Buffalo, N. Y., has resigned his office and severed all connection with the company's affairs. His action was the outcome, it is said, of differences following the reorganization of the concern. W. T. Evans has been chosen general manager and it is expected that he will succeed to the presidency.

Mr. Evans was formerly manager of the Metal Products Company, Detroit, and for nine years was with the Westinghouse Machine Company. He will reopen the McCue drop forge plant, under the direction of George Desautels, and it is understood that separate concerns will be formed, probably in Indiana, Michigan and Ohio, for the production of McCue wire wheels, etc.

Herbert Cole, well known in motoring circles in Boston and vicinity, has taken the New England agency for G. J. G. and Ohio cars, and has established a temporary sales office in the Garden building, Boylston and Church streets, and a temporary service station in the Motor Mart on Pleasant street. This is the first appearance of the G. J. G. in this territory, and while the Ohio is not a new comer, it makes its re-entry after several seasons of absence.

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FLOODS AFFECT SCHACHT.

Disaster Came at a Particularly Unfortunate Time for Cincinnati Concern.

It appears that the recent floods in Ohio had a depressing effect upon the Schacht Motor Car Company, Cincinnati, O., maker of Schacht cars. From a statement made by John H. Miller, vice president of the concern, it seems that the disaster came at a particularly unfortunate time. John F. Dietz has been appointed temporary receiver, and according to Mr. Miller the assets have a book value of approximately $600,000, while the liabilities of every description will not exceed $175,000.

The Schacht company has been engaged in business for a number of years. About two years ago it moved into a new plant and shortly after that decided to make certain changes in its cars. For some time it had considerable difficulty with its construction work, and later differences arose as to the conduct of the business. While negotiations were under way in an effort to settle these matters the floods made it impossible to get shipments of material and to move completed products. A number of those indebted to the company also were affected. As a result of these conditions some means were deemed necessary to bridge over the situation.

Mr. Miller's statement sets forth that practically all of the stockholders and approximately 85 per cent. of the creditors joined in the selection of Mr. Dietz, and he holds that with proper cooperation it should be entirely possible under existing circumstances to pay off all creditors in full and leave quite a comfortable margin for the stockholders. It is the object of the receiver to continue the business, and the order of the court is to that effect.

SPRING WHEEL CONCERN.

Invention of Chicago Man to Be Produced by New Company in South Bend, Ind.

A corporation composed of capitalists of South Bend, Ind., to be known as the South Bend Spring Wheel Company, is in process of formation to manufacture a new automobile wheel, in which the spokes are displaced by springs. The rights to the invention, which is by E. A. Nelson of Chicago, have been secured by the South Bend men.

The new concern will be capitalized at several hundred thousand dollars and a factory will be erected for the exclusive manufacture of the wheels. Fred G. and Otto Collmer of Collmer Bros., bicycle manufacturer and tool specialist, are promoters of the company and for the present the new wheels will be made in the Collmer factory at 420 South St. Joseph street.

IS LOCATED IN DETROIT.

Firestone Man in Syracuse Is Selected to Look After Tire Interests There.

Charles M. White, Jr., who has been representing the Firestone Tire & Rubber Company, Akron, O., maker of Firestone tires, in Syracuse, N. Y., has located in Detroit as pneumatic tire representative to the automobile manufacturers of Michigan. While in Syracuse Mr. White was particularly active in the interests of the company, and it was due largely to his efforts that it was deemed wise to open a new branch and service station there, which will be located at 502-504 East Genessee street. His removal to the heart of the motor car industry is looked upon in the nature of a well deserved promotion.



Charles M. White, Jr., with Firestone Tire & Rubber Company.

E. A. Hoffman, formerly manager of Wyckoff, Church & Partridge's supply house in New York City, has been appointed manager of the new Firestone branch in Syracuse. Mr. Hoffman has lived most of his life in Syracuse, where he has a host of friends, and his selection to take up the work now laid down by Mr. White is considered particularly fortunate. His experience dates back to the bicycle days, and at one time he was in business for himself in that city, operating as Hoffman & Weaver. It is expected that he will prove a very strong addition to the Firestone sales force, as well as of incalculable assistance to pleasure car and motor truck owners and users.

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RICHMAN LEAVES HUDSON.

Becomes Factory Production Manager for the Cole Motor Car Company.

Following the announcement of George H. Strout's resignation from the Cole Motor Car Company, Indianapolis, Ind., to become general sales manager for the Haynes Automobile Company, Kokomo, Ind., comes the information that J. F. Richman, for the past four years factory superintendent for the Hudson Motor Car Company, Detroit, has been appointed factory production manager of the Cole organization. This is a new position, created recently by President J. J. Cole because of the increase in the company's business.



J. F. Richman, Production Manager, Cole Motor Car Company.

Mr. Richman goes to his new duties with the good wishes of a host of friends in Detroit and throughout the industry. Before becoming associated with the Hudson company he was for a long time with the Maxwell-Briscoe Motor Company's plant in Newcastle, Ind., and he also served for a time with the Olds Motor Works, Lansing, Mich., and with a number of machine factories. He is particularly well fitted for the position and his selection is in keeping with Mr. Cole's announced intention of securing men of the highest ability to head the various departments of his organization.

TO PRODUCE MOTOR HEARSES.

Understood That Grand Rapids Concern Will Engage in New Line of Activity.

According to information from Grand Rapids, Mich., the Michigan Hearse & Carriage Company of that city will enter the automobile field, producing motor hearses, principally, and motor trucks. It has long been engaged in the manufacture of funeral cars, undertaker's wagons, ambulances, etc.

While the rumor cannot be verified, it is understood that additional capital has been secured and that men closely identified with the Grand Rapids Motor Truck Company will be on the new board of directors. The first named concern is not yet ready to make an announcement, and it is not definitely known whether the new business will be conducted under the old name.

TESTING KEROSENE CARBURETOR.

Ray Harroun Secures Important Results from His New Invention.

Announcement was made some little time ago of a new carburetor designed by Ray Harroun, the well known racing driver. The device is being manufactured by the Ray Harroun Company, Indianapolis, Ind., and this company reports the results of recent tests which seem to indicate that the vaporizer operates successfully on kerosene, motor spirit or gasoline.

The first test was over the road from Chicago to Indianapolis, by way of Logansport and Kokomo, a distance of 224.2 miles, under what was regarded as average touring conditions. This was made entirely on kerosene, and the fuel consumption worked out at 17.25 miles to the gallon.

Harroun next covered 500 miles on the Indianapolis speedway, utilizing four different kinds of fuel, alternately. The results as reported by the observers were as follows:

Fuel	Gravity Baume	Price cents	Miles a gal.	Cost a mile
Kerosene	43	.08	22.2	$0.0036
Kerosene	49	.10	21.6	.0046
Motor spirit	62	.13	20.4	.0063
Gasoline	60	.16	20.0	.0080

Prices quoted on tank wagon lots at Indianapolis, speed constant at miles an hour, one stop on each test.

GEDDES SUCCEEDS KELLY.

President of Kelly-Springfield Motor Truck Company Retires on Acount of Ill Health.

The many friends of E. S. Kelly, president of the Kelly-Springfield Motor Truck Company, Springfield, O., maker of Kelly trucks, will regret to learn that his health is such that he has felt compelled to retire from the active detailed management of the company. Mr. Kelly becomes chairman of the board of directors and will continue to exercise a general oversight over the

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affairs of the concern, but the details of the management will devolve upon James L. Geddes, who succeeds Mr. Kelly as president. He will be assisted by O. S. Kelly, who continues to be general manager.

The affairs of the company are in most excellent shape. The factory is running to its fullest capacity and the demand for the goods is sufficient to give every assurance of a prosperous future for the company. Mr. Kelly, while regretting his inability to continue as president, feels that he has secured a very competent successor in Mr. Geddes, who for many years was associated with Emerson McMillan, chairman of the board of the American Light & Traction Company, and who, with the firm of Emerson McMillan & Co., banker, holds a controlling interest in the truck company. Mr. Geddes has been connected with the Detroit City Gas Company for 14 years, joining its force in 1899, after a number of years with the Grand Trunk railroad in Port Huron, Mich., Detroit and Montreal, Can. His past business career has been such that the fullest confidence is felt as to his conduct of the truck concern.

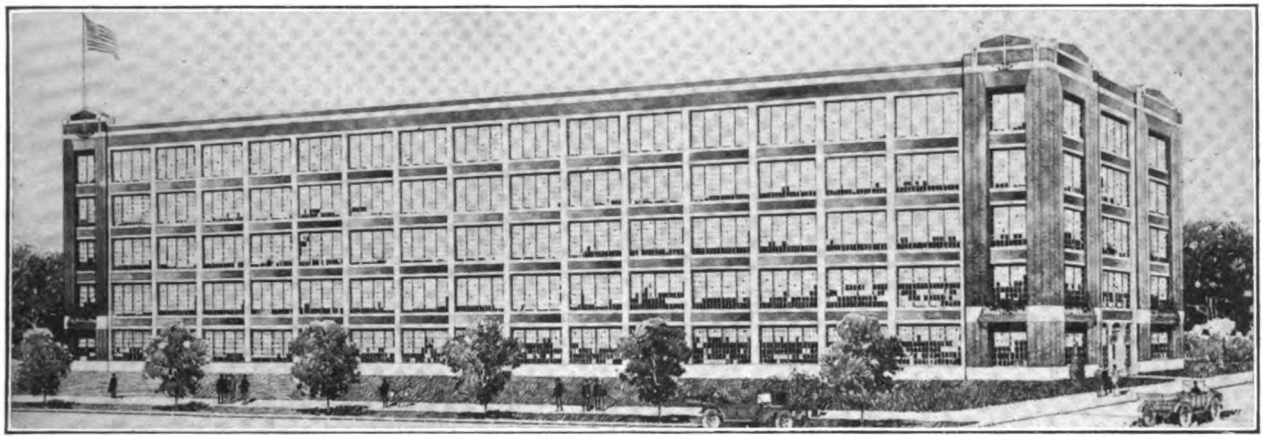
Mr. Kelly was one of the pioneers in the rubber tire business. In 1894 he started the Kelly-Springfield Tire Company, which produced rubber tires for horse drawn vehicles. After promoting that company to a high production and financial efficiency he retired from its board of directors, disposing of his stock. He remained inactive until about three years ago when he purchased and reorganized the Frayer-Miller Motor Truck Company and began a campaign of development. He is now at Dansville, N. Y., where he hopes to recuperate sufficiently to enable him to pass some time in Europe the coming summer.

ERECTING NEW FACTORY.

Gray & Davis Expects to Move into Cambridge Plant in Near Future.

Gray & Davis, Boston, Mass., has prepared plans and is having erected in Cambridge a handsome modern factory building, five stories high, 381 feet six inches long by 81 feet wide on the first floor and 61 feet wide above that. The design has been prepared with a view to permitting additions in the future.

An accompanying illustration presents a general view of the structure. The exterior will have a veneer of tapestry brick and will be so treated that nearly 70 per cent. of the wall area will be of glass, using steel sash. There will be a large show room on the first floor, while the offices will be located on the second, occupying the full width of the building for a length of 200 feet. The directors' room and the private office of Mr. Gray will be lined with a special design of tapestry brick, contain large fireplaces and be fitted with every modern convenience.



New Factory Building Now Being Erected in Cambridge, Mass., by Gray & Davis, Boston.

In the factory proper the ceiling will be painted a light color to assist in the light distribution. There will be locker rooms on every floor, containing steel lockers, one for each employee. Electrical time clocks will be placed on every floor, and these will register with a master clock in the main office. Electrical power will be used entirely, and in short the fittings will be modern in every particular.

The Illinois senate has passed a bill providing for imprisonment from two to 10 years for the theft of an automobile. This action is similar to that taken by other states.

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NEW AND NOVEL ACCESSORIES THAT APPEAL TO MOTORISTS.

Goodman Tire Shield.

The Goodman tire shield, marketed by the Approved Auto Specialties Company, 1737 Broadway, New York City, as the name implies, protects the casing and inner tube, and when utilized with an old shoe prevents punctures and blow-outs as well as adds to its service. The shield is constructed of several layers of tough, four-ply fabric chemically and asbestos treated, making it a non-conductor of heat as well as rust and friction proof. It is quilted and shaped to form a complete inner tube which fits snugly, but is capable of suitable expansion. It is free from buckles, seams, ridges, etc., and is easily fitted. It increases the efficiency of the tube in that contact of the latter with metal is prevented. It may also be employed to reinforce a casing weakened by a cut.

Justice Wheel Puller.

P. S. Justice & Co., 421 Chestnut street, Philadelphia, is manufacturing the Justice wheel puller, which is stated to have a capacity of seven tons. It is provided with a small round base attached to the screw member and the former may be displaced if desired by removing a set screw. Insead of arms or yokes a chain is employed and this is adjustable. It is operated in the usual manner, the chain being fitted around the hub of the wheel and the screw end applied to the axle, etc. The travel of the screw member is four inches, width of yoke 16.5, diameter of base four and weight of device 24 pounds. The chain is 11 feet long.

Dean Fordorn.

The Dean Auto Devices, 120 Sangamon street, Chicago, is manufacturing an electric horn for model T Ford cars that differs from the conventional signal in that it is operated by the current generated by the flywheel magneto and does not interfere with the ignition. The note is clear and penetrating and the pitch follows the speed of the motor, the blows on the diaphragm being said to be from 25 to 600 a second. The horn weighs but 26 ounces, is moderately priced and is held to require no attention or adjustment after installation.

Miller Tube Bag.

Inner tubes should not be carried among the tools of the car or exposed to the action of oils, grease, moisture or light. The proper method is to utilize a tube bag, one that will exclude foreign elements as well as prevent injury to the rubber. Chas. E. Miller, 97-103 Reade street, New York City, is marketing a tube bag which although inexpensive embodies the essential qualities of high priced members. It is made of a heavy napped cloth and its design is similar to conventional types.

Smith Trouble Indicator.

Smith & Gunn, Burlington, N. J., is marketing the Smith trouble indicator, a device for locating a missing cylinder, etc., by electricity, a light being flashed when the instrument is utilized. It is fitted to the dash and when employed in connection with a four-cylinder motor consists of four buttons and a like number of lenses. It is operated by pressing a button which cuts out the other cylinders, enabling the driver to test each in turn.

Bryant Service Lock.

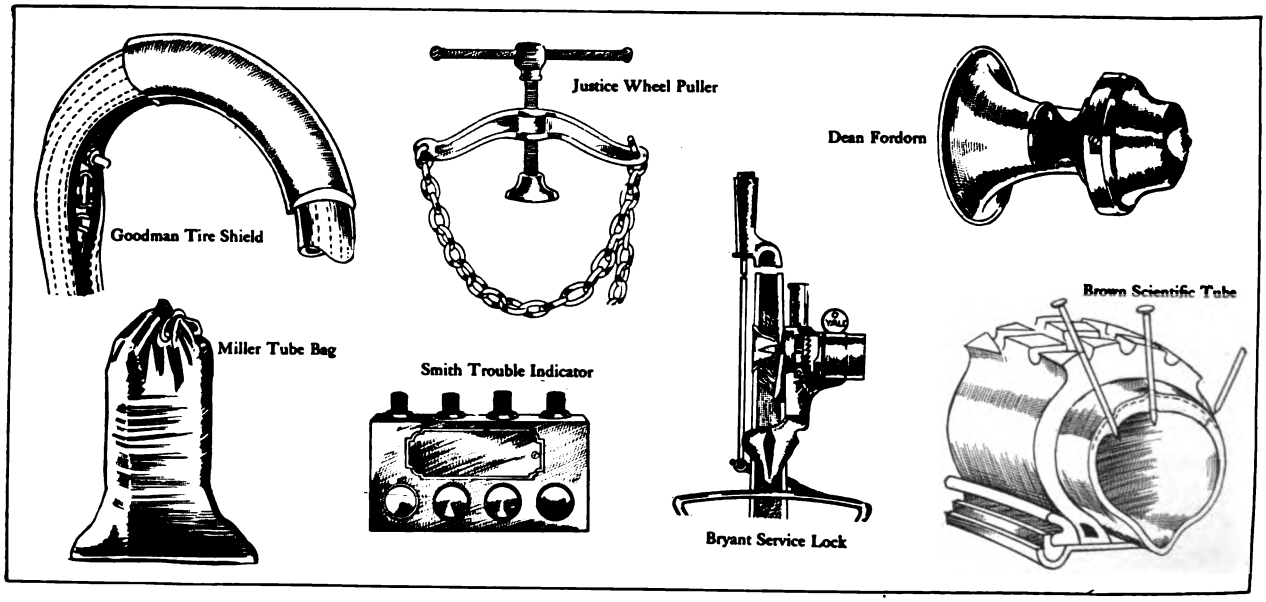
The Bryant service lock is manufactured by the E. H. Bryant Company, Cleveland, O., and locking as it does the gear shift lever, use of the car is prevented. The device is secured to the lever and depressing a knob operates a fork which causes wedges to fill the space on both sides of the gate. It is equipped with a Yale lock and turning the key automatically lifts the fork member out of engagement. The Bryant lock is positive in its action, very compact and neat, and is finished in brass, nickel or black.

Brown Scientific Inner Tube.

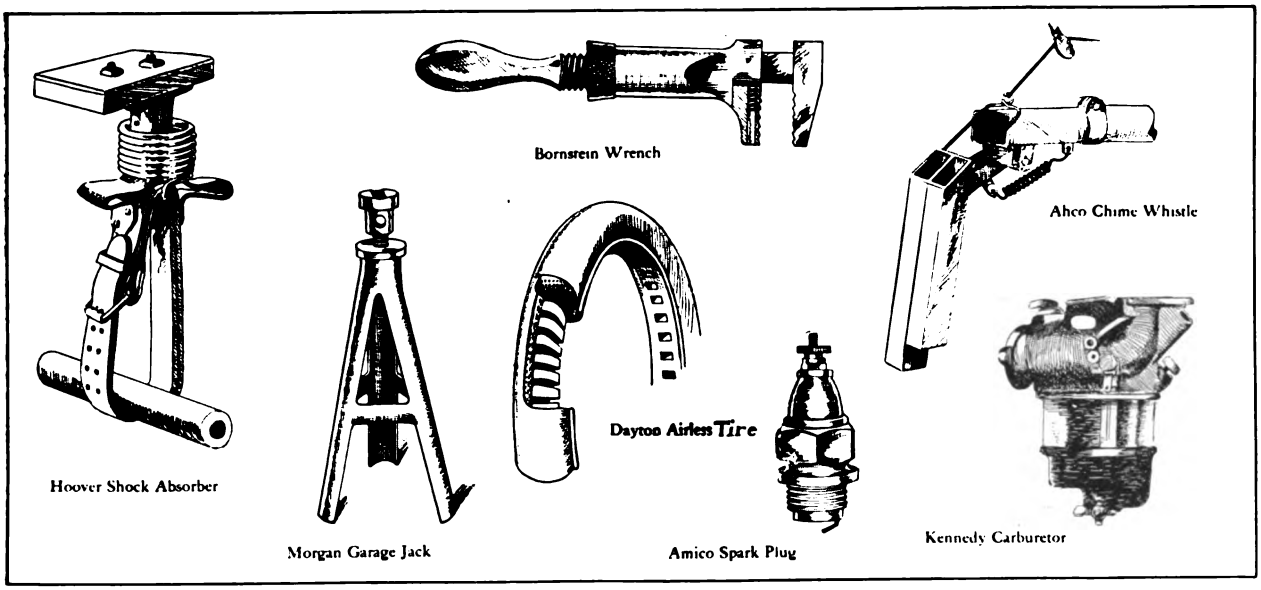
The Brown scientific inner tube presents interesting features in that it will not deflate when punctured and that this desirable quality is not secured through fillers of any kind, nothing but air being utilized as with a regulation tube. The self-closing of the puncture is due to the construction. The tube is made with a heavy tread, about twice as thick as usual, and as it is manufactured it is turned inside out. This places the excess material in compression, and it is held firmly in place by a strip of canvas or fabric on the outside. When the tube is punctured the tread portion of the rubber, due to the compression under which it is placed, immediately squeezes together, preventing the escape of the air. The thickened tread adds to the life of the casing, reinforcing the latter. The Brown tube is made of Para rubber. It is marketed by the Brown Scientific Tube Distributors, Broadway and Seventy-second street, New York City. C. J. Cross & Co., 1878 Broadway of the same city, is eastern agent.

Hoover Shock Absorber.

The Hoover shock absorber, made by the W. H. Hoover Company, New Berlin, O., is a combination device in that it serves as a rebound strap in addition to eliminating shocks to the chassis components. It is simple in design, easily fitted and is suited to any type of car. It comprises a steel plate which is secured to the floor of the vehicle, a coil spring of crucible steel, a steel strap attachment, and leather loops and straps of special chrome tanned rawhide. The latter encircle the axle and when the springs of the machine become extended to the danger point the rebound strap comes into action, checking the movement. The coil spring gradual-



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ly retards the upward movement. The leather straps are adjustable.

Bornstein Wrench.

Henry Bornstein & Co., Ipswich, Mass., is manufacturing the Bornstein patent pipe and vise wrench, which is designed for automobile and other service. It is made in several models, with plain jaws and for handling piping, etc., and a quality claimed of it is that lost motion is eliminated by the construction. The material and workmanship are high grade.

Morgan Garage Jack.

The Morgan Manufacturing Company, Newport, R. I., has brought out a new type of garage jack which differs from the usual tool in that the base is wide, preventing slipping. The three legs are sturdily constructed and the space between them is such as to prevent any possibility of tipping over. The jack head is made with a recess wide enough for the chassis to fit into it and throughout the best of material is employed. The height of the jack is 20.5 inches and it has an extension of nine.

Ahco Chime Whistle.

The Ahco chime whistle is the product of the Arnold-Hough Company, Inc., 124 Washington street, Providence, R. I., and is designed for model T Ford cars, being attached over the exhaust pipe of the muffler and being secured by a locking bolt and nut. It is constructed of aluminum and has a rich, mellow tone that is far reaching in its effect. One of the features of the Ahco is that it does not obstruct the passage of the burnt gases when not in operation. The signal is free from purring noises, the chime member being well below the outlet and being retained by a spring. The whistle is operated in the conventional manner, by a pedal, which actuates a cable, the latter lifting the chime into position. The whistle comes complete with brass pedal, cord and pulley. It is marketed by the Waite Auto Supply Company, Providence, R. I.

Dayton Airless Tire.

Resiliency, freedom from puncture or blow-outs, and absence of vibration are the features emphasized of the Dayton airless tire, made by the Dayton Rubber Manufacturing Company, 1011 Kiser street, Dayton, O. It is not a solid or a filled casing, but possesses the advantages of the former in that it requires no attention after fitting. The construction of the Dayton may be compared to the felloe and spokes of an automobile wheel in that it comprises an annular rib of straight cut fabric and rubber and piers of elastic, high grade rubber. The latter are spaced and the compartments between provide room for their expansion in encountering road obstructions, such as a stone, etc. Instead of the shoe bouncing, the rubber blocks are squeezed down and bulged out, providing resiliency. The shoe is constructed to fit standard rims and outwardly cannot be detected from conventional casings. They are made in both smooth and non-skid treads.

Amico Spark Plug.

The American Ignition Company, Inc., 319 Adams street, Dorchester, Mass., is marketing a new spark plug which presents practical features. The Amico plug differs from those of conventional design in several particulars and the most striking point is the provision made for expansion of the porcelain, which material is utilized for insulating purposes. The porcelain is approximately an inch in diameter, making for extreme strength and durability, and it should withstand severe usage. The metal shell of the plug is sturdily constructed and is provided with the usual hexagon, but the interior has a decided taper. This is for the purpose of compensating for the expansion of the porcelain, and if such action occurs it is on an incline. The packing is asbestos, which is completely wound around the porcelain, and the gasket is .75 inch high, making a perfect joint as well as one that is gas tight. The porcelain is retained at uniform pressure, by a vamped ridge. One of the qualities of the plug is that the electrode on the shell is liberal in size and not easily sprung out of positon through careless handling. The main electrode extends through the centre of the porcelain and the tapered end of the latter provides ample room for the gases to clean the points. The Amico is guaranteed and is moderately priced.

Kennedy Carburetor.

Easy starting in all temperatures, simplicity of adjustment and a fire proof construction are features emphasized with the Kennedy carburetor, manufactured by the L. D. Robbins Company, Lynn, Mass., for which F. Shirley Boyd, 903 Boylston street, is Boston representative. It has two adjustments, a high and low speed needle valve, and but one air inlet. The latter is provided with a full size hot air tube leading to the exhaust pipe of the motor and in the event of a backfire the danger of fire is reduced to a minimum. Easy starting qualities are secured through an accumulation of fuel below the gasoline level, which provides a rich mixture. This puddle forms automatically on stopping the motor. One of the features claimed of the carburetor is the use of a by-pass tube for providing a proper mixture at low speeds. The usual springs, etc., are eliminated, and a uniform mixture is secured at high or low ratios. The Kennedy is held to be very economical of fuel.

Miller Hydrometer Syringe.

The importance of maintaining the proper specific gravity of the electrolyte in the cells of the storage battery cannot be emphasized too strongly. As the modern automobile is equipped with electric lighting which depends upon the storage battery when the car is inoperative or travelling at very slow speeds, it is imperative that the instructions of the maker of the battery be complied with. As more or less of the fluid evaporates it has

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to be replaced, and sometimes it may be necessary to add acid. To ascertain the specific gravity a hydrometer syringe is utilized and these members are inexpensive. They are also used to check the performance of the dynamo. Chas. E. Miller, 97-103 Reade street, New York City, is marketing the Miller hydrometer syringe, which comes in a polished oak case and has a special filling nozzle. The scale is calibrated for Baume and specific gravity and it is a simple matter to take readings of the electrolyte.

Standard Trunk Racks.

The tendency toward clean running boards and the elimination of accessories formerly fitted to the outside of the car have resulted in the more general use of the trunk rack. These members are decidedly useful in that a large amount of luggage, etc., may be carried at the rear of the car where they are not only out of the way, but very accessible. The Connecticut Steel & Wire Company, Hartford, Conn., specializes in trunk racks and manufactures a wide variety to meet individual requirements and the design of the vehicle. The Standard trunk racks are of the folding type, constructed of high grade material, and although light are sturdy.

Guide Flush Dash Lamp.

The Guide Motor Lamp Manufacturing Company, Cleveland, O., is marketing a popular priced electric lamp of the flush dash type. The design eliminates the use of brackets as well as annoying rattles, being mounted in the dash, which is cut to take the lamp proper. The latter is provided with a flange for securing it and a back piece covers the mitre where the light goes through. The design is very neat and compact and the semaphore is constructed of heavy glass. The overall diameter of the lamp is 4.5 inches, requiring a 3.5-inch hole for fitting, and the dash thickness varies from .625 to one inch. The lamps are highly finished with front in brass and back in black or with nickel or black front.

Beard Auto Lift.

Tires are injured by allowing them to carry the weight of the machine when the latter is out of service for any length of time. The Walter H. Van Deusen Sales Company, Detroit, is marketing the Beard auto lift, which comes in sets of four. It is a simple device, which is placed under the hub of the wheel, raising it free from the ground by a slight pressure of the foot or hand. The mechanical principle involved is said to be such that it can be operated easily and without effort by a child. The design is free from springs, etc., and there is no possible danger of the lever springing back. The lifts are constructed of high grade steel, held to be indestructible, and the set weighs but 27 pounds. An additional feature is that they may be folded up and carried in the tool box.

Danver Ford Automatic Oiler.

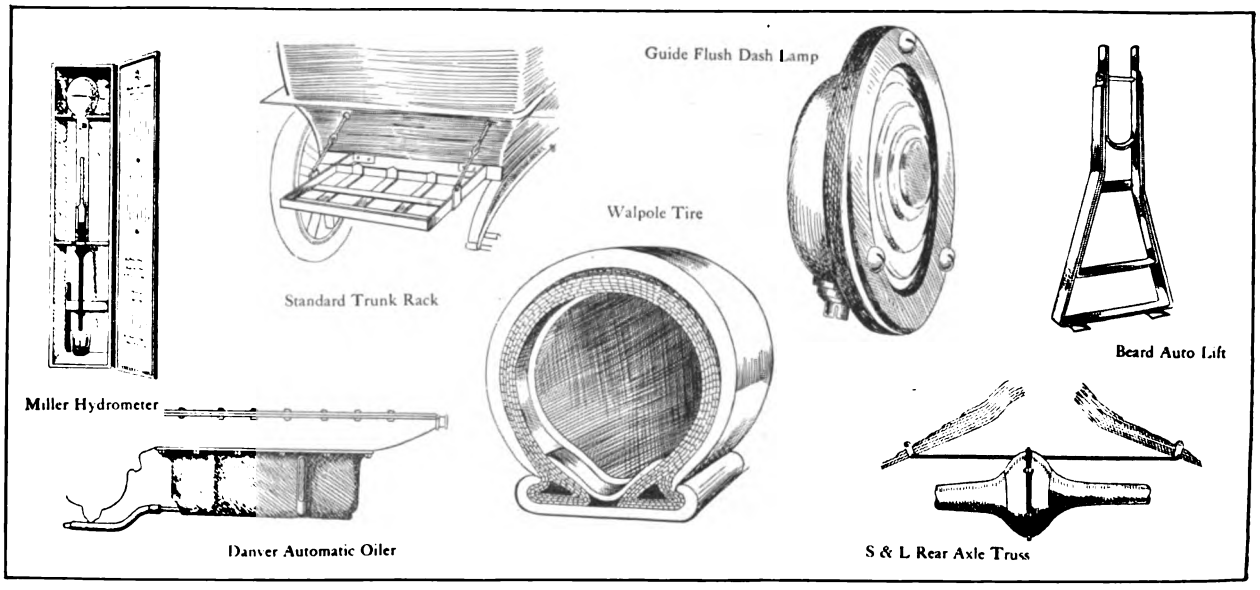
The A. .C. Danver Company, Borden and Hospital streets, Providence, R. I., has brought out an automatic auxiliary oiling system for model T Ford motors which presents several interesting as well as practical features. The most noticeable quality of the device is that means are provided for constantly maintaining the height of the lubricant in the crankcase, thus preventing excessive smoking as well as carbon. This is accomplished by a standpipe which governs the height of the oil irrespective of the amount poured into the sump. The system is of the constant circulating type, the oil flowing from the crankcase through the standpipe to the sump, thence to the reservoir in the flywheel housing and back to the motor. By this arrangement the lubricant is kept cool and the parts are supplied with a more efficient oil. A protected glass gauge is fitted to the side of the oiler where its location is readily accessible and it may be seen without stooping under the car. The glass is removable for cleaning when desired and the retaining members are leak proof. The oiler is easily fitted, replacing the lower crankcase cover, and the holes are accurately drilled. The pipe connecting the sump with the flywheel housing is secured to the latter by a special construction, quickly attached. The maker points out that greater lubricating capacity is provided, the sump holding double the usual amount of oil, and that an oversupply will not cause smoking. The supply is replenished through the breather pipe in the usual manner. The Danver oiler is constructed in aluminum and iron, nicely finished, and is not noticeable when fitted to the motor.

Walpole Tire.

One of the several features of the Walpole tire, made by the Walpole Tire & Rubber Company, with sales offices at 757 Boylston street, Boston, is that its construction is such that it is guaranteed against stone bruises, one of the most common causes of tire troubles. The casing is cured as a unit and throughout the best of material and workmanship are incorporated. They are manufactured in two types, a clincher designed to fit the one-piece rim and the quick detachable. The latter is identical with the regular clincher except for the bead, which is made stiffer and non-expanding. It also has a flap to protect the inner tube. As will be noted by the illustration an extra heavy layer of rubber protects the side walls of the casing and the tread is liberal in size. The Walpole tire is constructed for motorists desiring a high grade casing and it carries a mileage guarantee of 4000 miles.

S. & L. Rear Axle Truss.

Sunvold & Larson, Sacred Heart, Minn., is manufacturing the S. & L. rear axle truss or support for model T Ford automobiles. It is designed to eliminate opportunity for rear axle breakage, gear stripping or misalignment, and it is held that vibration is reduced to a minimum. It is clamped to the axle and the work is accomplished easily and quickly, requiring no drilling or fitting. The device is inexpensive.



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ALCOHOL AS A DECARBONIZER.

Experiments Conducted with Denatured Fluid Indicate Valuable Cleansing Properties.

In a paper read recently before the members of the Metropolitan Section of the Society of Automobile Engineers, New York City, Joseph A. Anglada, M. E., discussed the advantages of denatured alcohol as a solvent of carbon deposits in internal combustion motors. His findings were based on a number of experiments, the motors of 14 different cars and in varying conditions of carbonization being treated with alcohol.

Although various methods of inserting the alcohol were tried, the principle consisted of filling the combustion space with the fluid and allowing it to remain for periods varying from six to 12 hours, after which it was removed by means of an oil gun. It was found in the majority of cases that the carbon was loosened to such an extent that it passed out readily with the exhaust gases during the natural operation of the motor. In some tests a second or third use of alcohol was necessary, depending on the amount and nature of deposits. Between the treatments the car was utilized as usual.

It was found that where the rings fitted poorly the alcohol would leak past into the crankcase, necessitating the cleaning and renewal of the lubricant. The quickest results were obtained when the motor was hot, although heat is not necessary. It was stated by Mr. Anglada that alcohol does not injuriously affect the surfaces of metal with which it is brought into contact.

MARKET OF THE FUTURE.

Cartercar Official Foresees Ever Increasing Demand for Product of the Industry.

America is able to afford more automobiles today than ever before, according to Harry R. Radford, vice president and general manager of the Cartercar Company, Pontiac, Mich., maker of the Cartercar line. He says that the ever increasing prosperity of the country will take care of all the really good cars that can be manufactured at a reasonable cost. He adds:

If this country were the same financially and industrially today that it was some 10 or 15 years ago, there might be some excuse for the assumption that the market might be slackening a bit. But everywhere there is a great boom, and people are buying motor cars today who would not have thought of such a thing only a few years ago.

And another great thing is the improvement in roads and streets that is going on in all parts of the country. Of course these improvements help in the selling of cars, but they must and will be used almost universally whether there are any roads or not. Almost every day we get letters from Cartercar owners telling of the successful use of their machines even on roads which seemingly are impassable for a horse drawn vehicle.

When the first motor car was made the people were not ready for it and they had to learn what it would do and to get used to it. Today they recognize it as one of the important essentials of industry and pleasant living. Automobiles will be sold as long as people continue to live and make money.

YOUNGEST AUTOMOBILE DEALER.

William Whipple, Agent for Michigan in Genoa, Ill., Claims Honor.

Who is the youngest automobile dealer in the United States; that is, the youngest real agent who has a regular contract, sells cars and banks his commissions? William Whipple, Genoa, Ill., lays claim to this honor, and certainly, his claim is worthy of consideration.



William Whipple, Genoa, Ill., Youngest Automobile Agent.

Young Whipple recently passed his 16th birthday, and although his father is the possessor of five prosperous Illinois farms, he has a decided preference for a bank account built up strictly by his own energy. He is the duly accredited agent for Michigan cars, made by the Michigan Motor Car Company, Kalamazoo, Mich., in Genoa.

The young man has a youthful enthusiasm, which seems to win where the older salesman might fail. It may be added that his enthusiasm is backed by accurate knowledge acquired by actual experience in the Michigan factory at Kalamazoo, having spent considerable time in overalls and jumper as a helper to make himself thoroughly familiar with automobile construction. Business does not interfere with studies, as he is in the third year of the high school in Sycamore, Ill.

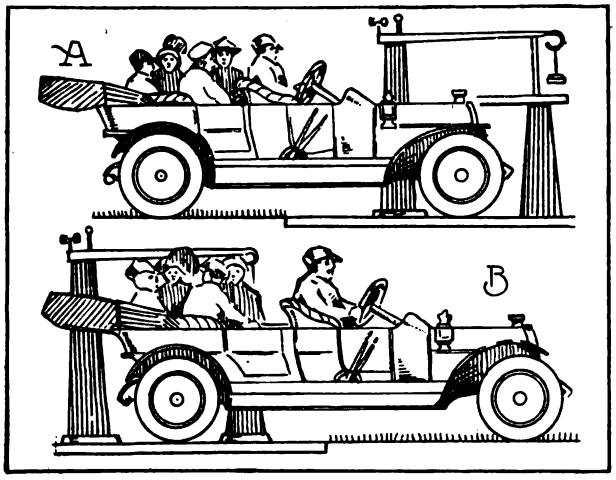
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OBTAINING EFFICIENCY FROM TIRES.

Why Many Motorists Fail to Secure Maximum Mileage---Effect of Impoper Inflation Upon the Fabric---Suggestions Making for Economy---Notes for Owners.

A PROMINENT tire manufacturer is the authority for the statement that 75 per cent. of the casings prematurely scrapped and sold for old rubber, come to an untimely end because they were not cared for properly. This would indicate that a certain class of motorists wastes thousands of dollars annually through carelessness or negligence, despite the educational campaign conducted by tire makers and motoring prints.

Improper inflation is responsible for more tire trouble than anything else and many motorists do not realize this, although repeatedly advised to maintain the air pressure at so many pounds. Many owners are careful in fitting new



When Weighing the Car It Should Be Fully Loaded, Tanks Filled, Etc.: A, Showing How Front Axle Load Is Determined; B, Position of Machine When Ascertaining Rear Axle Load.

shoes to inflate them properly, but thereafter neglect to occasionally test the pressure. A leaky valve or a minute puncture may reduce the pressure below the predetermined amount, and the running of the car under these conditions paves the way for the inevitable blow-out.

It is sometimes difficult for the tire expert to convince an owner that a blow-out is due to improper inflation, especially when the exterior of the casing is in perfect condition. Many automobilists judge a shoe from its outside appearance and do not give its interior any consideration whatsoever. This is an error as the fabric is the real shoe, the rubber serving to retain its shape and to protect the plies from moisture, and contact with the road, and to provide traction.

The alternate layers of fabric are "frictioned" with high grade rubber, which is forced into the voids of the cloth so as to hold it firmly. Over this is placed the breaker strip, another ply of fabric, and the tread is molded to this construction. The resiliency of the shoe is secured through the elasticity of the air, not through compression of the rubber. As a tire is required to endure and carry a large load, and in the case of the rear wheels is also forced to become a driving member, it will be seen that there is a combination of strain that is resisted by the strength of the thread of the fabric and the degree of adherence of the rubber to the thread.

The tread of a shoe is only slightly effected by the weight carried upon it, but the walls are effected in proportion to the load and as the tread may be flattened slightly the walls are curved, sometimes acutely, and every movement of the shoe from road shock is most acute at a point between the line forming the upper half of a transverse section of a tire and its bead. The tire wall is most flexible from the bead to a point midway of the wall and the action or movement of the fabric is termed alternate tensing and releasing of the threads. Some idea of the number of compressions and reactions may be gained by the statement that a 28-inch tire in covering 5000 miles will be subject to about 3,600,000 of these movements.

It follows, therefore, if a shoe be utilized under-inflated, these stresses are exaggerated and the separation of the plies and the breaking of the threads follow. The plies of fabric may be compared to a number of thin strips of cloth cemented together. As a whole the construction will present more resistance than would the same number loosely arranged. With a casing not properly inflated the threads of the fabric are subjected to more frictional stresses, and breakage follows.

There should be no deviation from the rule of keeping the tires inflated at all times to the pressure recommended by the maker. This applies alike in cold or warm weather. The writer has been asked repeatedly if it is not good policy to allow for hot weather in pumping a tire. Some

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have stated that tire experts advise less pressure, claiming that the air expands when heated. This contention is not borne out by the manufacturer,

SHOWING SPECIAL OR ODD SIZED TIRES FITTING STANDARD RIMS.

Tires	Rims	Tires	Rims	Tires	Rims
29x3½	28x3	33x4½	32x4	35x5	34x4½
31x3½	30x3	35x4	34x3½	37x5	36x4½
31x4	30x3½	35x4½	34x4	37x5½	36x5
33x4	32x3½	37x4½	36x4	39x5	38x4½

who gives the proper pressure and does not make exceptions, and his knowledge is acquired by years of experience.

The popular suppositon is that the heat generated by tire friction on the road is such as to considerably increase the pressure of the air in the shoe and that this causes blow-outs. The remark, "It is a bad day for tires," is heard frequently in hot weather. The fact is that the tires are more or less worn; that the fabric is loose or broken, and that the heat causes the structure to soften at the weak point. The blow-out naturally follows. The increase of pressure created by heat is so slight as to be a neglible factor.

Some motorists complain that their cars ride too hard with the shoes inflated to pressure and make it a practise to under-inflate. No one will question the right of an owner to use his tires as he sees fit, but soft shoes are a luxury. And, unfortunately, some of these motorists are as equally insistent upon an adjustment as those who conform to the instructions of the maker.

It is safe to assert that a large percentage of the "easy riding" class does not realize the great stress upon the shoe when improperly inflated. The dropping of a wheel into the gutter, a depression, a hole, or striking a stone, etc., produces an impact that breaks the fabric as the force of the blow is on the external structure. The flattening of the shoe and tube reduces the space containing the air under compression and the pressure for the moment is increased throughout the tube area, and there is a greatly increased strain at the point of contact. At high speeds the stresses obviously are augmented. With the shoe properly inflated the shock is more generally distributed; not localized as with the soft tire.

The policy of the car manufacturer to equip his product with larger shoes than formerly is appreciated by the experienced owner, but these large shoes do not relieve him of the necessity of giving them attention or maintaining them at the proper pressure. It is as imperative to properly inflate over-size tires as smaller ones. Tables giving the weights a wheel that different sized tires are constructed to carry are given herein, and these will be of value to the owner in checking up the weight of the car. The machine should be fully loaded; that is, with the seats occupied, tanks filled and with full equipment. Previous to the time when manufacturers completely equipped their product the owner fitted accessories weighing hundreds of pounds, thereby often overloading his tires. As there are many cars still in service, which were equipped by the purchaser, due consideration should be made for the extra weight in the selection of new shoes.

The proper method of weighing the machine is shown in an accompanying illustration. First, make a chalk mark on the step or running board to indicate the centre, then run the front wheels on the scale until the chalk mark coincides with the edge of the platform, as shown at A. To ascertain the axle load of the rear wheels, reverse the operation. Dividing the end weights will give the load sustained by each wheel and tire.

If the machine is found to be under-tired a larger size should be fitted when new casings are needed. This does not necessarily mean changing the rims as the tire manufacturer produces special or odd sizes which are interchangeable with standard rims. An accompanying table presents the standard rims and the odd sized shoes that may be fitted to them. It is a simple matter to figure out the required size by adding an inch to the wheel size of the casing and half an inch to its diameter; for example, a 32 by 3.5-inch rim

GIVING MAXIMUM LOADS DIFFERENT SIZED TIRES ARE DESIGNED TO CARRY ON FRONT AND REAR WHEELS.

Size	Load a Tire in Pounds Rear	Front	Size	Load a Tire in Pounds Rear	Front
28x2½	225	275	37x4	775	925
30x2½	225	275	38x4	800	950
28x3	350	425	40x4	850	1000
30x3	375	450	42x4	900	1050
32x3	375	450	32x4½	750	950
34x3	400	500	34x4½	900	1125
36x3	425	500	35x4½	950	1175
28x3½	425	500	36x4½	1000	1250
29x3½	425	500	37x4½	1025	1275
30x3½	450	550	38x4½	1050	1300
31x3½	475	575	40x4½	1125	1375
32x3½	500	600	42x4½	1200	1450
33x3½	525	625	34x5	950	1175
34x3½	550	650	35x5	1000	1250
36x3½	600	700	36x5	1050	1300
30x4	625	750	37x5	1100	1350
31x4	625	775	39x5	1200	1450
32x4	650	800	41x5	1300	1500
33x4	675	850	37x5½	1150	1400
34x4	700	875	38x5½	1200	1450
35x4	725	875	40x5½	1350	1600
36x4	750	900			

will take a 33 by four-inch tire. Many owners in purchasing new shoes make it a practise to fit larger members, thereby reducing the cost of tire

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upkeep as well as adding to the easy riding qualities of the machine. It is not practical, however, to utilize one 33 by four-inch tire and one 32 by 3.5 on the rear wheels, for example. The sizes should be the same. In connection with this matter of special shoes should be mentioned the necessity of using the proper sized inner tubes, as one too small will burst while a larger one will wrinkle and chafe the casing.

Too much emphasis cannot be laid upon the importance of keeping the tires properly inflated at all times, and although the maker's instructions are generally complied with when fitting a new tire they are not always followed afterward. A tire or pressure gauge is inexpensive, is easily utilized and with it but a few minutes are required to test the shoes. Even the extra inflated members carried on the running board should be tested before being used and should the pressure be below that recommended by the maker they should be pumped up before being fitted to the rim.

The inflation or air pressure in pounds recommended for 21 different makes of tires by their manufacturers is presented in an accompanying table and the cross sections of the casings are also given. It will be noted that the figures vary slightly, some makers advocating an air pressure a square inch of 18 times the cross section, while others recommend 20. The practise of inflating a shoe until it stands up round under load is not reliable, although indulged in by many owners. The only method is to utilize the pressure gauge.

Cuts, no matter how small, allow dirt to work in between the rubber and fabric, not only destroying the latter, but the abrasive action of the grit separates the tread from the breaker strip, etc. The fabric is also exposed to moisture, which causes it to deteriorate.

If the following suggestions contributed by the tire manufacturer are heeded, maximum efficiency will be secured from the shoes and the cost of the upkeep of the motor car will be greatly reduced thereby:

Keep tires properly inflated.
Clean and repair all cuts.
Examine casings periodically.
Take corners at slow speed.
Keep wheels aligned.
Apply brakes easily.
Use throttle instead of brakes.
Keep out of car tracks.
Engage the clutch gently.
Keep rims and rings clean.
Clean new casings before applying.
Examine interior of shoe for loose fabric.
Exclude light and moisture from new casings.
Remove all grease or oil from rubber.
Over-tire car if possible.
Keep brakes properly adjusted.
Jack up wheels when car is not in service.

LUBRICATING VALVE STEMS.

When grinding in the valves their stems should be thoroughly cleaned and lubricated before being replaced. These and their bearings in the cylinder are subjected to considerable wear and in time auxiliary air will find its way into the cylinder, causing missing at low motor speeds. Grease does not serve as the heat of the motor causes it to dissipate. The best method is to smear the stems with a grease graphite or the powdered material.

HOME MADE METAL POLISH.

A good metal polish for brass, nickel or silver can be made easily and at slight expense by taking two parts alcohol, one part ammonia and whiting enough to form a liquid having a cream-like consistency. This is smeared over the work and allowed to dry, after which it is rubbed off with a fine cloth. The alcohol and ammonia dissolve all dirt and oxides, which are absorbed by the whiting and removed when the powder is brushed off.

GIVING THE AIR PRESSURE IN POUNDS BY TIRE MANUFACTURERS FOR DIFFERENT SIZE CASINGS.

Size of Tire in Inches	Ajax	Batavia	Cataract	Diamond	Empire F	Empire R	Firestone	Frontier	Fisk	Goodrich	Gaulois	Goodyear	Imperial	Kelly-Springfield	Lee	Michelin	Pennsylvania	Republic	Swinehart	Shawmut	United States	Walpole
2½	..	..	..	45	45	50	..	..	....	55	50	50	55	..	..	....	55	..	45	50	50	..
3	60	50	50	54	50	55	50	60	60-65	65	60	60	65	60	50	50-60	65	50	54	60	60	55
3½	70	60	60	63	60	70	60	70	60-75	70	70	70	70	70	60	50-70	70	60	63	70	70	63
4	80	70	70	72	65	75	70	80	65-80	75	80	80	80	80	70	60-75	75	70	72	80	80	72
4½	90	80	80	81	75	90	80	85	70-85	80	90	90	85	90	80	60-80	80	80	81	90	90	80
5	100	90	90	90	80	100	90	95	75-85	85	100	100	90	100	90	70-80	85	85	90	100	100	90
5½	110	100	100	99	..	..	95	..	80-90	90	..	110	95	..	100	....	90	90	99	..	110	100
6	..	110	..	108	..	..	100	..	85-95	..	..	120	..	..	..	....	..	100	108	..	..	..

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CORRESPONDENCE WITH THE READER.

Large vs. Small Wheels.

(1528)—Why is it that large wheels and tires make for more comfortable riding in an automobile? Is there any advantage in tires of large diameter; that is, is a wheel 42 inches in diameter shod with 3.5-inch tires better than one 34 by 3.5? INTERESTED.

Alexandria, Va., April 29.

As a general rule the larger the wheel the smaller the shocks experienced in passing over obstructions or inequalities in the road. Thus a wheel five feet in diameter will sink only one-half inch in a rut a foot wide, while a 30-inch wheel will sink nearly three times as deep. This is illustrated in the drawing presented herewith, the diagram showing the relative drop into a road rut between a small wheel and one twice its diameter. It is obvious that the smaller member will be subject to greater shock than the larger as the latter rises less quickly over obstructions.

It is held that it is a distinct advantage to enlarge the diameter of motor car wheels to offset the concussions experienced on rough roads. As a 42-inch wheel does not make as many revolutions to a mile as one of 34 inches, there is less wear on the former. Less friction is developed and if the wheel be tired properly the road resistance to its steady and even rotation is decreased as the square of the increase of its diameter, a wheel 60 inches in diameter decreasing the resistance in a ratio of between 50 and 70 per cent., as compared with a wheel of 30 inches in diameter. The larger wheel must be properly constructed in order to neutralize the effects of torsional motor effort, and disproportionate road resistance.

Brake Horsepower.

(1529)—In the descriptions of new cars published in your book I frequently note that the brake horsepower of the motor is greatly in excess of that rated by the S. A. E. formula, and that the rating is given for so many revolutions a minute. What is the brake horsepower and how is it measured? What have the revolutions to do with it? HORSEPOWER.

Mercer, Penn., April 24.

In the determination of horsepower the time element is an important item in all formulae. This is true because the power to be calculated produces motion and is not simply a static pressure to be measured in terms of pounds weight. In calculating for a gas engine, also, it is important to remember that the power efficiency increases with the rate of motion, being expressed in terms of revolutions a minute of the flywheel or crankshaft. Thus, a given engine running with low gas supply or high load may be able to rotate the flywheel only 200 times a minute, while with full supply of gas, or at average load, it can produce as many as 2000 revolutions a minute. Furthermore, the available power decreases as does the number of revolutions a minute, while, as has already been stated, the rate of gas consumption a unit of work is increased. In making estimates for horsepower it is important to know whether the engine in question is running free or under load. This fact is generally specified in reports of engine power and operation, and is considered in several formulae.

A method of testing the effective power is by the use of Prony's brake, a form of which is shown in an accompanying illustration. Briefly, it consists of a band of rope or strip iron (the latter arrangement is shown), to which are fastened

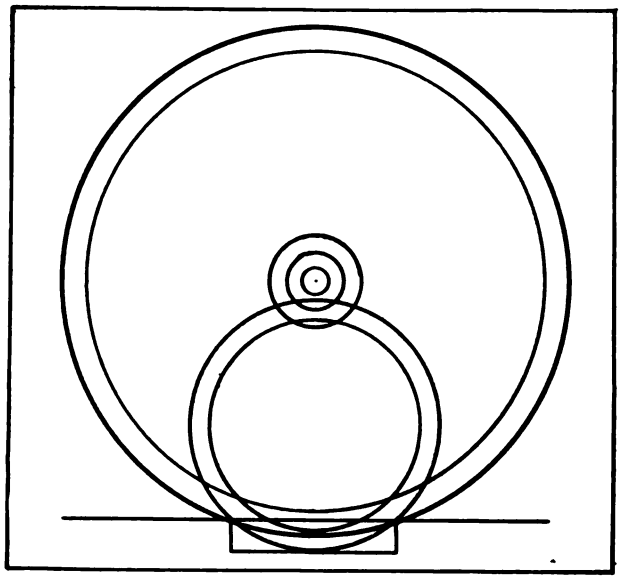


Diagram Showing Relative Drop into a Rut Between a Small Wheel and One Twice Its Diameter.

a number of wooden blocks, several carrying shoulders to prevent the contrivance slipping off the wheel rim. Being applied to the circumference of the flywheel the brake band is drawn tight, so that the blocks press against the surface all around. The brake, thus formed, is prevented from revolving with the flywheel, by two arms, attached near the top and bottom centres of the wheel, and joined at the opposite ends to form a lever, which bears on an ordinary platform scale, a suitable leg or block being arranged to keep its end opposite the centre of the shaft.

By this arrangement the amount of friction between the brake band and the revolving wheel is weighed upon the scales. For since the brake

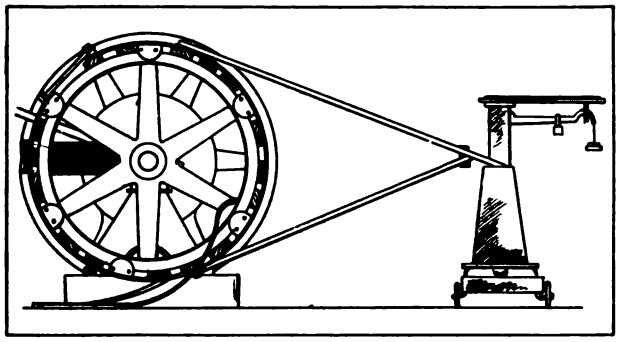
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fits tightly enough to be carried around by the wheel, but for the arms bearing on the scale, the amount of frictional power exerted by the wheel in turning free within the blocks may be transmitted and measured, just as would be the case were a machinery load attached, instead of a friction brake.

The factors in estimating the power developed are: The circumference of the wheel, the length of the leverage, measured on the line drawn from the centre of the rotating shaft to the centre of the scale platform; the number of revolutions a minute, the weight in pounds registered by the scales, less the static weight of the brake lever arms and block resting on the platform. With this form of Prony brake the formula for delivered horsepower is as follows:

$$\frac{w \times n \times l \times c}{33{,}000} = \text{B. H. P.}$$

in which w is the net weight as shown by the



Common Form of Prony Brake for Estimating Power of a Motor.

scale; n, the number of revolutions a minute; l, the length of the leverage; c, the circumference of the braked flywheel. Their product gives the number of foot-pounds developed; the quotient of the indicated division by 33,000 gives the efficient horsepower. If, therefore, a given engine has a flywheel of 16 inches diameter, revolving at 600 revolutions a minute, and giving 27.5 pounds at the scale, with a leverage of five feet, the result is, according to the above formula:

$$\frac{27.5 \times 600 \times 5 \times \frac{3.1416 \times 16}{12}}{33{,}000} = \frac{345592.5}{33{,}000} = 10.47 \text{ H. P.}$$

The diameter, 16 inches, being multiplied by 3.1416, the expression for the ratio between the circumference and diameter of a circle, gives 50.2656 inches, which, if divided by 12, gives 4.189 feet, approximately.

In some forms of Prony brake the block bearing the rope or band, instead of being secured as shown in the drawing, is attached to the floor and ceiling, two dynamometers or spring balances being interposed.

Belt and Pulley Transmission.

(1530)—Was a belt and pulley transmission ever used on automobiles? I had an argument with a repairman who states that it was. I contend that chain drive was the first form of transmission. Who is right? J. E. D.

Galveston, Tex., April 30.

The repairman is correct. The belt transmission was utilized with the early Daimler carriages and consisted of four pulleys regularly increasing in size, keyed to the main shaft, and four others regularly decreasing in size in the same order, keyed to the countershaft. Four belts connected these eight pulleys, and the power was thrown upon any one pair as desired, by tightening the belt with an idler pulley mounted on a suitably disposed bell crank. By this method it was possible to obtain four speeds forward on an even road, or to vary the power in ascending grades. There was no provision for reversing, the carriage being turned around by power or by hand.

Noisy Transmission.

(1531)—I have a car fitted with a planetary transmission which has been in service some time. The transmission is very noisy on the low speed and reverse, but quiet on the high. What can be done to quiet the noise? Can I use a certain grade of oil or grease or is there some preparation made for this kind of transmission? Is the noise due to the parts being worn out and would fitting new ones stop it? I am told that planetary transmissions are always noisy. Is this correct?

SUBSCRIBER.

Paterson, N. J., May 1.

From the description it would appear that the noise is largely due to the gears being worn. The transmission is quiet on the high speed because no gears are in operation and the drive is direct. The use of a heavy grease may help some, but if the casing is not tight much of the lubricant will be lost. The Joseph Dixon Crucible Company, Jersey City, N. J., makes a preparation for planetary transmissions which is said to be effective where gears are noisy. The replacing of the worn gears with new would be expensive and with some types of planetary transmissions the cure would only be temporary. If the car is an old one it would hardly pay to fit new parts as suggested.

Auxiliary Mixing Devices.

(1582)—I note there are a number of devices for improving faulty carburetion and that they are placed in the intake pipe between the carburetor and the cylinders. Can you inform me if they are practical? Will they cut down the gasoline bills as claimed? I have a motor and find it difficult to get a good mixture at high and low speeds. If I set it so the engine will start easily and

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throttle nicely at low speeds, it will flutter at high. If set so as to run good at high speeds, say 20 miles an hour, it will miss at low. Have had several reputed carburetor experts set the carburetor, but they do not get any better results than I do. Can you give me any idea as to the trouble?

Meriden, Conn., May 3. W. H. S.

The devices referred to are designed for providing a uniform mixture, the principle involved being that of breaking up the globules of raw fuel and mixing them with air. There are several makes on the market and the fact that the companies have been in business for some time would indicate that the devices accomplish the results claimed for them. The writer has not had any experience with the mixers, but knows of several cases where they have been installed with success.

Regarding the trouble experienced in setting the carburetor it would appear that either the needle valve is too large or too small, or that the motor was taking in auxiliary air. As the make of the carburetor was not given, suggestions as to the cause of trouble cannot be made with any degree of accuracy.

The fact that the mixture must be slightly rich at low speeds would indicate auxiliary air. When the motor is operating slowly and auxiliary air is being drawn in, the mixture is diluted. This would not be so noticeable at high speeds. With the carburetor set with a rich mixture at low speeds, it would be too much so at high.

Examine the connections between carburetor and intake pipe and those between the manifold and cylinders. If the valve guides are worn badly, auxiliary air will find its way to the cylinder. It may be possible that the trouble at high speeds is due to the auxiliary air valve sticking.

Wiring Bosch D U 4 Magneto.

(1583)—Will you kindly give me the wiring plan of the Bosch magneto used on Cole cars?

THOMAS WHEELWRIGHT.

Freeport, Me., May 4.

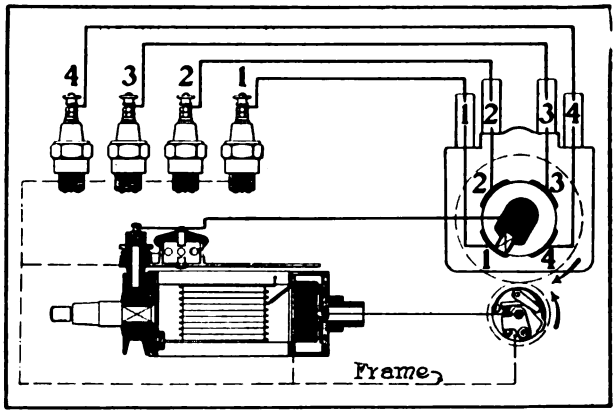
The Bosch D U 4 magneto was employed on former models, but the 1913 Cole is fitted with the Delco system. The wiring plan of the Bosch is presented in an accompanying illustration and it is one of the simplest as the instrument is a true high-tension; that is, the secondary current is mechanically produced without the aid of step-up coils or transformers.

But five wires are required for a four-cylinder unit, four of these being the leads from the distributor terminals to the spark plugs. The fifth wire is led to the switch, thence to the frame of the car, being employed for grounding the primary current when the operator desires to stop the engine. This differs from the other types of magnetos in that the wiring is simplified and the motor may be started easily on the magneto itself.

The wiring plan shown does not give the firing order of the motor, the leads being made in order. However, it is an easy matter to wire correctly by ascertaining the firing order of the motor, which will be either 1, 3, 4, 2 or 1, 2, 4, 3.

First note the direction of drive of the magneto. The rotation of the distributor arm is opposite thereto as it is gear driven off the armature shaft. This is shown in the drawing, an arrow denoting that the armature shaft revolves to the left or anti-clockwise and that the distributor arm rotates to the right or clockwise.

Assuming that the motor fires 1, 3, 4, 2: Connect the terminal of the distributor marked 1 in the drawing with the spark plug of the first cylinder. As the third cylinder explodes next, wire the terminal marked 2 with the plug of the third cylinder. The fourth is next in order, so connect



Wiring Plan of Bosch D U 4 True High-Tension Magneto.

the terminal marked 3 with the fourth cylinder. The last to fire will be the second cylinder, to which is connected a wire leading from the terminal 4.

It will be noted that there is a knurled nut or terminal which holds the spring or lever extending to the cover of the circuit breaker box. This is the ground member and an insulated wire is led from this to the switch. The other post of the switch is wired to the frame of the car. When the switch is open the magneto will supply a current to the plugs, but if closed the primary current will be diverted to the frame, preventing the generation of a secondary current.

The St. John Motor Club is planning a tour from St. John, N. B., to Boston, leaving St. John, Aug. 9, and travelling by way of Lepeaux and St. George along the coast to Calais, inland to Bangor, and Portland, Me., to Boston and return.

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WITH THE MOTORING INTERESTS ABROAD.

Features of New Helios Wire Wheel, Made in France—Analysis of International Stock Car Race—Discussing American Invasion—Foreign News Notes.

A NEW demountable wire wheel has been produced in France under the name of Helios, the principal feature of which is the simplicity of the locking means. Engineers who have had opportunity to study the construction are of the opinion that the inventor has adapted the mechanism which closes the breech of the Lebel rifle, a gun that is somewhat familiar to those who have done military duty in the French barracks. The components are presented in accompanying illustrations and a little study will reveal the method of operation.

It will be noted that both the removable hub and the fixed hub, the latter being mounted on ball bearings, are in the form of a truncated cone, the drive being taken by the members F and H, Fig. 3, these bearing against similar members on the interior of the removable hub. Thus far, the

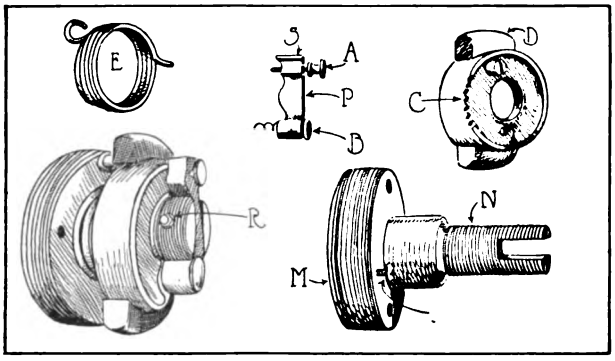


Fig. 1—Components of Helios Wire Wheel Locking Device.

construction does not differ materially, at least in principle, from the usual practise, and the chief point upon which the Helios patent is granted is the means for keeping the wheel in place after it is mounted on the fixed hub.

The device comprises four separate pieces, and is shown assembled and disassembled at Fig. 1. The base plate at M screws upon the cylinderical end of the fixed hub and remains permanently attached thereto, being protected by the cover L, Fig. 3. It is only necessary to release this to apply lubricant to the bearings, which is held to be very seldom. It is terminated by a threaded mandrel N.

A spiral spring E is attached at one end to the base plate by a screw and the other to the locking nut D. It is maintained that the tension of this spring is such that it automatically takes up all play between the fixed and removable hubs.

The locking nut with its winged projections is screwed over the threaded mandrel, and is so located as to pass through the opening in the removable hub seen at G, Fig. 3. It is then given a quarter turn, so that the projections bear against the exterior surfaces of the removable hub, and apparently assist in taking the drive.

The safety lock P is a simple lever which engages with the mortise in the threaded mandrel and bears against the outer face of the locking nut. It is fixed at its central point upon a small bolt R, termed an axle, in such manner as to be able to take up the slight oscillating movement of this axle, but without being permitted to turn with the locking nut. One end of this fastening has a bevelled projection S, which engages with teeth C on the edge of the locking nut. A screw A bears upon the external face of the device, while a spiral spring B acts upon the opposite end of the fastening. Of course, a hub cap holds the assembly in position as indicated at Fig. 2.

To remove the wheel it is first necessary to displace the hub cap. Then the screw A is turned backward as far as it will go, after which it is possible to oscillate the safety lock, little by little, until the projection S is released from the notches C. Next the locking nut D is turned a quarter turn and the wheel is free to slip over the projections. Its replacement is a reversal of this operation.

ISLE OF MAN RACE.

Society of Motor Manufacturers & Traders Forbids Members to Take Part.

The proposed international standard or stock car race under the auspices of the Royal Automobile Club of Great Britain on the Isle of Man in September is not meeting with the success that was anticipated, judging from the fact that the Society of Motor Manufacturers & Traders has issued a warning to its members not to enter. British motoring prints state that this does not necessarily mean that the race will not be held, but only that a majority of the council of the society objects to it.

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A careful study of the conditions and of the American machines eligible to compete under them, indicates that the promoters hardly could have expected a large entry list from the United States. The first provision is that only four-cylinder cars with bore not to exceed 90 mm (approximately 3.5 inches) and stroke not to exceed 140 mm (5.5 inches) are eligible. The list of stock cars in America shows the following eligible:

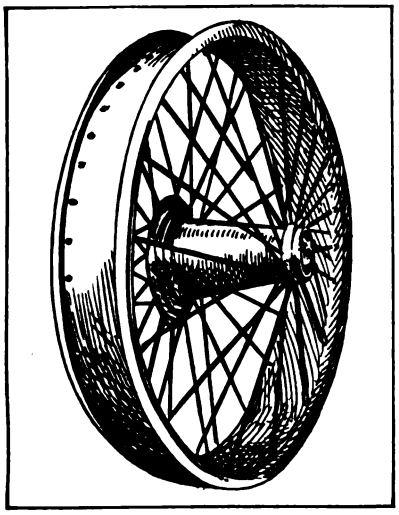


Fig. 2—Helios Wire Wheel Completely Assembled.

Make and Model	Bore	Stroke	Piston Dis.
Detroiter A	3.38	4.75	170.0
Dispatch G-2	3.50	5.00	192.4
Empire	3.50	4.50	173.2
Herreshoff 4-30	3.38	4.50	161.0
Hupmobile C	3.25	3.38	112.0
Hupmobile H	3.25	5.50	182.5
Lambert 40	3.25	5.25	174.2
Little Four A	3.50	3.38	129.9
Marathon Runner	3.50	4.50	173.2
Oakland 35	3.50	5.00	192.4
R-C-H	3.25	5.00	165.9
Studebaker 25	3.50	5.00	192.4

This gives a list of 11 makes from which to select an American team, and it may be assumed from the first that some of these manufacturers will not make their initial appearance in contest work of this character in the Isle of Man event. Already a movement has been started in England to so change this condition that machines which do not exceed the piston displacement of these dimensions, 3561 cubic centimeters (about 217.3 cubic inches), shall be eligible, in which case the list of American possibilities would be increased by the addition of the following:

Make and Model	Bore	Stroke	Piston Dis.
Buick 25, 24	3.75	3.75	165.6
Buick, 31, 30	4.00	4.00	201.1
Cameron 29A	3.87	3.75	176.9
Crow Elk-Hart C-1	3.75	4.50	198.8
Ford T	3.75	4.00	176.7
Franklin G	4.00	4.00	201.1
K-R-I-T K	3.70	4.00	172.1
Maxwell 4	3.75	4.00	176.7
Metz 22	3.75	4.00	176.7
Paige 25	3.75	4.00	176.7
Perfex 2	3.75	4.50	198.8
Regal T, N	3.75	4.50	198.8
S. G. V. A	3.75	4.38	193.3
Studebaker 20	3.62	3.75	154.8

It thus will be seen that there is a grand total of 23 makes out of something over 150 produced in this country that are eligible for this international event. And it must be remembered that the Isle of Man race was organized following a suggestion of an English motorist that a competition be arranged in which American and British cars might have ample opportunity to test their relative merits.

ELECTRIC LIGHTING TESTS.

Special Regulations Covering Certified Trials by Royal Automobile Club.

As announced in a recent issue of The Automobile Journal, Country Life of London, England, has offered a cup for the best electric lighting system to be installed on motor cars, the competition to be decided by the technical committee of the Royal Automobile Club of Great Britain. This is of particular interest for the reason that electric lighting has not received the same attention abroad that it has in this country, very few cars being marketed with such equipment as standard. The Royal Automobile Club has prepared the following special regulations governing the tests:

1—Entries must be made under the general regulations for certified trials. No entry will be accepted after Sept. 15, 1913.

2—The whole equipment must be entered for trial, and must be properly installed upon a car.

3—The distance run upon the road shall not be less than 2000 miles.

4—All lamps (not less than two head lamps, two side lamps and one tail lamp) shall be alight at the same time and for at least six hours a day.

5—The technical committee of the R. A. C. shall decide which of the performances as shown in the trials certificates is the best.

6—Any equipment which completes its trial before Oct. 15, 1913, will be eligible.

7—The following data (inter alia) will appear upon the certificates, and any equipment entered for a certified trial in order to compete for the prize will be subjected to such tests as may be necessary to obtain such data:

a—Full description of equipment entered, including battery, and its fitting to car, together with weights of parts, and the wattage and candlepower of the lamps.

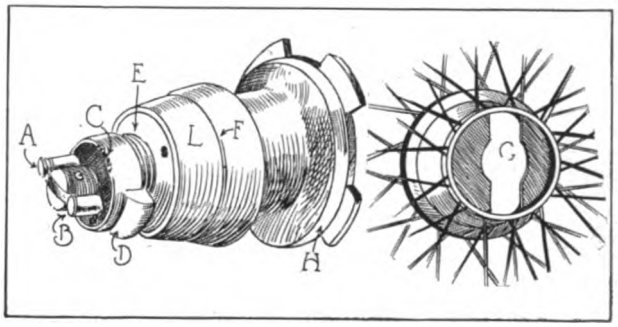


Fig. 3—Fixed and Removable Hubs on Helios Wire Wheel.

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b—Total distance run.
c—Number of lamps expended.
d—Wear of parts during trials and general condition after trial of the equipment, including accumulator.
e—The behavior of the equipment at different car speeds on the various gears during tests on Brooklands track.
f—The convenience of the adjustments of the dynamo, control of the lamps.

In the absence of definite information to the contrary, it is assumed that the competition is to be international in character.

WHOSE SHOE PINCHES?

British Writer Presents Some Very Interesting Hints Anent American Invasion.

Writing in The Autocar, a British motoring print, someone who signs himself Runabout has some very interesting remarks to make concerning the so-called American invasion. Under the title of "Whose Shoe Pinches?" he says:

I am afraid there is a certain amount of hypocrisy anent the American influx. Quite a number of the importing concerns are run by British brains and British capital. Quite a decent proportion of the shares in several leading American factories are held by British investors. Quite a good percentage of the profits on sales of American cars in this country goes into the pockets of British agents. So far as dividend-earning goes, the so-called invasion is a gold mine to many a British capitalist, both small and large. Many a country mansion and many a suburban villa form pockets for the gold that comes of the large sales of the imported cars, and many a financier, big and little, interested in the motor trade would prefer things to remain as they are. He is making money out of small cars, without the trouble of securing a design, building a factory, or organizing a demand. The same is true of many a shallow-pursed motorist. He is getting a cheap car, which suits him indifferently well, and so long as it runs quietly and costs little to maintain, he does not worry very much what its country of origin may be. The real sufferers—if any—are the British workmen and those towns who are in search of new industries; and neither workmen nor municipalities can lay down the capital requisite to cope efficiently with the huge motor manufacturing concerns of Detroit.

CHAMBER OF MOTOR EXPERTS.

Body Formed in London to Advise and Assist Inventors and Investors.

D'Arcy R. Baker, Robert W. A. Brewer, Hamilton Hobson, Charles Jarrott, Arthur F. Mulliner, A. S. Mays-Smith and James A. Tinling, all more or less well known in British automobile circles, have formed the London Chamber of Motor Experts with offices at 13 Finsbury Circus, E. C., London, England, to consider and report upon new inventions and patents generally, also to furnish information and advice to investors. The plan is somewhat new to the industry and is set forth in the following statement concerning those to whom it is expected to appeal:

To one who has an invention with the means to exploit it, but is doubtful as to whether the invention has practical value and is a good commercial proposition.

To the inventor who has a good thing but no money to exploit his patent.

To the parent, who, perhaps, wishes to put a son in the motor business and invest a substantial sum of money with him and has no means of ascertaining as to whether the venture is a good one or not.

Where a firm requires financial support and the lender wants to know from experts as to whether the venture is good enough to lend money to.

NOTES FROM FOREIGN LANDS.

The Royal Hungarian Automobile Club will hold an eight-day endurance run from Budapest, May 25-June 11. The distance to be covered is about 1312 miles.

The Automobile Club of Milan, Italy, is organizing a race for small cars to be held in September. It is anticipated that the course selected will be over the Brescia circuit.

Twelve entries have been filed for the race for the Coupe de l'Auto, which is to be run in France, Sept. 21, as follows: Peugeot, three; Delage, two; Koechlin, four; Th. Schneider, three.

The entry list for the French Grand Prix has been closed, with 20 cars, divided according to countries as follows: French, nine; British, four; Italian, three; German, two; Belgian, two. The total distance to be covered is 580 miles.

Citizens of Shanghai, China, recently combined to present Dr. S. M. Cox, a prominent British physician, with an American made Regal touring car, as a recognition of his services in checking a cholera epidemic in that country. The presentation speech was made by Dr. Wu Ting Fang, on behalf of the Chinese Red Cross Society.

The First Baltic Automobile Club of Riga, Russia, will hold a reliability run some time early in July. It is planned to take the cars by steamer from Riga to Stockholm, from which point the way will lead through Dalecorlia and Gothenburg back to Stockholm. It is probable that the club will be assited by the Royal Swedish Automobile Club.

The Chambre Syndicale de l'Industrie du Petrole of France has decided to offer two prizes of $1000 and $50 respectively in a competition to arrive at the best means of utilizing kerosene in automobile engines without the assistance of gasoline for starting purposes. The trials will be conducted under the auspices of the Automobile Club de France.

The question of holding the Paris Automobile Salon in October is still in abeyance owing to the difficulty of securing the Grand Palais at that period. The proposition of reducing the duration of the show from 15 days to 10, advocated by the manufacturers, is meeting with some opposition on the part of the exhibition committee, on the ground that it will curtail the receipts. On the other hand the prospective exhibitors maintain that there should be a corresponding decrease in expense. A further suggestion is made that the show be open in the evening until 7:30 instead of closing at 6 as formerly, this giving business people an opportunity to inspect the models without inconvenience.

The population of Bordeaux, France, is 262,000, and of the Department of the Gironde, 829,000. Including Bordeaux and its surrounding territory the population is 3,200,000. Possibly one-tenth of the population possesses the means to indulge in motoring in the sense of continued proprietorship of a car. This would provide for about 60,000 cars. There is a fair number of pleasure motor vehicles in the cities, but touring, despite the excellence of the French roads, has not come into such general favor as in the United States. There is no prejudice against American machines as such because the people of the district know nothing of them. The only inducement for them to purchase an American car would be the establishment of a stock and repair shop on the ground and ready for business, something which does not now exist.

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AMERICAN TIRES IN EUROPE.

Evidence of Foreign Demand Lies in Increased Shipments Each Year.

It is admitted by J. D. Anderson, general sales manager of the United States Tire Company, New York City, that in the building of automobile tires Europe had the start of this country by several years, but he adds that American manufacturers have progressed so substantially in the development of pneumatic shoes that today they have proven themselves keen contenders in the foreign field. His concern has sold a large quantity of Nobby Tread tires in St. Petersburg, Russia, and one firm in Stockholm, Sweden, has installed 750 sets in taxicab service. Other extensive shipments have been made to Porto Rico, South America, Mexico and the Orient. In discussing the situation Mr. Anderson says:

Tires manufactured in this country have the advantage of a rugged construction, made necessary by the wide variety of road conditions which must be met in our native service. When a man starts touring in the United States, taking the highways as he finds them, mile in and mile out, he must be prepared to negotiate roads ranging from good to extremely bad. And if he is to get anywhere he must have tires sufficiently strong and adaptable to withstand the strain of extremely hard service. The American manufacturer must build tires of this character if he expects to satisfy the consumer.

In Europe it is different. You may tour for hundreds of miles without encountering a bad stretch of road. Consequently, the strain on tires over there is not so great. Therefore, when American tires are placed in service on European roads and against European tires, the rugged qualities built into them to meet our native conditions, assert themselves in increased mileage.

Experts who have made comparative studies of manufacturing methods and results in Europe and America fail to see wherein Europe, in spite of its long experience, has any advantage over us in tire building. And the more we compete in foreign countries the more this conclusion seems to be borne out. The tire product of this country is making good all over the world and with the wonderful export business being done in American cars, I see no reason why the native tire trade abroad should not broaden out every year.

KEETON IN FOREIGN LANDS.

Demand in America and Abroad Makes an Increased Output Necessary.

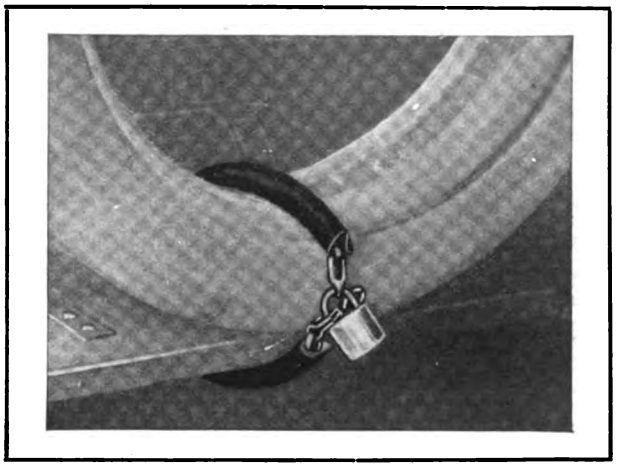
Although the Keeton Motor Company may be regarded as one of the newer concerns in Detroit, the product having been on the market something less than a year, its reputation appears to have reached all parts of the world. Cable orders for Keeton cars to be shipped immediately to Roumania, Argentine, Russia, Philippines and Japan have been received recently.

It is understood that several export houses in New York have applied for foreign agencies, and the pressing demand in this country and abroad has made it necessary to increase the output of the Keeton factory very materially. Night and day shifts will be engaged for some little time in an effort to keep up with the orders from this country and abroad.

PROTECTING CAR'S EQUIPMENT.

New Automobile and Tire Lock Produced by American Chain Company.

A new accessory which is expected to meet with the approval of the motorist who desires to be assured that the movable equipment of his machine cannot be tampered with in case he should leave his car unattended for a few minutes or a few hours is the American automobile and tire lock, made by the American Chain Company, Sherrill, N. Y. An accompanying illustration shows the lock in place and indicates its method of use.



American Chain Automobile and Tire Lock.

These chains are three feet long, simple, strong, and when not in use take up little space in the tool box. They are held to possess a number of advantages because of the flat links, which give them a strap like action and permit of being drawn closely around extra shoes on the running board, or through the wheel, spring or frame, thus affording real protection. They are moderate in price and may be had covered with duck, pantasote or leather. They also may be purchased without the lock if desired.

The following distributing agents have been appointed: F. E. Sparks, 1430 Michigan boulevard, Chicago; Petry-Cassidy, Inc., 1427 Vine street, Philadelphia; T. A. Cotter, 109 Massachusetts avenue, Boston, and Hughson & Merton, Inc., 530 Golden Gate avenue, San Francisco.

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TRANSPORTATION AND GOOD ROADS.

The motor truck is not to be considered by legislators in the same light as the so-called pleasure car. There is little doubt that motorists originally made a mistake in virtually agreeing to a propositon in which they permitted their cars to be taxed for good roads under the guise of a registration fee. This has resulted in a tendency upon the part of the legislators to deem automobile owners a legitimate source from which to secure additional income whenever the need for better highways is felt most acutely.

The American Automobile Association is seriously contemplating the matter of testing the registration laws before the United States supreme court. It will be remembered in this connection that in one case brought in New Jersey it was held by the state courts, in effect, that a fee could be levied provided it did not raise any considerable revenue, more than enough to pay the running of the highway department, and that such a fee was not a tax. The inference seemed to be that a fee which provided a sum sufficiently large was a tax and could not be levied. The question was raised in its application to interstate commerce.

The motor truck is a business proposition. It can be demonstrated to the satisfaction of anyone at all interested in economics that the more general adoption of the mechanical transport is a progressive step. This being true, there is every need for a revision of the viewpoint from which the problem of the motor business vehicle and its application to the good roads situation has been considered.

Sufficient data have been compiled to afford a scientific study of the question by engineers, and it is possible to have available such information as the legislators need. Any attempt to avoid meeting the situation squarely has the effect of delaying the inevitable. Certainly, nothing is to be gained by imposing restrictions which must result in embarrassing the business man who is seeking the proper solution to the modern transportation problem.

There is abundant evidence that the manufacturers are giving every attention to the fuel problem, and in view of the reports that are being made public from time to time, the advent of the successful kerosene carburetor does not appear to be far distant. England and Continental Europe are turning their attention to benzol, but the American inventor seems to be confident that the solution of the problem lies in a product more closely related to the type of hydrocarbon originally selected for automobile use. One reason for this undoubtedly hinges upon the suggestion that when both kerosene and gasoline become available as fuels, there will be such adjustment of price as to make the cost of either satisfactory from the standpoint of operating expense.

It is hardly necessary to recall that a large majority of motorists deplore the fact that there is a class of drivers who seemingly have little regard for the rights of others using the highways, but it is manifestly unfair to the rapidly increasing body of automobile owners and users to include all operators in the same category.

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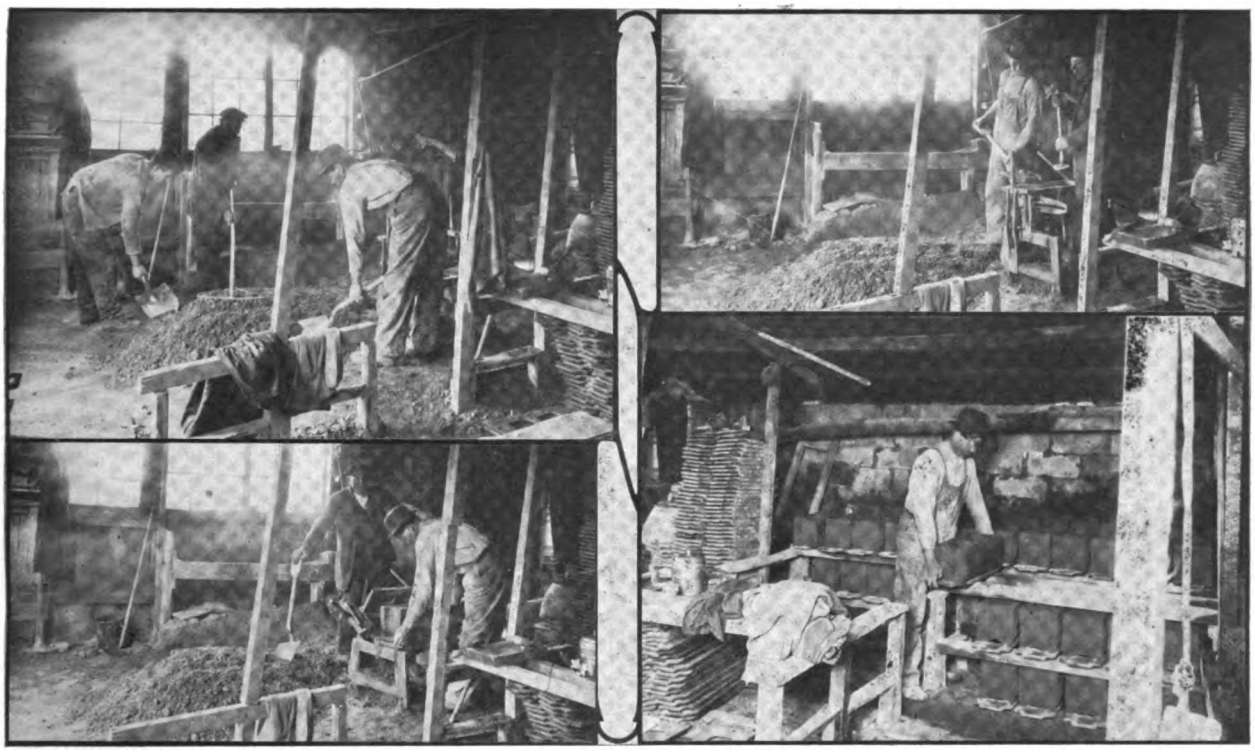
CONCRETE BLOCKS FOR PRIVATE GARAGES.

Explaining Method of Manufacture and Advantages Claimed for Them--Detailed Estimates of Cost as Compared with Wood Structures of Same Dimensions.

SEVERAL factors must be considered by the motorist who is contemplating the erection of a private garage. If it were a matter simply of providing protection from the weather without giving thought to the possibility of needing additional room in which to work about the car, a serviceable wooden shelter doubtless could be built for a very little money. In at least one instance of record an owner constructed a garage of this character, doing the work himself, at a cost of $35. On the other hand, private garages have been built at an expense far in advance of what might be considered necessary or advisable, judging from the standpoint of practicability alone.

The subject of portable garages has been treated at some length in these columns, and while it is contended that these offer features which may be regarded as of value when considered for use during the entire year, reference is made herein to those buildings which are designed as a permanent addition to the property on which they are located. And special attention is drawn to the concrete structure, because of its ready adaptation in the solving of some of the problems which are held to be of prime importance.

Concrete is a mixture of cement, sand and gravel, with sufficient water to hold the mass together. Its most general application in building work of this character is in the form of blocks, although cement is utilized in other ways to form a stucco finish, or fastened to metal lath as under the so-called Kahn system. The concrete blocks possess an added feature of economy, in that the motorist may procure a mold and make them on his own property, although this plan undoubtedly would not prove practical were he contemplating the erection of but one small building, since the blocks may be purchased readily at small cost.



Four Steps in the Production of Concrete Blocks; Upper Left, Mixing the Ingredients; Upper Right, Shovelling Mixture into the Mold; Lower Left, Completed Block After Molding; Lower Right, Setting Away to Cure.

There can be little question as to the perma-

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nency of the concrete structure. Those who favor this method of construction maintain that the building will be warmer than when built of



Concrete Block Garage in Process of Erection, with Workmen Engaged in Shingling Roof.

wood; that wind has no effect upon it, whereas it is practically impossible to keep a wood building from being draughty; that it is easier to keep clean; that there is no maintenance cost, and that it is absolutely fireproof. This last feature depends, of course, upon the character of roof utilized, and the material of which the windows and doors are composed. It may be conceded, however, that with a metal roof danger to other buildings arising from a fire within the garage, or to the garage itself from a blaze outside is minimized to an appreciable degree.

Charles K. Setchell of Providence, R. I., who has had wide experience in manufacturing concrete blocks and production of concrete work of all kinds, holds that the best results are obtained with a 1:2:2 mixture, while the usual formula is 1:3:5. The first figure refers to the proportions of cement, the second to sand and the third to gravel. The knowledge of the correct amount of water to be used is acquired by experience, and no definite rule can be made to apply. It will depend upon the moisture in the sand, etc., and it is held to be better to have too little than too much.

ESTIMATED COST OF WOOD GARAGES.

	A	B	C	D
Studs, rafters, plates, etc.	$10.00	$10.00	$10.00	$10.00
Siding, Novelty	30.00	30.00	....	....
Siding, cypress sheathing	....	....	36.00	36.00
Roof boards, N. C. pine	11.00	12.00	11.00	12.00
Roofing, gravel	8.00	....	8.00	....
Roofing, wood shingles	....	26.00	....	26.00
Windows, three	15.00	15.00	15.00	15.00
Doors, two front, one side	20.00	20.00	20.00	20.00
Hardware	5.50	7.00	5.50	7.00
Labor	48.00	64.00	48.00	64.00
Painting	15.00	15.00	15.00	15.00
Floor, cement	25.00	25.00	25.00	25.00
Totals	$187.50	$224.00	$193.50	$230.00

A, with Novelty siding and gravel roof; B, Novelty siding and wood shingles; C, cypress sheathing and gravel roof; D, cypress sheathing and wood shingles.

ESTIMATED COST OF CONCRETE GARAGES.

	A	B	C	D
Concrete blocks	$140.00	$140.00	$140.00	$140.00
Floor, cement	25.00	25.00	25.00	25.00
Rafters, plates, etc.	3.50	3.50	3.50	3.50
Roof boards, N. C. pine	11.00	12.00	....	....
Roofing, gravel	8.00	....	....	....
Roofing, wood shingles	....	26.00	....	....
Roofing, slate shingles	....	....	60.00	....
Roofing, asbestos shingles	....	....	....	76.00
Windows, three	15.00	15.00	15.00	15.00
Doors, two front, one side	20.00	20.00	20.00	20.00
Hardware	4.50	6.00	3.50	3.50
Labor	48.00	64.00	64.00	64.00
Totals	$275.00	$311.50	$331.00	$347.00

A, with gravel roof; B, wood shingles; C, slate shingles; D, asbestos shingles.

Accompanying illustrations set forth the manner of producing the blocks as done by Mr. Setchell. The sand is what is termed a good coarse grit sand, and the gravel ranges in size from that of a pea to that of a walnut. The object of the mixing is to cause the cement to fill all the minute holes between the sand and gravel, thus forming a solid block.

When the ingredients have been thoroughly mixed on the working floor with shovels and rakes, the mold is turned in an upright position and the mixture shovelled in, care being taken to ram it into all the corners. When the mold is filled, one side is let down and the completed block is transferred to a metal pallet made to receive it, and placed with others on a rack to season under cover for at least 15 days. At the completion of that time the blocks may be piled out of doors until needed.



Neat and Attractive Concrete Block Garage, Adequate for the Private Owner.

The difference in cost between the 1:2:2 block

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and the 1:3:5, is held to be about one cent, and one of the advantages of the former is that it may be handled much quicker. Should necessity arise, it is claimed that this block might be used in 20 days, although the requirements of building departments in most cities make it impossible to use concrete blocks in less than 30 days.

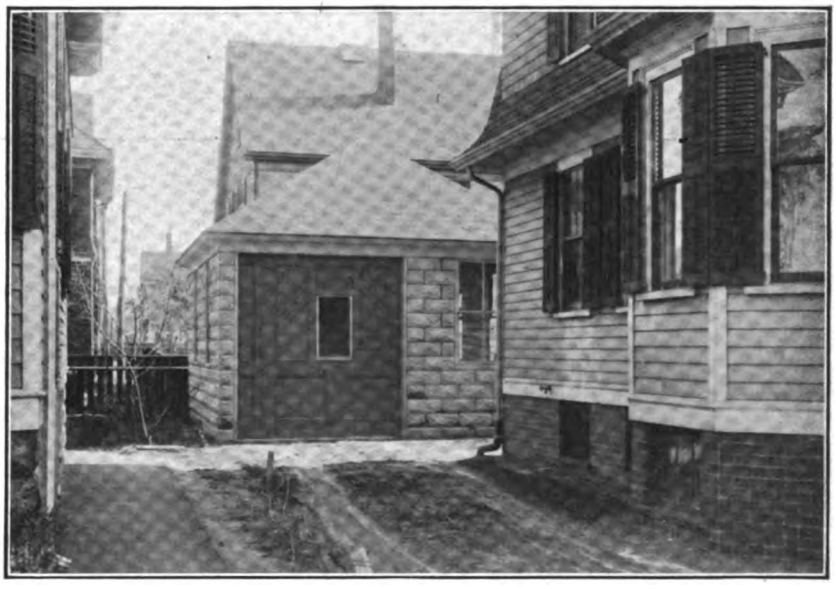
The standard dimensions are eight by eight by 20 inches, although some blocks are made 22 inches long and others 24. The regulation charge is 15 cents a block. Two courses are laid side by side. With this information it is possible to estimate very closely the number of blocks necessary to construct a given building, and to so arrange matters that there shall be very little, if any waste.

It will be noted that the blocks are made hollow; that is, there are usually two holes in the block itself, and the ends also are concaved to a certain extent, so that when two are placed together there is another hole between each pair of blocks. This arrangement is expected to keep out the frost and moisture to a certain extent.

When but one mold is used, of course, the blocks are all alike, and this is one of the objections that has been raised against the concrete building. However, it is possible to vary the monotony, when blocks are purchased from a concern making them in large numbers and where the conditions will warrant the manufacture of various styles for trimmings, etc. This is a feature which is being given more and more attention, and those who have devoted systematic study to the subject maintain that it is possible to do anything with concrete that may be done with cut stone.

For the purpose of comparing the cost of a simple concrete garage with that of a wood building of the same dimensions, a table of estimates is presented herewith. It will be understood that while these figures were compiled by those familiar with building operations, they are at best only an approximation, as the condition of the lumber and labor markets varies decidedly and they do not include what is regarded as the contractor's profit. They should serve, in some measure at least, as a guide for the motorist who is contemplating work of this nature.

In each instance the dimensions selected are for a building 20 feet long, 18 feet wide and eight high. The plans call for three windows, one on either side and one at the back, double doors in front and a smaller door at the side. The wood building A is to be covered with what is known as Novelty siding and to have a gravel roof. B is the same with the exception of wood shingles for the roof. C is with cypress sheathing on the side and a gravel roof, while D is with the same sheathing and wood shingles. The list might be extended still further by the addition of buildings utilizing other roofing materials—slate, asbestos, tin, asphalt, etc. Some of these would be flat, and the amount of lumber undoubtedly would be reduced, but not sufficiently to affect the increased cost of the roofing material to any appreciable extent, or the total estimated expense.



Even the Simple Design of Concrete Garage May Be Made to Harmonize with Its Neighborhood Surroundings.

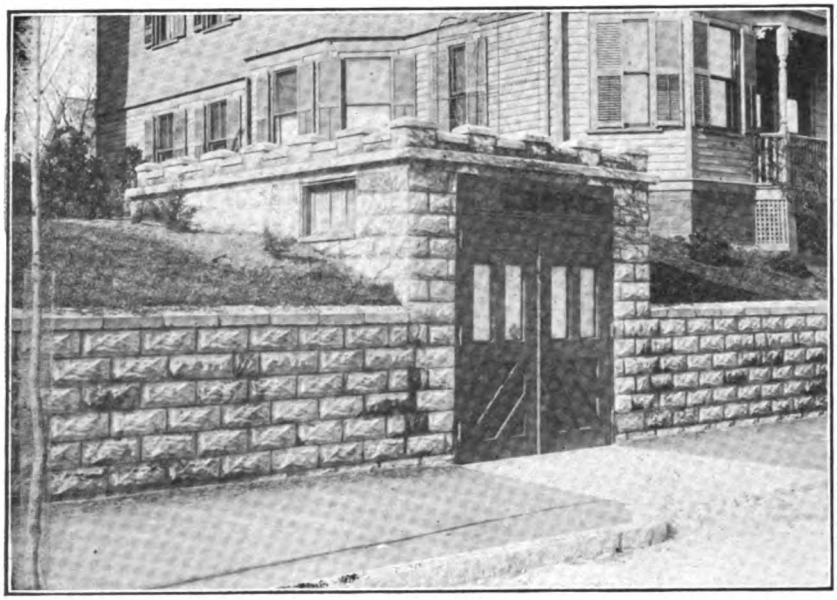
Mr. Setchell estimates that for a building of this size the concrete blocks would cost $140. It will be seen that the same cement floor is considered for all the structures, and the flat rate of $25 also is his estimate. The labor charge is purely arbitrary, and is based on the estimate that it would take two men six days to erect any of these buildings with a gravel roof, or eight days where the roof must be shingled.

Experience will indicate that even where a man first sits down and carefully computes the cost of any building work, it is wise to allow something additional for incidentals. Therefore, the figures given in these tables may be considered as representing the lowest cost of the re-

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spective items, and while there has been an attempt to include a reasonable allowance for waste, etc., the motorist who uses these as a guide need not be surprised if the completed structure exceeds the estimate given.

These figures indicate that even a simple concrete garage will cost anywhere from $50 to $100 more than a wood building of the same size. Mr. Setchell suggests that a concrete structure of these dimensions should cost anywhere from $350 to $450, depending upon the character of the roof. Inasmuch as one of the chief advantages of the concrete over the wood is that of being fireproof, it would seem injudicious to utilize wood shingles. The gravel roof is expected to protect a building from fires originating outside, but may be considered of very little more value than wood as a protection from fire arising within the garage.



Indicating Possibilities with Concrete Structure Where Conditions Will Permit of Somewhat Elaborate Treatment.

Probably the best protection for the roof would be either slate or asbestos shingles. There are a number of grades of the former, and the cost of laying is governed somewhat by the method employed. Properly laid, with copper ridge, etc., they should cost from 11 to 15 cents a square foot, although it would be possible to make this as much as 18 or 20. Asbestos shingles figure out from two to three cents a square foot more than slate. With these figures as a basis it would be necessary to add about $52 for slate and $64 for asbestos to the estimate for gravel roofs, and $34 for slate and $46 for asbestos to the estimate for wood shingles in the tables given herewith for wooden garages.

Photographs of some of the concrete garages erected by Mr. Setchell, or with blocks of his manufacture are reproduced herewith. It will be noted that even the plain concrete block building does not make an unattractive addition to the property, either when standing somewhat alone or when made to fit into the general scheme of the neighborhood. One of the illustrations indicates the possibilities where conditions are such as to permit of something quite out of the ordinary. In this instance, the garage is built into an embankment, and its front and side walls virtually form a continuation of the retaining wall. The roof is flat and is fitted with a parapet. On summer evenings it is utilized by the members of the family as in the nature of a piazza.

It will be understood that the dimensions selected for the comparisons made are based upon Mr. Setchell's experience of what is demanded in the average garage. They not only provide sufficient space for the car, but plenty of additional room for a work bench and some little machine tool equipment, or two cars could be accommodated. It is at all times wise to consider the possibilities of the future, and even if the builder does not contemplate owning two cars, he may find it advantageous to have the necessary room when friends from out of town are visiting, or he may be able to rent a portion of his garage to a neighbor.

One or two other points have not been touched upon in the estimates given. It is assumed, of course, that some means will be provided for carrying away the water, and this may include plumbing to connect with the local sewage system, or some less expensive arrangement. There also is the matter of lighting. Some other fittings may well be considered when laying the floor, these including a turntable, repair pit, base for machinery, etc. It readily will be seen that it is possible to make the garage cost almost anything the motorist is willing to pay.

Manufacturers of commercial and pleasure electric vehicles are to meet at Boston in a convention to be held May 20-21 in conjunction with other big electric interests.

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LANGELIER SWAGING MACHINE.

Designed for Rapid Work on Automobile Wire Wheel Spokes.

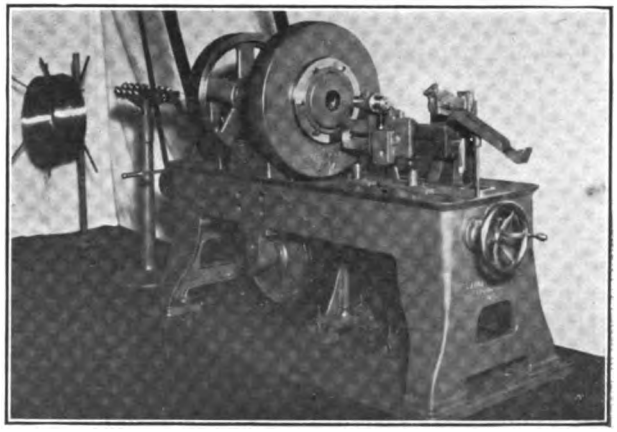
The increasing interest in wire wheels for automobiles extends to the machinery utilized in their manufacture. An accompanying illustration presents the swaging machine produced by the Langelier Manufacturing Company, Providence; R. I., for this class of work. It takes the wire from the coil, straightens it before entering the machine, swages the spoke between butts and mechanically cuts it off to length. All operations are entirely automatic and absolutely without waste or manual handling. The output is as high as three spokes a minute.

It will be noted that the coil of wire is supported on a reel resting on the floor at the extreme left, from which it unwinds as it is drawn through the straightener on its way to the swaging machine. This straightener is an improved design of the rotary type made by this company. It has offset steel eyelets mounted with ball bearings in suitable holders, so that the former do not bear in an unyielding manner against the passing wire, but revolve so as to prevent marring the finish.

The wire enters the swaging machine through the rear end of a hollow spindle carrying the dies, and as it is drawn through these swaging dies these close automatically over the wire, after allowing that portion forming the butt to pass out of them, and impart a large number of sharp, clean blows simultaneously in couples from diametrically opposite directions on the stock, reducing it rapidly and giving it a sort of hammer temper for the distance between the butts. When the dies open again the portion of the wire forming the opposite butt passes out of the machine unswaged.

The outward travel of a saddle with a chuck mounted on a horizontal slide in front of the machine head draws the wire through. This saddle is provided on its rear with a rack, seen projecting at the end of the slide in the illustration, in which meshes an oscillating segment gear, already set in motion by a face cam and roller underneath the bed of the machine. The connection between the segment and the cam roller lever is obtained by means of a special form of link having a right and left hand nut, readily reached and locked from the rear. When this is adjusted vertically it varies the centres of the link pins, increasing and decreasing the arc of travel of the segment gear, correspondingly varying the travel of the saddle on the horizontal slide above the bed and producing thereby spokes of different overall lengths and with different swaged portions between the butts.

The wire gripping chuck, carried by the saddle, closes on the wire for the outward or drawing stroke and releases it at the end of the stroke, being entirely clear during the return of the chuck to its starting position. The automatic operation of this member is obtained through the up or down action of a wedge actuated by the saddle as it reaches its extreme points of travel. At the end of the outward stroke the wire is gripped firmly in the cutting off attachment, while the saddle returns to take the next stroke forward, and the finished swaged spoke is cut off just before the next drawing stroke begins. The cutting off attachment consists of two hardened



Swaging Machine for Automobile Wire Wheel Spokes.

and ground steel bushings, the cutting edges of which are in close contact and slide past each other at the proper time, leaving the ends of the spoke sharp and square with the wire.

Forced oil lubrication to all running parts and on the dies is maintained by an automatic oil feed pump. The net weight of the machine is about 5500 pounds, and the gross weight 6150. The floor space necessary is about three by six feet. Other types of wire feeds are available to suit different makes of spokes and the machine is built for either belt or motor drive.

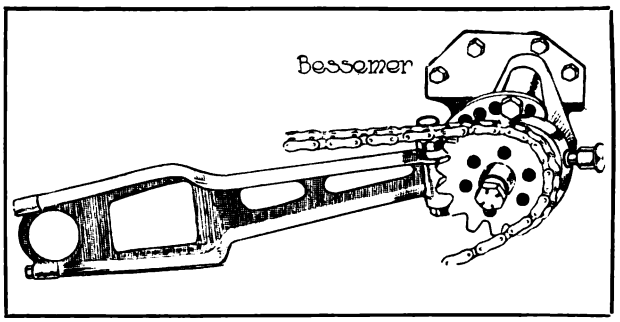
Failure to co-operate with the Motor Dealers' Contest Association, New York City, is given as one of the reasons why the New York Motor Speedway Association, which intended to build a motordrome at Garden City, N. Y., is to withdraw from its offices on Automobile row and abandon its project.

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IN THE COMMERCIAL VEHICLE FIELD.

Changes in Radius Rod Design as Revealed by Some Manufacturers in Their Latest Product—Agricultural Competition in Canada and Other Truck News.

THOSE who have followed closely the changes in the design and construction of commercial motor vehicles, cannot help but appreciate



Vernier Adjustment on New Bessemer Chassis.

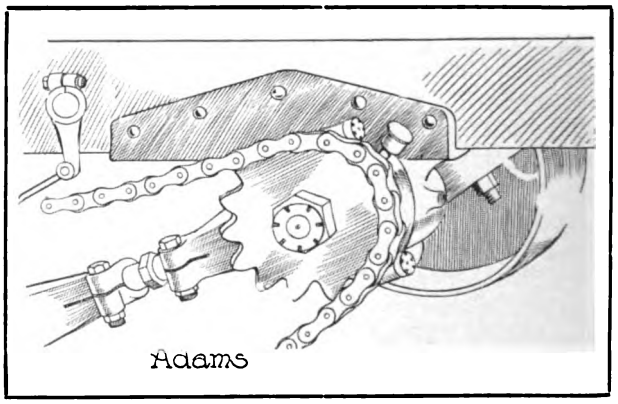
that one of the details that has been given very general attention is that of radius rods. There seemingly is an increased tendency to lessen the angle of inclination that there may be a more direct forward driving thrust. This is particularly noticeable with many of the shaft driven machines, and to some extent with those in which the drive is by side chains.

It is maintained that while the speed of the service vehicle may be comparatively slow and the springs of the machine so designed that there will be gradual deflection or reflection, there will be the vertical movement of the rear axle proportionate to the inequalities of the road surface. The tractive effort is assumedly the same and the angularity of the thrust is dependent upon the degree of movement. The longer the rod the less the degree of angularity and the upward thrust. Lengthening the radius rods and coupling them to the chassis frame members is held to cause the thrust to be directed more longitudinally, so that there is not the "lift" in the centre of the chassis frame that would cause extreme strain, especially when the load is, in a great part, back of the radius rod connection.

Some examples of new construction along this line are presented herewith. With the Mais the chassis frame is designed with two cross members well forward, between which is set a special block or fitting. The rear cross member is reinforced against the forward thrust by heavy channel diagonals from the centre to either side member. The thrust block carries a large socket, into which is fitted the globe of a short shaft, and on this shaft is mounted a yoke. In the ends of the yoke are sockets, into which are set the forward ends of the radius rods, clamping bolts affording means of adjustment when the relation of the rear axle has been determined. This yoke is pivoted on the shaft so that the movement of either end of the rear axle is not resisted, and the globe and socket connection permits the vertical action of the axle without stress. This joint is lubricated by two large grease cups connected with the block by heavy copper tube.

The Studebaker construction differs from this in that there is a heavy centre frame cross member, mounted in the channels of the side members and dropped to lower the long radius rod ends. The driving shaft is under this member and at either side of the shaft secured to the member are two large brackets. The radius rods are mounted in the lower part of these brackets and in the top of each is a small shaft with a long bearing to the ends of which are clamped two lever arms. The arms project downward. To the outside arms are attached the forward pull rods, and to the inside arms are secured the rear pull rods of the linkage of the two transmission brakes, this construction giving a direct draw of the rods in line with the shaft. The radius rods have a free motion with the vertical movement of the rear axle.

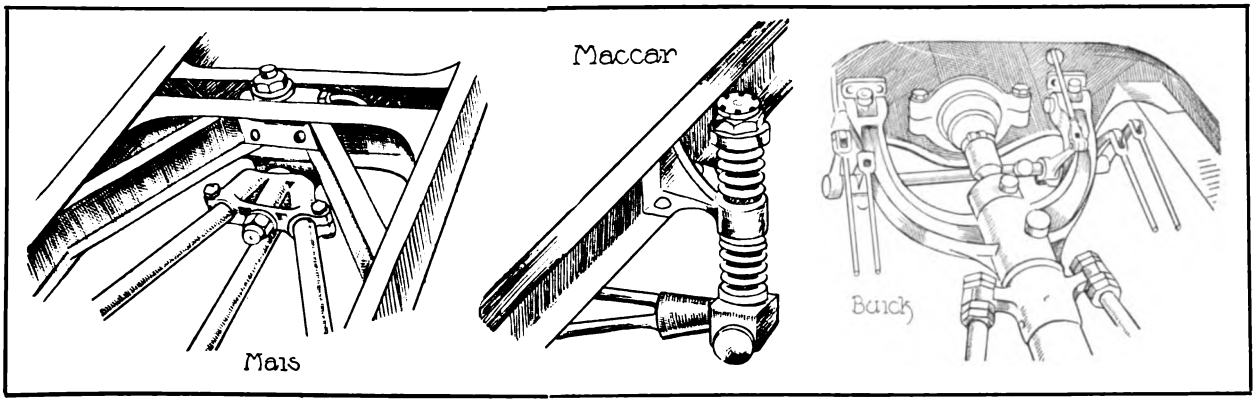
In the Universal worm driven one-ton vehicle the centre cross member is a wide web in which



Long Jackshaft Hanger of the Adams Machines.

is a round hole through which the shaft extends. Below the hole and under the shaft is a large bracket with two ears or lugs wide apart. The

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Perfected Thrust Block Design in Mais, Forward End Arrangement on Maccarr and Enlarged Torque Tube Yoke on Buick Delivery Wagon.

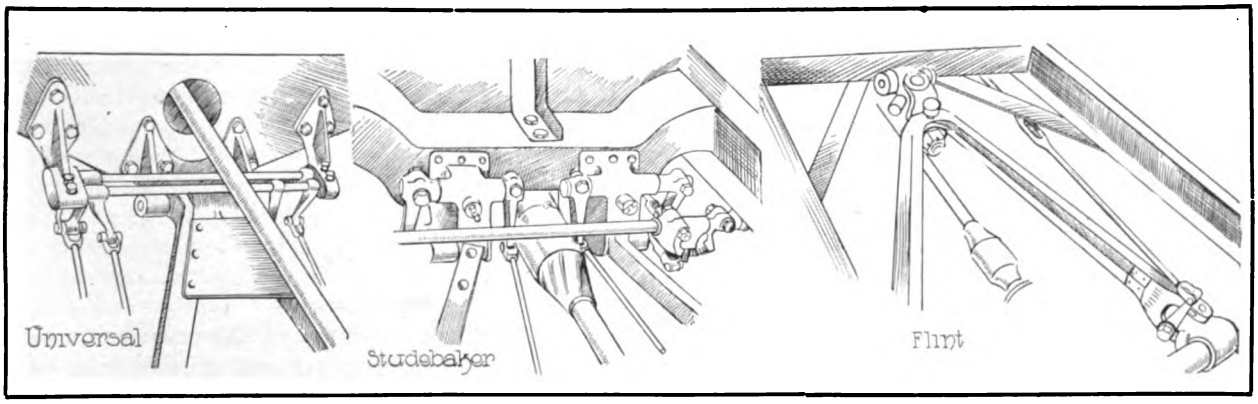
radius rods are of angle steel connected at the forward ends by a wide gusset plate, and ahead of this is mounted between the ends of the rods a fitting. A shaft extends through the lugs of the bracket and the fitting, on which the rods may move freely with the movement of the rear axle. At either side of the central bracket are two others, and in these are mounted the shafts for the service and emergency brakes.

The radius rods of the Flint wagon are steel channels with yokes at the rear ends, the forward ends being joined by a heavy curved member, through the centre of which is a yoked fitting, in which is a shackle that is mounted in a yoked bracket carried on the centre frame member. The coupling allows a transverse and vertical motion, and the rods may also twist on the supporting member, eliminating every probable stress. The yoked rear ends are connected with the rear axle so that a transverse movement is possible.

The Buick delivery wagons are built with the driving shaft enclosed in a torque tube that has a large, wide yoke with the ends carried in brackets on a large frame cross member, pivoted to allow a free vertical movement of the rear axle, and directly behind the yoke is a fitting in which the forward ends of the radius rods are secured after adjustment as to correct relation. The construction is not new, but it is extremely heavy and intended for endurance in service. Beneath the ends of the torque tube yoke are brackets that carry the brake shafts, with the forward pull rods extending through holes in the frame cross member.

The 1500-pound Maccarr chassis has a torque rod that has round upper and lower members to secure lightness. The forward end is shackled to a member mounted in a bracket on a frame cross member that is carried between helical springs. The rod moves at the rear end with the rear axle and is free to turn on the shackle at the forward end, and the possibility of vibration is taken by the helical springs and the thrust is very nearly direct at all times.

The Bessemer wagons have an adjustment for the forward ends of the radius rods in the jackshaft hanger in the form of an eccentric and a vernier arrangement of a segment of the eccentric, which may be secured in any desired grad-



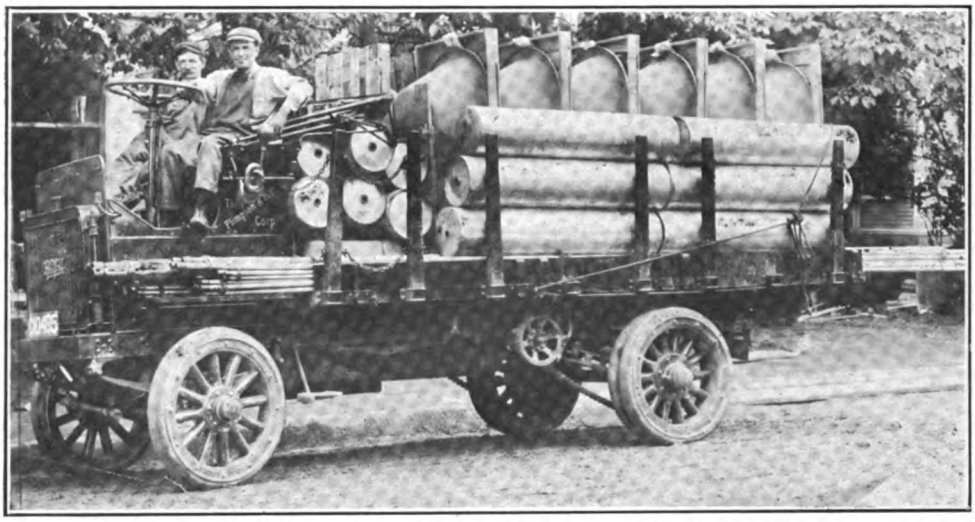
Forward Ends of Worm Driven Universal, Coupling of 3.5-Ton Studebaker and "Triple-Acting" Design on Flint Machine.

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uation by a bolt. This is independent of the adjustment that may be made at the axle end of the rod. Provision is made with the Adams machines to stiffen the chassis frames where the jackshaft hangers are installed by unusually long plates, the fittings extending backward from the hangers, and thus for these parts affording very secure anchorage.

SEEKING ECONOMICAL CITY DELIVERY.

ALTHOUGH it will be admitted that the cost of operation for one machine is relatively higher than with several and that the lack of facilities that would be possible or practical with the larger installation limits the productiveness that might be realized, it is of interest to learn that motor trucks are able to demonstrate their economy and efficiency in a satisfactory manner even under such conditions. This is exemplified in the experience of the Plimpton & Hills Corporation, Hartford, Conn., a wholesale dealer in plumbing and steam fitting supplies. In common with a large number of business houses this concern had no very definite information as to the expense entailed by its horse drawn equipment. A careful analysis of the situation revealed conditions which led the officials to believe that the figure was somewhat excessive and that there was every reason for estimating that it would increase rather than diminish. With this knowledge came the decision to purchase a three-ton truck, which was expected to do the work of at least five horses, and a Pope-Hartford, made by the Pope Manufacturing Company of that city, was selected.



Three-Ton Pope-Hartford Truck in Service with Plimpton & Hills Corporation, Hartford, Conn., as Loaded with Plumbing and Steam Fitting Supplies.

Inasmuch as the investment was regarded in the light of an experiment, the truck was placed in direct competition with the horses and was used for all kinds of transportation within the city limits. While the usual practise is to depreciate a vehicle of this character at the rate of 20 per cent. or some such matter, this car was accepted as a part of the equipment of the business and not as a separate item of expense. For this reason the plan adopted was to charge off 50 per cent. the first year and 50 per cent. of the previous year's valuation each subsequent year. The truck was placed in service in May, 1912, and the cost of operation for its first year, even with the increased charge for depreciation, figured out at $11.96 a day.

The average daily mileage has been 35. The intention has been to keep the machine on the road so far as this can be done, and during the year it has not been withdrawn for repairs. It is in charge of a man who has a factory training and thoroughly understands motor trucks. This driver and a helper handle the freight and in this manner the loading and unloading time is minimized so far as possible. Something like 20 tons are handled each day, and the concern has found that aside from the economy resulting from the use of the truck, the ability to make expeditious deliveries, especially with the prevailing rates for wages of plumbers and steam fitters, is of decided advantage. So satisfactory has the experiment proven that it is planned to add another motor vehicle some time this spring.

The White Company, Cleveland, O., has placed eight 34-passenger motor omnibuses with the Pittsburg Auto Transit Company, Pittsburg, Penn., for regular service in that city.

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WINNIPEG MOTOR COMPETITION.

Annual Contest in Connection with Canadian Industrial Exhibition in July.

The committee in charge of the agricultural motor competition, to be held in connection with the Canadian industrial exhibition, Winnipeg, Manitoba, July 1-16, has issued entry blanks and a booklet setting forth the conditions of the tests. The events will be divided under two general heads, one for agricultural motors and the other for gang plows.

The former will be sub-divided into three divisions, the first for machines using gasoline engines, the second for kerosene engines and the third for steam tractors. These will be sub-divided again into classes, those for divisions one and two being as follows: A, with piston displacement of less than 300 cubic inches a minute; B, from 300 to 500; C, over 500. Division three will have the following classes: A, piston area in square feet times 60 or less; B, 60 to 100; C, over 100, the piston displacement to be the area times 700, which is established as the typical speed. The trials will include brake tests, plowing and such others as the judges deem essential.

The plowing competition will be divided into two classes, as follows: A, engine plow with six bottoms and under; B, over six bottoms. The test shall consist of one or more rounds of the plowing field, as may be deemed necessary by the judges. The contestants may use any kind of engine they wish, the depth of the plowing to be uniform and as directed by the judges. Each plow must cut full width. Evenness of depth of furrow, uniformity of thickness of furrow slice, straightness of furrow and finish at the ends will be taken into consideration in making the award.

Full information may be secured by addressing Prof. L. W. Chase, engineer in charge, Canadian Industrial Exhibition, Winnipeg.

ABANDON TRUCK SHOW.

Definite Action Taken with Reference to Holding Display in New York City.

The executive committee of the National Association of Automobile Manufacturers, after securing the sentiment of the Automobile Board of Trade and manufacturers generally throughout the country, at a recent meeting decided to discontinue the truck show in New York City, and consequently none will be held next year, many of those interviewed having stated that they have found such displays cost more than the returns warrant. It is understood, in view of this decision, that Madison Square Garden will be abandoned altogether and that next year the pleasure car exhibition will be held in the Grand Central Palace only.

It is expected that similar action will be taken in connection with the holding of a commercial vehicle display in Chicago. The proposition to abandon both of these displays was brought up at the meeting of the executive committee of the N. A. A. M. in March, and met with the approval of that body. Definite action was postponed until the matter could be laid before the manufacturers themselves.

MOTOR TRUCKS IN SERVICE.

A handsome motor hearse built by the Peerless Motor Car Company, Cleveland, O., and displayed at the Chicago truck show has been purchased by the Newberry Auto Livery Company, Chicago, for use in conjunction with its 21 Peerless touring cars for funerals.

The John Bell Company, a builders' supply firm of New York City, has placed an order for five Garford motor trucks of six tons capacity each, made by the Garford Company, Elyria, O. This firm bought a Garford machine about a year ago and the development of the Bronx borough, with its large building operations, has resulted in greatly increased business for the Bell company, which necessitated this enlarged equipment.

An Alco truck, owned by John Lucas & Co., Philadelphia, Penn., loaded with three tons of paint, was driven from Philadelphia to Pittsburg, a distance of about 400 miles, in five days recently. The night stops were made at Lancaster, Gettysburg, Bedford and Greensburg. This was the first overland delivery made between the two points in 25 years, when horses made the journey in several weeks.

A new portable type of complete wireless telegraph station has been exhibited recently to the government officials at Washington, D. C. The outfit, which includes two telescopic towers, is carried on a large automobile truck, and the two towers can be raised to an altitude of 200 feet by the same motor that propels the vehicle. The instruments and generating apparatus are located in one of the rooms into which the truck is divided. This room is also used by the operator in the sending and receiving of messages.

The New York Railways Company, the public service corporation that controls the street, elevated and subway transportation of the metropolis for Manhattan and the Bronx, has purchased of the General Vehicle Company 29 electric wagons and trucks, which will be used for differing work. Three of these will be 1000-pound wagons with panel bodies, one will be a money wagon on a 2000-pound chassis, five will be 4000-pound chassis fitted with bodies and equipment for emergency service, 14 will be 3.5-ton chassis and two five-ton chassis, all with standard make platform bodies.

Henry Frerk Sons of Chicago, dealer in building materials, coal and feed, has operated a four-ton KisselKar truck, made by the Kissel Motor Car Company, Hartford, Wis., during the past year. The vehicle replaced two double and one single-horse teams and the figures compiled are interesting. The truck was in service 263 days and covered 10,241 miles, an average of 39 miles a day. The average weight carried a load was 7225 pounds. One gallon of gasoline was used for each 28 miles and the tire expense a mile was five cents. The firm finds the machine of particular value in taking care of distant deliveries quickly, thus materially widening its field of service.

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MOTORING LAWS AND THEIR ENFORCEMENT.

Rhode Island Legislature Adjourns without Passing Truck Bill---New York City Aldermen Asked to Tax Commercial Vehicles Heavily---Other Legal News.

MOTOR truck users in Rhode Island were successful in their efforts to defeat the proposed bill imposing a registration fee of $20 on business vehicles of one ton capacity and $10 for each additional ton, at least for the time being. When the matter came up in the lower house of the legislature it was recommitted, and when the legislature was adjourned it was still in the committee. This should not be taken as an indication that the matter has been decided definitely, as it is anticipated that some energetic work will be necessary in order to prevent the reappearance of the bill next year.

In the meantime, Borough President McAneny of Manhattan has introduced in the board of aldermen of New York City, a proposed ordinance which would deal the motor truck industry the most serious blow yet, if it were to become a law. The Motor Truck Club, the Automobile Dealers' Association and other organizations in that city have taken active means to protest against its passage. The text of the measure follows:

Section 1—No vehicle shall be allowed to use or pass over the pavements of any street of the City of New York after the passage of this ordinance without a license from the bureau of licenses of said city; and the bureau of licenses of the City of New York is hereby authorized and directed to regulate the widths of tires, loads per wheel, and widths of vehicles using or passing over the pavements of the City of New York, and to issue licenses or permits, to charge and collect fees, in addition to any other fees elsewhere authorized, to employ such clerks and inspectors as may be provided for by the board of aldermen and the board of estimate and apportionment, and to provide weighing stations as hereinafter set forth.

Section 2—Annual licenses shall be granted upon payment of the fees specified in the following schedule, to wit:

(a) Vehicles carrying or intending to carry a total gross load of 6000 pounds, or less, upon any wheel, shall be charged the following annual license fees:

Loads in pounds per inch width of tire	License fee for each vehicle
750 or less	$1
More than 750 but not to exceed 800	3
More than 800 but not to exceed 850	6
More than 850 but not to exceed 900	12
More than 900 but not to exceed 950	25
More than 950 but not to exceed 1000 (maximum)	50

(b) In addition to the fees provided in sub-division a, further fees shall be charged for loads greater than 6000 pounds, but not exceeding 10,000 pounds upon any wheel as follows:

Weights in pounds per wheel	License fee for each vehicle
More than 6000 but not to exceed 6500	$75
More than 6500 but not to exceed 7000	110
More than 7000 but not to exceed 7500	150
More than 7500 but not to exceed 8000	200
More than 8000 but not to exceed 8500	300
More than 8500 but not to exceed 9000	500
More than 9000 but not to exceed 9500	750
More than 9500 but not to exceed 10,000	1000

For loads greater than 10,000 pounds per wheel, license fees shall be charged for each vehicle at the additional rate of $500 for each 1000 pounds increase in weight, or portion thereof, per wheel; provided, however, that no load greater than 1000 pounds per inch width of wheel shall in any case be permitted, except as specified in sub-division d.

(c) Vehicles six feet six inches or more in width over all shall be charged, in addition to the fees specified in sub-divisions a and b, the following annual fees:

Width of vehicles	License fee for each inch in width in excess of 6 ft 6 in.
More than 6 feet 6 inches but not to exceed 7 feet 0 inches	$5
More than 7 feet 0 inches but not to exceed 7 feet 6 inches	10
More than 7 feet 6 inches but not to exceed 8 feet 0 inches	15
More than 8 feet 0 inches but not to exceed 8 feet 6 inches	20
More than 8 feet 6 inches but not to exceed 9 feet 6 inches	25

In determining this fee, any width which is greater than six feet six inches by a fraction of an inch, or by a distance which contains a fraction of an inch, shall be reckoned as if it were the next greater even inch.

(d) No loads, rigging, harness or other appurtenance shall in any case be allowed to extend beyond the outside limits of any vehicle except as specified in sub-division c.

(e) In lieu of the fees hereinabove provided for in sub-divisions a and b for loads of 6000 pounds or more on any wheel, special permits may be issued for single trips and fees charged therefor, at the rate of 10 per cent. of the fees therein provided, except that no such single fee shall be less than $25; and in lieu of the fees provided in sub-division c for excess width of vehicles, special permits for single trips may be granted upon payment of a single fee of not less than $10.

Section 3—Duplicate plates stating the weight of empty vehicle, the maximum load capacity per inch width of tire and per most heavily loaded wheel and width over all vehicle, shall be furnished by the city upon payment of the license fees herein established, and shall be permanently attached in a conspicuous place on each side of the vehicle as directed by the chief of the bureau of licenses.

Section 4—Suitable weighing stations shall be established in various parts of the city in such numbers and at such places as may be determined by the board of estimate and apportionment upon the recommendation of the chief of the bureau of licenses. All vehicles shall be weighed at one of such weighing stations whenever required by a duly authorized representative of the bureau of licenses.

Section 5—Any violation of the provisions or regulations of this ordinance shall render the owner of such vehicle liable to a revocation of its license, if any be held, and such owner shall be deemed guilty of a misdemeanor, and may upon conviction thereof be fined not less than $100 nor more than $500, and in default of payment of such fine may be committed to prison for a term not to exceed ten (10) days.

Section 6—All ordinances, resolutions, permits or licenses heretofore adopted, issued or granted by the City of New York, or by any board, body, council or officer thereof, or by any department, division or bureau thereof, permitting, licensing or regulating the widths of tires, loads per wheel and widths of vehicles using the pavements of the City of New York, are hereby in all respects repealed, cancelled and revoked.

Section 7—This ordinance shall take effect ninety (90) days after the date of its approval by the mayor.

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GIVES GOOD ADVICE.

Automobile Legal Association Urges Motorists to Obey Law's Provisions.

The Automobile Legal Association, with headquarters in Boston, calls attention to the fact that motorists in that state are violating the provisions of the law with reference to illuminating the rear registry number, suggesting that the practise of carrying tires at the rear doubtless is responsible for the error. Additional advice is given under the heading, "Stop and make yourself known," as follows:

The law requires that a person who causes injury to another or damage to property must not knowingly go away without stopping and making himself known, and the Massachusetts highway commission in a recent case have held that simply to stop and give people an opportunity to secure your number is not compliance with the law. The law undoubtedly requires that a person must not only stop, but must give his name and address in order to make himself known.

A number of motorists have, during the past year, been so unfortunate as to kill dogs, and because they failed to stop and make themselves known, have been liable to criminal prosecution, and rather than take the chance of a conviction they have paid various sums as damages for killing the dog, which they would not have been obliged to pay had they stopped and made themselves known as required by law. A person cannot be held liable for killing a dog unless he is operating his machine recklessly or in a grossly negligent manner, or unless he kills the dog wilfully or intentionally.

TO THE SUPREME COURT.

American Automobile Association to Test Constitutionality of Registration Laws.

A committee consisting of William H. Hotchkiss of New York, Lewis R. Speare of Massachusetts and H. M. Rowe of Maryland, has been appointed by the American Automobile Association to consider the advisability of taking the matter of registration fees for automobiles to the United States supreme court, in an effort to determine the constitutionality of the proposition. The matter was discussed fully at the meeting of the directors of the association in Baltimore, Md., May 8. The official statement of the situation contains the following:

While there has been an acquiescence for several years on the part of motorists in accepting the automobile registration tax when the money was employed in highways progress of one kind or another, especially in those states where it was paid in lieu of a personal property tax, the legislatures of the past winter have shown such a marked inclination to increase fees to an exhorbitant degree that the A. A. A. officers have taken up the matter with the state divisions of the national body, with the result that President Laurens Enos appointed a special committee to prepare and present a report.

Where the registration tax has been in lieu of all other taxes, and the money used exclusively for road maintenance, as in New York State, there has been slight objection on the part of the motorists over the unconstitutional discrimination against one class of road user, as long as the amounts paid were within reason. The protest recently has accumulated strength in those states in which the owners of motor driven vehicles are called upon to pay a registration tax, personal property tax and still another tax for the driving of the car. Double taxation and discrimination against one class of road user are the two points which invite attack on the ground of unconstitutionality.

The case that may be carried up originated in New Jersey, which state calls for three payments by the automobile owner—registration of car, driving license and property tax. The A. A. A. state organization instituted the suit, which has had adverse decisions in New Jersey courts.

LAW IS UNCONSTITUTIONAL.

State Has Collected from Motorists Nearly $600,000 Which Cannot Be Expended.

According to Homer J. Tice, chairman of the good roads committee of the house of representatives in Illinois, the automobile license law, under which nearly $600,000 has been collected by the state, was passed unconstitutionally. The fund is now in the state treasury and it is claimed that it cannot be expended without special appropriation.

Representative Tice has introduced a new bill, carrying all of the old law and providing in addition for the distribution of the $600,000 to the respective counties for state aid roads. It is understood that in spite of the unconstitutionality of the law the money paid cannot be recovered unless a protest was filed at the time it was paid.

LEGISLATIVE BRIEFS.

Mayor Gaynor of New York City has introduced an ordinance in the board of aldermen reducing the present taxicab rates, and doing away with the hack stand privileges in front of hotels, clubs, etc.

Under the terms of the new motoring law in South Dakota, owners will be obliged to pay a license fee of $3 for each machine from July 1 to Jan. 1, 1914, and $6 a year thereafter. The present fee is $1. It is expected that $100,000 will be raised annually for good roads under the new plan.

In a trial of a chauffeur accused of leaving his motor car for 38 minutes on Boylston street, Boston, in violation of the traffic ordinance, counsel contended that the car was not left as a person was seated in it during the period named. The court found the defendant guilty, although admitting that the point was a novel one, and the case has been appealed to the superior court.

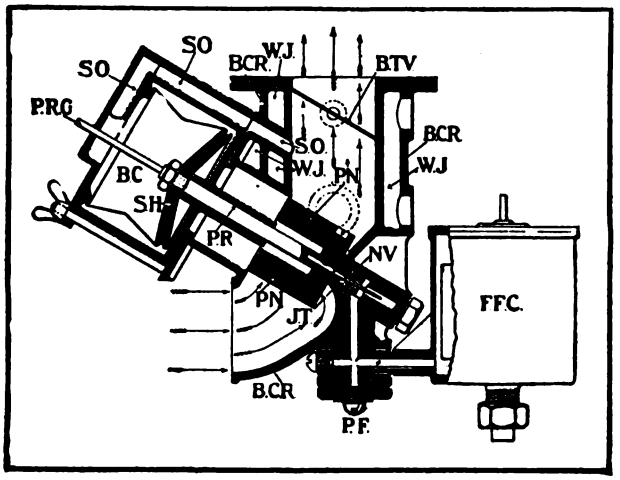
New legislation in New Jersey provides as follows: That no license to a driver shall be granted to any person under 18 except by the commissioner of motor vehicles in person and then only to those between 16 and 18; that the commissioner may suspend any license granted under his authority; that for registration purposes the horsepower formula shall be adopted yearly by the commissioner under the restriction that he shall adopt no formula not used by standard trade associations; that the commissioner shall have power to summon witnesses to attend hearings in revocation proceedings and carrying a fine of $100, and that the commissioner is vested with the powers of a justice of the peace, recorder or police judge.

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THE REPAIR SHOP AND GARAGE.

Construction and Operation of S. U., an English Carburetor, Made in This Country --Priming Valve for Starting Motor on Mixture of Kerosene and Gasoline.

FITTING and adjusting a carburetor to an old motor frequently involves considerable labor and patience, as it is often difficult to set it so that a uniform mixture is obtained at high and low speeds. Economy of fuel is an important factor and an owner when solicitating the advice of the repairman desires to know how many miles to the gallon the proposed vaporizer will give, as well as its efficiency. These desirable features and others are incorporated in the design of the S. U., an English carburetor, which is manufac-



S. U. Carburetor, Having but One Moving Part and Being Easily Adjusted—The Principle Is That of a Constant Speed of Air Past the Jet and Accurate Fuel Adjustment.

tured in this country by the Simms Magneto Company, for which George Sumner, Inc., 1926 Broadway, New York City, is selling agent.

That the carburetor differs from those of conventional design will be noted by the sectional diagram presented herewith. It will be seen that there is but one moving part, the piston, and this member does not actually touch the walls of the device, nor does the needle come in contact with the sides of the jet. Wear is, therefore, eliminated as well as springs, etc.

The float chamber F F C is of the conventional design, but the jet J T is set at an angle of 45 degrees in the choked or restricted portions of the jet chamber, through which the entrance of air is blocked by the interpositon of the concentric piston P N. The latter slides up and down in its cylinder, guided by a piston rod P R, which carries at its upper end a mushroom suction disc, forming the bottom of a bellows suction chamber B C. The piston rod continues in the shape of an indicator rod P R G, which passes through the cover of the suction chamber B C.

The lower end of the piston rod carries a tapered needle valve penetrating the centre of the gasoline jet J T. A tubular connection S O is formed between the upper portion of the jet chamber below the butterfly throttle valve B T V and the interior of the chamber B C. The balance of the components of the carburetor are: B C R, body of carburetor; N V, gasoline needle valve; P F, fuel supply; P N, piston governing the area of air passage across jet and carrying tapered needle entering jet, controlling delivery of gasoline thereof; S H, mushroom shaped suction head; W J, hot water or exhaust jacket spaces.

The operation of the S. U. is as follows: When the motor is operating slowly and without load, the piston P N obstructs the air passage to within .03125 inch, the total area then offered to the passage of air being approximately one-twentieth of a square inch. This extremely small area endows the air passing through it with sufficient velocity to thoroughly atomize the amount of fuel then being delivered through the jet.

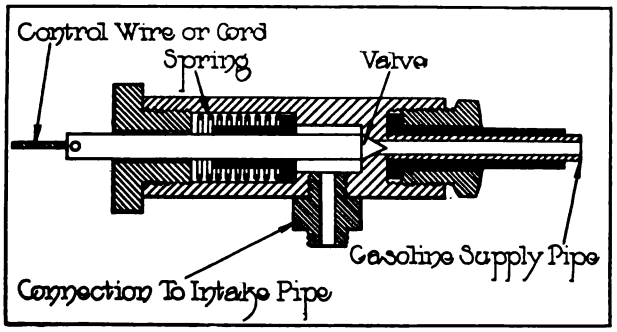
As the throttle is opened the suction increases, the depression in the jet chamber above the jet increases correspondingly, and the suction effect then exerted obtains similarly in the suction chamber B C above the disc S H. This has the effect of lifting the under face of the piston farther away from the jet, augmenting the area of the air passage. At the same time the tapered needle valve N V is drawn further up the jet, the orifice therein is enlarged, and a proportionately larger volume of fuel is emitted. When at the top of its upward stroke the piston leaves so large an area for the air travel that a minimum of back pressure is exerted on the engine.

All the air passes by the jet at right angles to it, and as the supply of gasoline is entirely dependent on the form of the needle valve, it is a simple matter to increase or diminish the size of this member at any particular point when the speed at which the motor may be running is not entirely satisfactory. The accessibility is notice-

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able, the unscrewing of the thumb screws permitting easy access to the parts.

The air space in the S. U. is automatically in-



An English Invention for Starting Motor Utilizing Kerosene and Gasoline.

creased or decreased in accordance with the requirements of the engine, by the piston acting as a shutter, and rising and falling as the motor speed varies. At very low speeds the piston is shut down, but the draught is sufficient to properly spray the fuel, and at high the piston rises to its full extent, providing a large space for the air to pass. The speed of the air past the jet is therefore constant. The S. U. presents an advantage in fitting in that the float chamber can be placed in any convenient position as it revolves around the carburetor. Easy adjustment, economy of fuel, flexibility and power are features emphasized with the S. U.

MOTOR STARTING DEVICES.

That kerosene can be utilized for fuel is conceded by those who have experimented with it, but the chief objection is the difficulty encountered in starting when the motor is cold. There is no doubt that there will be considerable experimentation with the heavy fuel during warm weather, when it is more easily vaporized, than at present.

The invention of M. de Jarny, which is utilized by an English taxicab company, is of interest in that it is designed to overcome starting troubles attendant upon the use of kerosene, mixed with gasoline. As will be noted by an accompanying illustration, it is a valve device by means of which gasoline is fed to the intake pipe to obtain the initial explosions.

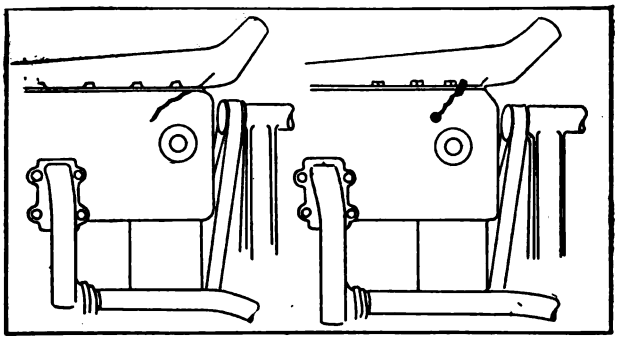
The valve is screwed into the intake manifold, which is drilled and threaded, and the source of supply of gasoline is a small container located on the dash or in any other convenient place. A valve is fitted and is normally held closed by a spring, but it may be opened when desired by a cord or wire. The latter is led to the front of the car near the starting handle, and when the driver wishes to start the motor the control cord is pulled, releasing the valve and allowing a small amount of gasoline to flow into the manifold. This insures the preliminary explosions, after which the motor is supposed to operate on the combination mixture supplied by the regular tank.

Details are not given concerning the dimensions of the openings into the manifold or the amount of gasoline utilized. The design is similar to several priming devices made in this country for starting the motor on gasoline in cold weather. Presumably the operator acquires by experience the knowledge of how much gasoline to use to secure the preliminary explosions.

REPAIRING CRACKED CYLINDERS.

The usual practise in repairing cracked cylinders is to employ the autogeneous or welding process, although iron cements, etc., have been used with success, depending on the nature of the fracture. The Commercial Motor, an English publication, prints the following suggestion, which may be of service where a small crack is to be mended and when there is not time to send the part to be welded:

Drill and tap a small hole at each end of the crack to prevent further extension of the weakness, and fit an iron stud. Next clean the outside and inside of the fracture very thoroughly, using a scraper and gasoline. File up some soft copper and fill the crack, heaping the filings over it. Then take a powerful blow lamp or a torch and direct the flame on the copper. By this method a fair amount of metal can be worked into the opening.



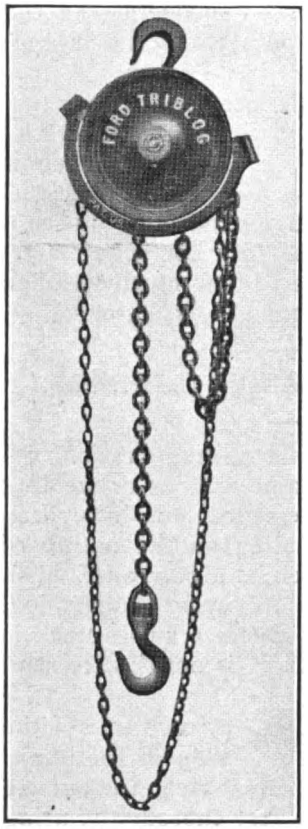
Method of Repairing Crack in Cylinder by Fusing Copper Filings.

After cooling, the studs are cut off flush and the copper filed smooth. It is said that the repair will endure indefinitely.

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GARAGE AND REPAIR SHOP EQUIPMENT.

THE use of en bloc motors and the increasing number of commercial vehicles call for suitable equipment for handling this heavy work, and among the devices marketed is the Ford Tribloc, made by the Ford Chain Block & Manufacturing Company, 139 West Oxford street, Philadelphia. As will be noted by the accompanying illustration, it is a spur gear chain block of the hand hoist type, and one of its features is a patented loop hand chain guide, which prevents the hand chain from over riding the hand wheel when operating the hoist at any speed or in any direction.



Ford Tribloc.

In the Tribloc the load is held by a device entirely independent of the lifting mechanism. The maker points out that all of the applied power is the hoisting effort and that 80 per cent. of that applied to the hand chain is converted into lifting energy. The latter is so multiplied that one man pulling 82 pounds can lift a ton four feet a minute.

The parts are few and simple and the gears centre around the one main bearing. The gears are of steel covered by a dust proof steel case and are balanced. All working parts are of steel and the swivel hook is a steel forging. The Tribloc is made in sizes ranging from .25 ton to 40 and is guaranteed for five years. The patented loop guide can be furnished on all sizes and is interchangeable with the strap hand chain guide. The company also manufactures differential and screw gear hoists. Figures and data will be forwarded upon request.

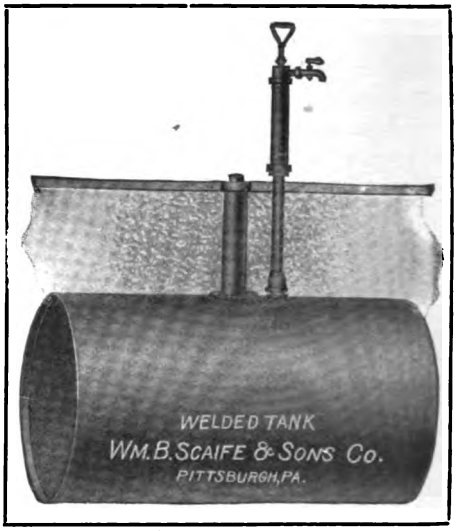
GASOLINE STORAGE OUTFITS.

The storage and handling of gasoline are becoming items of importance in these days of constantly increasing cost of fuel, and garages and service stations are giving the subject more attention than formerly. Not only must the system make for convenience, but it must provide accurate means for noting the amount utilized as well as prevent loss by evaporation or careless handling.

The William B. Scaife & Sons Company, Pittsburg, Penn., manufactures a wide variety of gasoline, oil and fluid storage systems, one of which is shown in an accompanying illustration. They are made in various sizes ranging from 60 gallons to 1000 and come complete for installation.

The tanks are constructed of a high grade open hearth steel and are free from rivets, etc., being welded by the autogenous process. They are thoroughly galvanized inside and out by a hot process and pure zinc is utilized. A coat of rust proof paint is applied to the exterior and each tank is tested with compressed air to insure absolute tightness.

The filler pipe is sturdily constructed and a galvanized malleable iron rim cap is grooved on the inside to fit tightly over two strong lugs on the filler pipe casting. A bronze padlock prevents tampering. The cap requires no tool to operate, a quarter of a turn with the hand releasing it after it is unlocked. Several lug slots are provided through which the air enters by suction while the contents of the tank are being pumped. A perforated brass strainer sets inside the pipe, easily removed for cleaning, and there is also a screen covering the vent space. When the filler pipe is installed under a driveway or sidewalk a cast iron box with hinged cover is provided at a slight additional cost.



One of Several Gasoline Outfits Made by William B. Scaife & Sons Company.

The long distance pump is of the suction type

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and it is stated that it is very powerful and easily operated. The base is provided with an opening to admit the suction pipe in case it is not desirable to cut a hole in the floor and have the supply pipe enter at the bottom. Either bolts or screws may be employed for securing it. The faucet is of the anti-drip type and has improved shut-off features. Provision is made for holding a can, etc. A bronze padlock is securely riveted to the top cylinder casting, and swings aside out of the way when the pump is operated. The foot valve is located in the lower cylinder casting and contains a ground bevel seat. The pump faucet, cylinder and inside parts are brass, the handle, top and bottom castings of malleable iron galvanized and the base is cast iron black enameled. The maker will forward particulars, including price list, upon application.

HILL-STAGE TUBE VULCANIZER.

A revolving, quick steaming vulcanizer, said to permit the operator handling eight tubes at one time and without changing his position, has been brought out by the Hill-Stage Company of Anderson, Ind. The boiler is of porcupine construction where the flame strikes it, making for rapid and uniform heating. The vulcanizer can be operated with a gasoline burner or with direct steam. Details will be supplied on request.

FORMULAE AND USEFUL MECHANICAL TABLES.

Alloys for Metal Patterns.

An alloy suitable for small metal patterns is composed of tin one part and lead one part by weight. The result is a somewhat soft alloy which requires care in the handling of the patterns. Some harder mixtures are as follows:

Lead	Antimony	Tin
55.0	30.0	15.0
55.0	22.7	22.3
61.3	18.5	20.7

A white metal that has small shrinkage and is good for pattern plates is lead 90, antimony 10. A harder metal with small shrinkages and very good for pattern plates is zinc 66 per cent., tin 34 per cent. An amalgam, very convenient for stopping up holes that cannot be soldered easily, is made from the filings of the last named alloy, and mercury kneaded in the hand into stiff dough, squeezing out all the mercury possible. This amalgam should be pressed when first made, into the cavity and allowed to harden. When hard it may be filed or scraped like the metal itself.

Melting Points of Alloys.

The following table gives the melting points of alloys of tin, lead and bismuth:

Tin	Lead	Bismuth	Degrees Fahrenheit	Tin	Lead	Bismuth	Degrees Fahrenheit
2	3	5	199	4	1	—	372
1	1	4	201	5	1	—	381
3	2	5	212	2	1	—	385
4	1	5	246	3	—	1	392
1	—	1	286	1	1	—	466
2	—	1	334	1	3	—	552
3	1	—	367				

Gears for Screw Cutting.

Take from the index the number of threads cut by equal gears and multiply it by a number that will give for a product a gear on the index. Place this gear on the spindle or stud. Then multiply the number of threads an inch to be cut by the same number, and put the resulting gear on the screw. For example: The lathe cuts four threads by equal gears, and 13 threads an inch are wanted. then

$$\frac{\text{spindle or stud}}{\text{threads to be cut}} = \frac{4}{13}$$

The constant 5 will give for a product a gear on the index, and

$$\frac{4\times5}{13\times5} = \frac{20}{65}$$

Therefore, to cut 13 threads an inch, would require a gear of 20 teeth on the spindle or stud, and a gear of 65 teeth on the lead screw.

Care of Grinding Wheels.

When a grinding wheel becomes glazed or smooth it is necessary to redress the surface or it will continue to grow smoother, lose its cutting ability, heat the work and cause chatter. Glazing is caused by two factors—too high speed or too hard bond. After the wheel has been dressed by passing a diamond point across its face its speed should be reduced in an effort to prevent further glazing. If this does not do it, increase the speed of the work.

U. S. Standard Screw Threads.

Diameter of Screw at Top of Thread.	Threads per Inch.	Diameter at Root of Thread.	Width of Flat, Top and Bottom.
1-4	20	.185	.0063
5-16	18	.2403	.0069
3-8	16	.2936	.0078
7-16	14	.3447	.0089
1-2	13	.4001	.0096
9-16	12	.4542	.0104
5-8	11	.5069	.0114
3-4	10	.6201	.0125
7-8	9	.7307	.0139
1	8	.8376	.0156
1 1-8	7	.9394	.0179
1 1-4	7	1.0644	.0179
1 3-8	6	1.1585	.0208
1 1-2	6	1.2835	.0208
1 5-8	5 1-2	1.3888	.0227
1 3-4	5	1.4902	.0250
1 7-8	5	1.6152	.0250
2	4 1-2	1.7113	.0278
2 1-4	4 1-2	1.9613	.0278
2 1-2	4	2.1752	.0313
2 3-4	4	2.4252	.0313
3	3 1-2	2.6288	.0357
3 1-4	3 1-2	2.8788	.0357
3 1 2	3 1-4	3.1003	.0385
3 3-4	3	3.3170	.0417
4	3	3.5670	.0417
4 1-4	2 7-8	3.7982	.0435
4 1-2	2 3-4	4.0276	.0455
4 3-4	2 5-8	4.2551	.0476
5	2 1-2	4.4804	.0500
5 1-4	2 1-2	4.7304	.0500
5 1-2	2 3-8	4.9530	.0526
5 3-4	2 3-8	5.2030	.0526
6	2 1-4	5.4226	.0556

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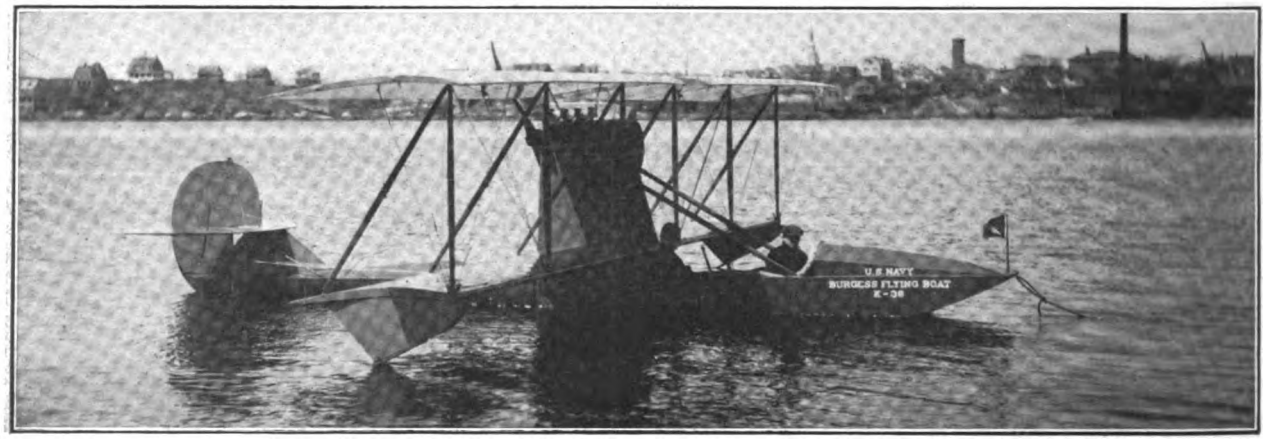
AVIATION IN AMERICA AND ABROAD.

Details of the Latest Burgess Folding Flying Boat---Official Stability Test of Dunne Biplane---Prevost Secures Hydraeroplane Trophy---New Records.

BECAUSE Burgess Co. & Curtis, Marblehead, Mass., has departed somewhat from recognized American standards in manufacturing machines for the United States government, and particularly for the navy, the productions of this concern are of particular interest. Three distinct designs have been prepared by W. Starling Burgess to conform with the special requirements for which they were purchased. The latest of these is now undergoing trials at Marblehead. This is known as model K or the Burgess flying boat, and is presented in an accompanying illustration.

The hull, power plant and main surfaces each form separate units capable of being assembled and taken down in the least possible time. The fabric, making it very strong and serviceable.

The construction of the wings is particularly interesting. While the lower plane includes in its frame work both front and rear longitudinal members, the upper surface is constructed with a single heavy steel tube throughout its length, the ribs being so connected to this tube as to permit of warping without straining them. The motor is an eight-cylinder, 70 horsepower, air-cooled Renault, and the propeller is of 9.5 feet diameter, being mounted directly on an extension of the camshaft and thereby reducing the 1800 revolutions a minute of the engine to 900 revolutions. The weight of the motor is 400 pounds, its bore approximately 3.75 inches and its stroke 4.75. Ignition is by the latest type of Bosch magneto.



Burgess Flying Boat, Model K, Built for United States Navy by Burgess Co. & Curtis, Now Undergoing Its Trials at Marblehead, Mass.

principal innovations in the design include: The triangular arrangement of wing struts, allowing the upper plane to be staggered forward of the lower plane in order to increase the carrying efficiency; the upper and lower wing surfaces permanently attached to each other and capable of folding together; the peculiarly shaped hull and the detachable unit power section.

The aviator and passenger are carried near the bow of the boat, their seats being arranged in tandem. At the canoe shaped stern are located the elevator and the combination rudder for steering both in the air and on the water. The hull is built up on spruce and oak ribs, double diagonally planked with mahogany separated by

The principal dimensions are: Spread of upper main plane, 43 feet; lower main plane, 36 feet; depth of wings, five feet six inches; area of supporting surface, 397 square feet; length over all, 31 feet; length of hull, 29 feet six inches; height, eight feet 10 inches.

DUNNE BIPLANE STABILITY.

The Royal Aero Club of Great Britain has issued a certificate of the performance of a Dunne biplane entered for a test of natural stability at Salisbury Plain, England, last December. Two official flights were made on succeeding days, the official observer being a passenger. The first

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was made with the wind blowing in gusts up to 20 miles an hour, and the second under similar conditions. In the former the pilot ceased to manipulate all controls for a period of 1:05 while flying over a spot where irregular disturbances were, from the actual experience of the observer, known to prevail, and only resumed their operation upon the request of the observer. In the latter test the machine described a complete circle without the slightest guidance on the part of the operator after he had adjusted the controls for the circuit.

Lieut. Dunne, the designer and constructor, is an officer in the British army. He has been interested in aviation since 1908, and is said to have made a flight in that year. He first came into public notice with a monoplane, in which the remarkable stability was apparent from unofficial tests. He appears to have changed his design but slightly in adding the second surface. Additional interest in the machine will be awakened by the recent announcement of the results of the December tests.

Briefly described, the main plane formation of the Dunne biplane is in the form of a V, the point of the V being the advancing edge, so to speak. There is no tail and the nacelle or body is suspended between the upper and lower main planes, extending backward from the point of the V a distance of 18 feet. On either side of this and back of the supporting surfaces are two seven-foot propellers driven by gears from the engine within the hull.

The principal feature is held to be the shape of the main planes, which have considerable camber close up to the centre, this being diminished toward the tips, while at the same time the leading edge is lowered, until at the outer extremities, the planes present an actual negative angle of incidence. The entire control is said to be exercised by the ailerons set out at the rear ends of the planes, that at the right being guided by a lever at the pilot's right, and that at the left by a lever on that side. These can be moved independently of each other or together at the will of the operator.

Maurice Prevost won the first international race for Schneider cup at Monte Carlo, Monaco, April 16, using a Deperdussin machine. The trophy was presented recently by Jacques Schneider of France as an annual international award for hydraeroplanes, similar to the Gordon-Bennett cup for aeroplanes. The other competitors in this year's event were: Roland Garros, Morane-Saulnier; Espanet, Nieuport, and Charles T. Weymann, Nieuport. The last named represented America, while the others composed the French team.

A new world's duration record for pilot and four passengers was created at Orleans, France, April 16, by Champel in a Champel biplane fitted with a 10-cylinder Anzani motor, the new mark being 3:01:00. A new distance record was made at the same time, this being 155 miles.

New world's altitude records were made by Marty with a Caudron biplane at Crotoy, France, April 16, when he reached 8658 feet with three passengers and 4757 feet with four passengers. The previous marks were held by Henri Farman biplanes, the former at 4409 feet, made by Chevillard, and the latter at 3675, made by Gougenheim.

Eight hydraeroplanes have been nominated to participate in the international Great Lakes flying boat cruise, which is scheduled to start from Chicago, July 8, and end in Detroit a few days later. The makes of machines have not been made public as yet, but some of the aviators who will pilot them are: Thomas Benoist, Hugh Robinson, Anthony Janus, Frank Harriman, C. C. Witmer, Weldon B. Cooke, Max Lillie and F. B. R. Verplank.

The Bosch Magneto Company, New York City, announces that the Rumpler monoplane, utilized by Lieut. Canter in making new world's records in Germany recently, was equipped with a 90 horsepower Mercedes-Daimler motor, using Bosch magneto and plugs.

An interesting cross country flight is reported from Orleans, France, in which Champel, using a biplane designed and constructed by himself, flew from Juvisy to Orleans, a distance of practically 62 miles, with three passengers in 44:00.

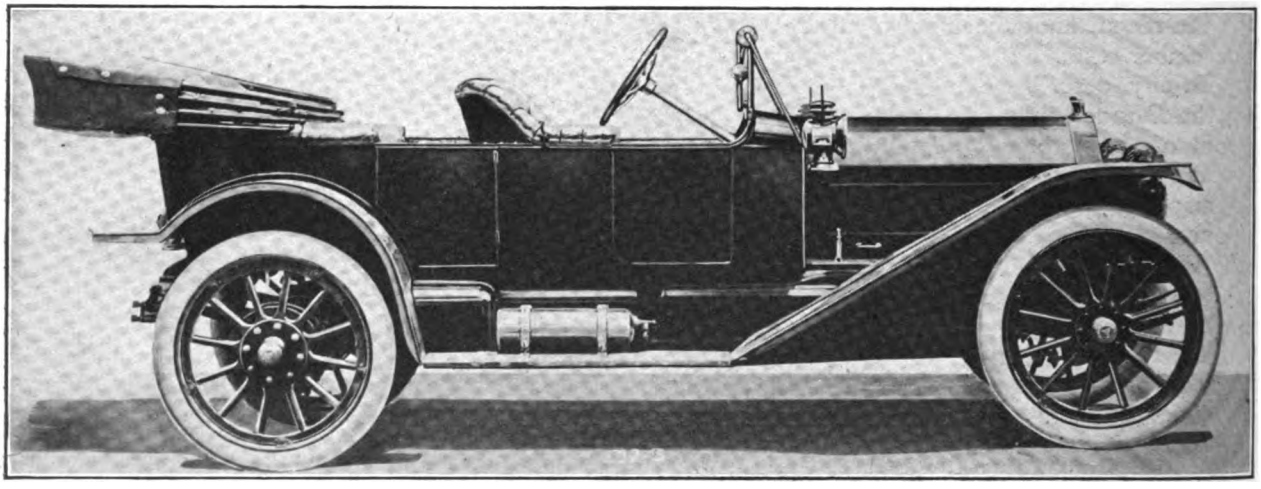
The German navy officials are said to have perfected plans for the expenditure of $12,500,000 for aeroplanes and dirigibles during the next five years. This sum is in addition to the amount set apart for the army, which is said to reach $250,000,000. A bill appropriating $750,000 as the initial outlay in connection with the naval plans has been introduced in the imperial parliament.

Glenn H. Curtiss has renewed his offer to instruct free of charge as many men as the United States government cares to assign for signal corps duty at his military aviation camp in California or at Hammondsport, N. Y.

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HAVERS LINE INCLUDES NEW SIX CHASSIS.

CHANGES in the models produced by the Havers Motor Car Company, Port Huron, Mich., for the present season consist of refinements in the details of the series C, Havers Six 44, and the addition to the line of a series D, a six-cylinder chassis to which is fitted a five-passenger touring type of body and a speedster design. The Six 44 will be equipped with three styles of bodies, four and five-passenger touring and two-passenger roadster. The general specifications of the new chassis are similar to those of the series C with the exception of a more powerful motor, longer wheelbase, larger body and electric lighting and electric motor starting systems. The equipment is very complete, including those accessories making for convenience in operation and comfort for the passengers. The same high grade material and workmanship noticeable of the product of the Havers company for the past two years are continued and both chassis are designed to meet the requirements of those desiring a powerful car capable of being maintained at a minimum cost.



Havers Series C, Six 44, Five-Passenger Touring Car with Ample Power and Completely Equipped.

As the same mechanical details apply to the Six 44 as to the Six 55, a description of the latter will serve for both. The cylinders of both motors are cast in pairs and those of the larger have a bore of four inches and a stroke of five, a bore to stroke ratio of 1:1.25. Although rated at 38.4 horsepower by the S. A. E. formula the company lists its product at 55, which does not appear to be excessive when the piston displacement of 376.9 cubic inches is considered. The bore of the series C motor is 3.75 inches and the stroke five, giving 33.75 horsepower according to the S. A. E. formula, but it develops 44 in block tests, according to the maker.

The four bearings of the crankshaft, which is ample in diameter, are plain, and the length of the centre members is three inches, that of the forward 3.5 and that at the flywheel end four.

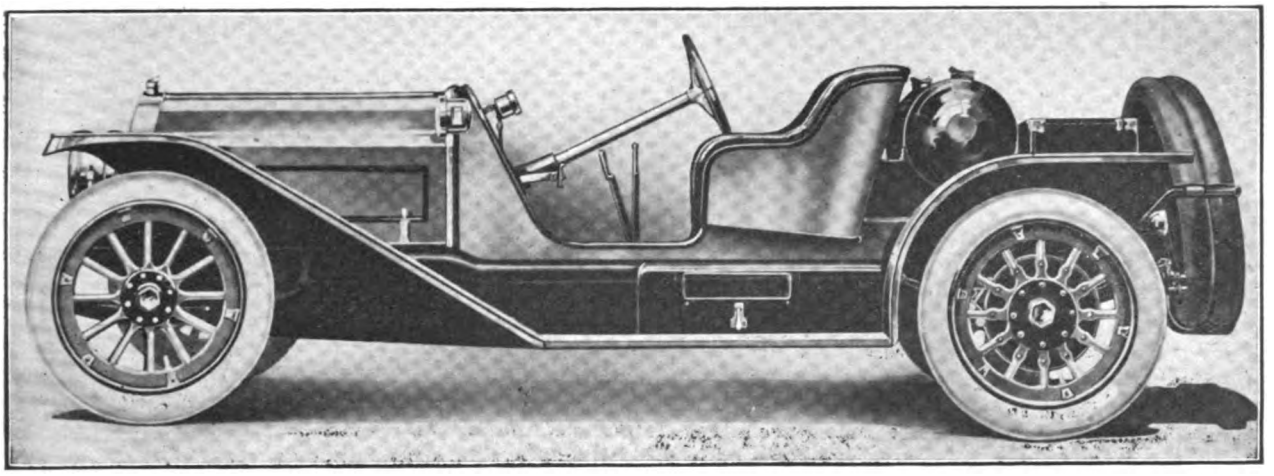
Carburetion is by the latest type Stromberg, located on the left hand side of the power plant. Ignition of the Six 44 is by a Bosch high-tension magneto, dual system, while that for the larger motor is supplied by the combined lighting, starting and ignition system. Cooling is by thermo-syphon.

Lubrication is by a combination splash and force feed. The oil is pumped by a gear pump from the reservoir cast integral with the lower half of the crankcase through a distributing channel in the upper case to the main bearings and gears. The excess lubricant is collected by grooves or troughs into which the large ends of the connecting rods dip, splashing it to the pistons, rings, walls, etc. A multiple disc clutch is utilized, steel plates, Raybestos lined.

The transmission is of the conventional selective type having the usual three forward speeds and a reverse. All gears are of chrome vanadium steel, of ample diameter and wide face, and special attention is paid to cutting and tempering. The main and countershaft are liberal in size and rotate on annular ball bearings.

Drive is by shaft carried in a torsion tube with a full universal joint and slip joint on the transmission shaft. The driving strain of the rear

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Havers Series D, Six 55, Knickerbocker Speedster, an Addition to the Havers Line—A Five-Passenger Touring Body Is Fitted to the Same Chassis.

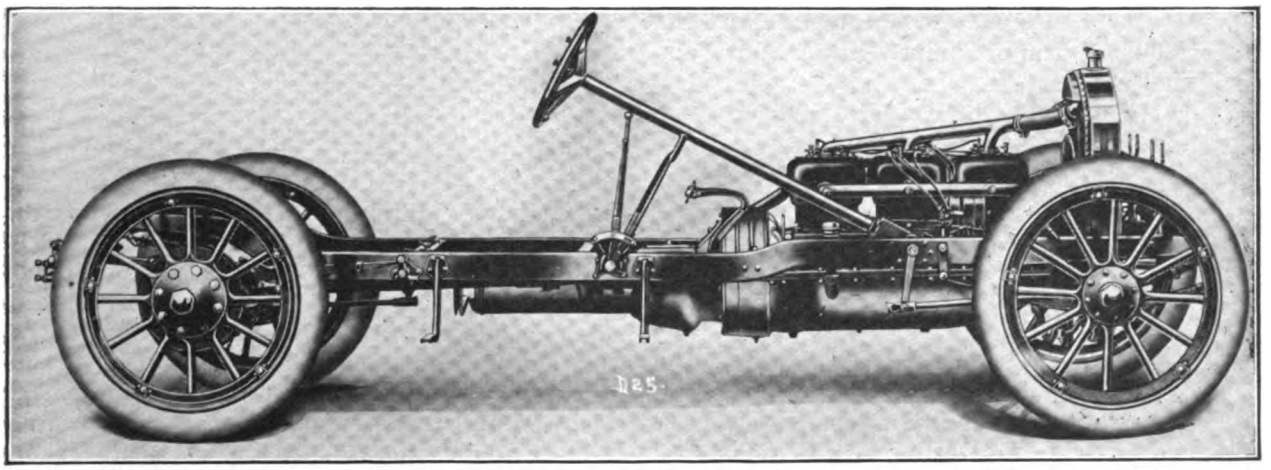
axle is carried through radius rods. The rear axle is of the full floating type and the drive shafts are of 1.5-inch diameter nickel steel.

The frame is of pressed steel, heavy channel section, 30 inches in width at the front and 31.5 at the rear. It is dropped just back of the motor and has the usual kick-up at the rear, providing a low centre of gravity. The front springs are semi-elliptic, 40 inches long by two wide, while the rear are three-quarter platform, 36 inches long by two wide. Provision is made for lubrication of all parts subject to friction by fitting grease cups. The wheelbase is 128 inches, tread standard, 56. The wheelbase of the series C is 122.

The wheels are of the artillery type with large hubs and heavy spokes, and are fitted with Baker or Firestone quick detachable, demountable rims with one extra member as standard equipment. Tires are 36 by four inches, both front and rear.

The steering gear is of the worm and full wheel type, irrevesible and adjustable to wear. The steering column is heavily nickeled, 1.75 inches in diameter, and the wheel carries the usual gas and spark control members. Two sets of brakes are provided, the service member being of the external contracting type and the emergency of the internal expanding design. Both are fitted with equalizers. The fuel tank has a capacity of 20 gallons and the oil reservoir carries 1.75 gallons.

The driver is located at the right with control levers at the right, inside of the body. The clutch pedal is at the left and service brake member at the right. The usual accelerator is included. The touring bodies are of the latest fore door type and are noticeable for their straight lines, high grade finish and handsome appearance.



Chassis of Havers Six-Cylinder, Noticeable for Its Low Centre of Gravity, Powerful Motor and Accessibility of Components.

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NATIONAL CONTEST AND RACING NEWS.

Itinerary Completed for Reliability Tour Which Succeeds the Glidden---Entries for Indianapolis 500-Mile Race---Concerning Coming Events.

ALL mention of the Glidden tour, as the annual national reliability run of the American Automobile Association has been known for so many years, is eliminated from the publicity concerning the 1913 event. As already announced the tour will start from Minneapolis, Minn., and end at the gateway of the Glacier national park in Montana, covering 1233.1 miles. The event is scheduled for July 11-19, and is to be known as the A. A. A. Twin City-Glacier National Park reliability tour.

The chief award this year will be the new A. A. A. trophy, an illustration of which is presented herewith. It stands 25 inches high and has a diameter of 24 inches, and around the top is a border depicting scenes in Yellowstone park, California, the White mountains and the South. On either side are figures symbolizing speed and endurance, and other official emblems are used with good effect. The trophy was made by the old established firm of Samuel Kirk & Sons Company, Baltimore.



The New A. A. A. Trophy.

The itinerary has been approved by the national association, as follows:

July	Noon	Night	Miles
Fri. 11....	St. Cloud, Minn.	Alexandria, Minn.	144.4
Sat. 12....	Fergus Falls, N. D.	Fargo, N. D.	123.8
Mon. 14...	Grand Forks, N. D.	Devils Lake, N. D.	194.6
Tue. 15...	Rugby, N. D.	Minot, N. D.	135.6
Wed. 16...	Stanley, N. D.	Williston, N. D.	136.8
Thu. 17....Poplar, Mont.		Glasgow, Mont.	163.8
Fri. 18....	Malta, Mont.	Havre, Mont.	156.1
Sat. 19....	Shelby, Mont.	Glacier Park, Mont.	178.0

Sunday, July 13, rest at Fargo, N. D.

The committee in charge is composed of the following: Dr. C. E. Dutton, Asa Paine and H. J. Clark, Minneapolis; E. W. Brazille, St. Paul; W. W. Smith, Fargo, N. D.; A. J. Davis, Butte, Mont.; N. H. Van Sicklen, Chicago, and James T. Drought, Milwaukee.

THE SWEEPSTAKE EVENT.

Entry List Includes at Least Two Cars Utilizing Knight Sleeve Valve Motor.

Entries closed May 1 for the third annual 500-mile international sweepstakes race on the Indianapolis motor speedway, Memorial Day. The list is particularly interesting because of the fact that this is the first American event of this character in which the Knight sliding sleeve valve motor has been in competition with the poppet valve type of engine. The entries include the following:

Car and Driver	Cyl.	Bore	Stroke
Stutz, Anderson	4	....	....
Stutz, Merz	4	....	....
Nyberg, H. Endicott	6	4.00	5.00
Keeton, Burman	4	5.09	5.50
Mason, Evans	4	4.31	6.00
Mason, Tower	4	4:31	6.00
Unknown	4	....	....
Stutz, Herr	4	....	....
Sunbeam, Guyot	6	3.54	6.29
Henderson, Knipper	4	4.31	6.00
Fox Special, Wilcox	4	4.75	5.50
Smada, Adams	4	3.50	5.00
Peugeot, Goux	4	....	....
Peugeot, Zucarrelli	4	....	....
Amel, Liesaw	4	4.50	5.00
Schacht, Jenkins	4	4.87	5.50
Mercer, DePalma	4	4.80	6.18
Mercer, Bragg	4	4.80	6.18
Mercer, Wishart	4	4.37	5.00
Mercedes-Knight, Pilette	4	3.93	5.12
Stearns-Knight	..	....	....
Isotta-Fraschini, Grant	..	....	....
Isotta-Fraschini, Tetzlaff	..	....	....
Isotta-Fraschini	..	....	....
Case, W. Endicott	..	....	....
Case, Nikrent	..	....	....
Mason, Houpt	..	....	....

The purse posted by the speedway management comprises $50,000, divided as follows: First, $20,000; second, $10,000; third, $5000; fourth, $3500; fifth, $3000; sixth, $2200; seventh, $1800; eighth, $1600; ninth, $1500; tenth, $1400. In addition, the famous speedway trophies have been revived and will be distributed as follows: To the driver leading at 200 miles, Remy grand brassard; 300 miles, Prest-O-Lite trophy; 400 miles, Wheeler-Schebler trophy. Special awards accompanying these as follows: Remy grand brassard, $50 a week for 50 consecutive weeks if car is equipped with Remy ignition; $1000 in

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gold with Wheeler-Schebler trophy if machine is equipped with a Schebler carburetor. The Bosch Magneto Company, Hartford Suspension Company, Findeisen & Kropf Manufacturing Company and Emil Grossman offer additional special prizes for place cars using Bosch ignition, Truffault-Hartford shock absorbers, Rayfield carburetors and Red Head spark plugs, respectively.

OVERLAND WINS SECRET RUN.

Mrs. Waxham's Waverley Takes Award in Electric Division of Same Event.

The first automobile contest of the season in New York City was a secret time run from Columbus Circle to New Rochelle, May 2. Out of 59 entrants 54 started, and all but one finished. The event was run in two sections, one for gasoline machines and the other for electrics.

The secret time schedule was fixed at 56:21 for the gasoline division and 1:20:17 for the electrics. J. T. Kelly in an Overland won in the former class, his time being 56:50. Second place went to W. Cullen with a De Dion-Bouton, and third to Stella Mayhew in a Regal. In the electric class, Mrs. A. E. Waxham in a Waverley completed the trip in 1:24:49.6, taking first prize, while the second award went to P. S. Rogers in another Waverley. Others who competed were as follows:

Gasoline—Edward Cordier, De Dion-Bouton; J. H. Stelling, De Dion-Bouton; M. W. Colwell, Herreshoff; George H. Robertson, Hudson; C. W. Renner, Pope-Hartford; C. H. Larson, Oldsmobile; E. C. J. McShane, Mercer; I. M. Uppercue, Cadillac; Louis R. Smith, Cadillac; W. W. Jones, Cadillac; W. C. Poertner, National; K. C. Pardee, Inter-State; J. C. Nichols, Keeton; S. S. Toback, Hudson; Arthur Ferguson, Fiat; W. L. Van de Welle, Stevens-Duryea; J. Westerfield, De Dion-Bouton; T. B. Shoemaker, Studebaker.

Electric—Louis J. Rencke, Baker; Mrs. G. Rencke, Baker; Miss Florence F. Finch, Detroit; Dr. Charles Schram, Detroit; Dr. G. E. Mauer, Detroit; T. J. Jones, Detroit; Dr. S. P. Goohoot, Detroit.

FIFTH GRAND PRIZE RACE.

Entry Blanks as Issued Indicate Event Will Cover 400.4 Miles.

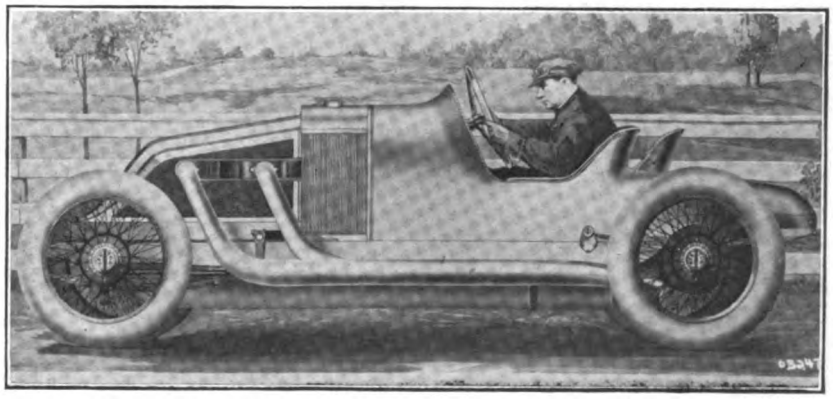
Entry blanks have been issued for the fifth race for the Grand Prize of the Automobile Club of America, which will be run under the auspices of the Savannah Automobile Club, at Savannah, Ga., Nov. 27. Besides the trophy, which is valued at $5000, there will be cash prizes as follows: First, $3500; second, $2000; third, $1000; fourth, $500. The length of the course is approximately 11.44 miles and must be covered 35 times, making a total of 400.4 miles.

No more than three cars of any one make are permitted to enter, and foreign entries should be made through the recognized automobile club of the country in which the car is manufactured. Entrance fees are as follows: One car, $1000; two, $1500; three, $1500.

CONTEST NEWS BRIEFS.

Two Cadillacs have been entered by Don Lee and S. A. McKee for the proposed road race from Los Angeles to San Francisco, to be held July 4.

Three entries have been received for the Montamara Festo races in Tacoma, Wash., in July. William Prince will drive a Cadillac, W. L. Alfred an Apperson and Joseph Dawson a National.



Robert Burman in Keeton Car Entered for 500-Mile Indianapolis Race.

The 200-mile race which is to be held under the auspices of the Columbus Automobile Club, Columbus, O., and originally scheduled for Sept. 1, has been advanced to July 4.

Among the entries for the Chicago-Boston non-stop run of the Chicago Automobile Club, scheduled for June 25-29, are the following: Packard, E. C. Patterson; Abbott-Detroit, A. M. Robbins; Abbott-Detroit, Abbott Motor Company; Staver, T. J. Hay; Staver, Staver Carriage Company; two Imperials, Imperial Automobile Company; Case, J. I. Case Threshing Machine Company.

Owing to the recent heavy floods in Ohio and Indiana, the three-day reliability run of the Ohio State Journal, Columbus, O., which was to have been held April 29-May 1, has been postponed until June 16-18. Because of the numerous bridges which were destroyed or damaged, the route also has been changed somewhat, and the tourists will now go from Columbus to Detroit, to Cleveland, to Akron, and back to Columbus.

As a result of his recent visit to the Pacific Coast, Chairman Schimpf of the contest board of the American Automobile Association reports an agreement with the Western Automobile Association. It is stated by President Frank A. Garbutt of the W. A. A. that his association has gained the point for which it was contending, which was an equal voice in the selection of the governing body officials, and that all drivers, mechanicians and officials operating under W. A. A. sanctions will be recognized by the A. A. A.

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IN THE REALM OF THE MOTORCYCLIST.

Miami Cycle & Manufacturing Company Secures Auxiliary Plant in Indianapolis---Denver Convention to Be Held the Last Week in July---Club News.

ANNOUNCEMENT is made by K. R. Jacoby, president and general manager of the Miami Cycle & Manufacturing Company, Middletown, O., maker of Flying Merkel motorcycles, that his concern has secured the Prest-O-Lite building at Indianapolis, Ind., for an auxiliary factory to the already large plant at Middletown. The information comes somewhat as a surprise, despite the rapid growth of the Miami company, which has been one of the notable features of the motorcycle industry. In January the company occupied its new concrete and steel building, the addition embracing 55,000 square feet of floor space, but this extra room was insufficient for its operations.



Indianapolis Auxiliary Plant Acquired by Miami Cycle & Manufacturing Company.

The building at Indianapolis has just been vacated by the Prest-O-Lite Company, which has acquired a new and larger plant near the speedway. The motorcycle concern will use it for the production of complete motors, two-speed gears and band brakes. These will be the only items manufactured at the Indianapolis plant and in order to take care of the work President Jacoby has let the contracts for $100,000 worth of new machinery. Such machinery as is now in the Middletown factory which is used for the building of motors will be transferred to the Indianapolis factory, while part of the new purchase will be used in both places. The Indiana plant will be in charge of C. S. Barkelew, who has been engaged as mechanical engineer, and 800 men will be employed there. It is planned to have the new factory in operation by Aug. 1, when the 1914 models of Merkel motorcycles will be ready for the market. The output of the company for 1914 will be 25,000 machines.

During July and August the company will work its factory night and day in order that complete machines can be on hand for immediate deliveries during next season. The motors made at Indianapolis will be shipped to Middletown, where they will be block tested, after which the assembled machines will be tested on a circular track to be built within the factory grounds. A roof over the track will insure no interruption of testing because of weather conditions. The advantages of an exclusive motor, two-speed hub and band brake factory at Indianapolis are apparent. Of particular benefit is the ability to secure the highest grade of skilled labor. The net result will be an even better grade of motors produced on a more economical basis.

Convention Dates Selected.

It is announced that the annual convention of the Cycle Parts & Accessories Association will be held at Atlantic City, N. J., Aug. 5-8. The programme has not been completed, but a competent committee is in charge. The convention of the F. A. M. will be held at Denver, Col., July 30-Aug. 1, which will make the conclusion of that meeting rather close to the other association's gathering.

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SO. BEND RESIDENT WANTS NAME OF YOUNG'S MACHINE

Saw the Article in Regard to the Wonderful Record Made by Fay Young's Motorcycle and Writes and Asks for Name of Machine.

Deputy Sheriff Fay Young in opening his mail this morning found a letter from a resident of South Bend, Ind., the writer stating he had seen an article in regard to the record of the motorcycle ridden by Mr. Young, it traveling 18,000 miles without having a thing done to the motor, and he asked that the deputy forward him the name of the fachine and the year it was built. Deputy Young rides a twin cylinder Merkle, seven horsepower machine.

IN HYDRO-AEROPLANE

"The World's Best Motorcycle"

"Wonderful Economy." "Fastest machine on two wheels." "Lowest cost of upkeep," and similar phrases do not stand for much unless backed up by actual performances.

Read any of the motorcycle advertisements being published today. Nine-tenths of them are about as enlightening as the hieroglyphics on an obelisk of Pharaoh's time. Each machine is the best, but you must take the manufacturer's word for it. There is nothing to back up the cheerful statements and glowing typographical phrases.

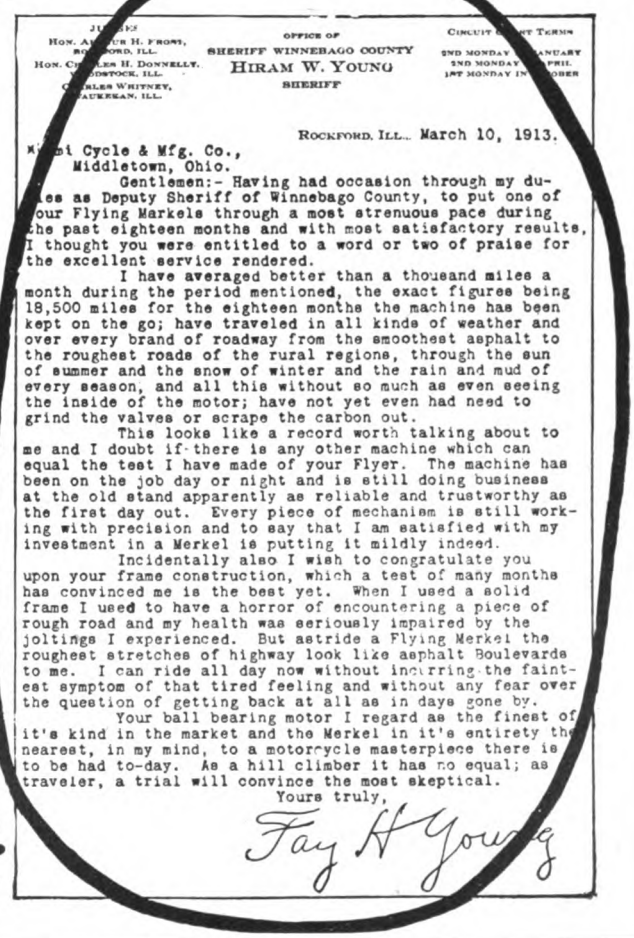
THE SELFSTARTING-TWO SPEED-SPRING FRAME
FLYING MERKEL
MOTORCYCLE

"Made its name on Merkel Mileage"

What the rider should have is facts—indisputable incidents to prove the merits of the motorcycle being talked about. Every statement made by the makers of the Flying Merkel is substantiated by real performance. Sheriff Fay Young's experience is merely the experience of all Flying Merkel riders.

Have you seen our new art catalog, which fully describes the Self-Starting Two-Speed Flying Merkel Models for 1913? It's free for the asking.

The Miami Cycle & Mfg. Co.
320 HANOVER STREET.
MIDDLETOWN, OHIO
MEMBER M.M.A.



JUDGES
Hon. Arthur H. Frost, Rockford, Ill.
Hon. Charles H. Donnelly, Woodstock, Ill.
Charles Whitney, Waukegan, Ill.

OFFICE OF
SHERIFF WINNEBAGO COUNTY
HIRAM W. YOUNG
SHERIFF

CIRCUIT COURT TERMS
2ND MONDAY IN JANUARY
2ND MONDAY IN APRIL
1ST MONDAY IN OCTOBER

ROCKFORD, ILL., March 10, 1913.

Miami Cycle & Mfg. Co.,
Middletown, Ohio.

Gentlemen:- Having had occasion through my duties as Deputy Sheriff of Winnebago County, to put one of your Flying Markels through a most strenuous pace during the past eighteen months and with most satisfactory results, I thought you were entitled to a word or two of praise for the excellent service rendered.

I have averaged better than a thousand miles a month during the period mentioned, the exact figures being 18,500 miles for the eighteen months the machine has been kept on the go; have traveled in all kinds of weather and over every brand of roadway from the smoothest asphalt to the roughest roads of the rural regions, through the sun of summer and the snow of winter and the rain and mud of every season, and all this without so much as even seeing the inside of the motor; have not yet even had need to grind the valves or scrape the carbon out.

This looks like a record worth talking about to me and I doubt if there is any other machine which can equal the test I have made of your Flyer. The machine has been on the job day or night and is still doing business at the old stand apparently as reliable and trustworthy as the first day out. Every piece of mechanism is still working with precision and to say that I am satisfied with my investment in a Merkel is putting it mildly indeed.

Incidentally also I wish to congratulate you upon your frame construction, which a test of many months has convinced me is the best yet. When I used a solid frame I used to have a horror of encountering a piece of rough road and my health was seriously impaired by the joltings I experienced. But astride a Flying Merkel the roughest stretches of highway look like asphalt Boulevards to me. I can ride all day now without incurring the faintest symptom of that tired feeling and without any fear over the question of getting back at all as in days gone by.

Your ball bearing motor I regard as the finest of it's kind in the market and the Merkel in it's entirety the nearest, in my mind, to a motorcycle masterpiece there is to be had to-day. As a hill climber it has no equal; as traveler, a trial will convince the most skeptical.

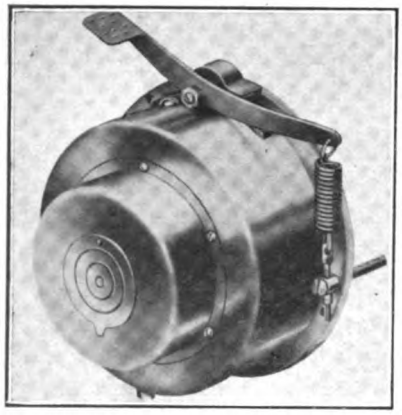
Yours truly,

Fay H Young

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Details of Merkel Starter.

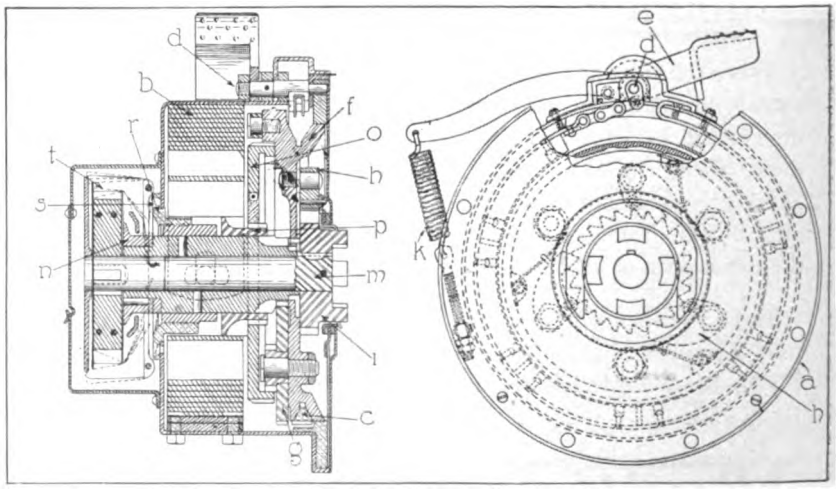
The Ever Ready starter employed on the Flying Merkel motorcycle is a mechanical device, nearly all of the mechanism of which is enclosed within a drawn steel shell a. It is designed to be attached in such position that its driving shaft is in direct alignment with the crankshaft of the engine, to which it is permanently secured by couplings. The power of the motor is stored in the main spring of the starter b, which is held in tension by the internal brake c, which consists of six V shaped segments riveted to a steel band. One end of the brake is fastened to the starter shell and the other to a short link chain that is secured to and which wraps around the chain stud d. The pedal lever e also is attached to this stud. The gear plate f, to which the reducing gears g and the starting dogs h are secured, acts as the drum to the V brake.



Ever Ready Flying Merkel Starter.

Pressure on the pedal expands the internal brake and releases the main spring, which in unwinding has a pressure greater than the compression of the engine, rotates the starting ratchet i and thereby turns over the engine crankshaft about eight complete revolutions, and at a speed of approximately 300 revolutions a minute, which is held to be sufficient to start any motorcycle motor on the magneto. When the pressure of the pedal is released the pull back tension spring k pulls the long end of the pedal lever e downward, wraps the link chain around the chain stud and brings the V shaped brake c down tightly in its seat and holds it down.

The running of the engine rotates the driving shaft m in the starter. The dogs in the clutch block, which is secured to the front end of the driving shaft, engage the bell crank shaped release dogs that are attached to the rewinding spider n, and thereby carry this spider around with the driving shaft. The teeth on the back end of the pinion arbor engage with and rotate the three gears g, which in turn rotate the internal gear o. This latter gear rotates the spring arbor p, to which the main spring is anchored, and the spring is thereby rewound to a tension that is regulated by the adjustment of the case nut r. As the spring arbor is being rotated the case nut screw s is gradually being forced forward until when the spring is rewound to the predetermined tension, this screw presses against the inner arms of the two release dogs t and forces the outer arms of these dogs away from the clutch dogs, when the rewinding mechanism immediately becomes idle and the driving shaft rotates freely with the engine crankshaft of which it is a part.



Sketches Showing Detailed Construction of Starter Used on Flying Merkel Machines.

Racing League's Plans.

The American League of Professional Racing Clubs will open its season about the middle of May and the decision announced is to offer an extra $500 purse, to be divided at the end of the season, among the three highest point winners in league races. Joseph Wolters, the Chicago rider, has decided to compete as a member of the Chicago team and he will probably be its captain. B. Carslake will be captain of Cleveland, Smiley of Cincinnati, Standen of St. Louis, while Gibson will probably head the Detroit team. At Luna motordrome, Cleveland, O., 60 riders are practising daily. Each rider is allowed 15 minutes each day on the track in order that all may have a chance to practise. Captain Carslake is in charge of the riders and as soon as they have had sufficient practise the teams to represent the various

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cities will be selected with an eye to balancing them as nearly equal as possible. It is probable that a second training camp will be established at St. Louis because of the large number of riders who desire trials.

Salt Lake City Tracks.

The Wandamere Motordrome, Salt Lake City, Utah, will be controlled this year by the Motor & Bicycle Tracks Company, Inc., and the contract calls for at least one race each week, weather permitting, from Memorial Day to Labor Day. Harry W. Heagren is the manager of the company and he has secured the Salt Palace track. Both tracks, between which there has been much rivalry, will be handled this year by the same interests.

Merkel on Foreign Tour.

J. F. Merkel, chief engineer of the Miami Cycle & Manufacturing Company, Middletown, O., maker of Merkel motorcycles, has sailed for Europe, where he will make a pleasure tour through England, Germany, France and Belgium. He will incidentally study conditions in the trade make some interesting comparisons with the situation in America.

Brown Becomes Sales Manager.

Fred L. Brown, for the past five years manager of the Pacific Coast branch of the Pierce Cycle Company, Buffalo, N. Y., maker of Pierce motorcycles, has been appointed sales manager of the company, with headquarters at the factory in Buffalo. He succeeds to the positon formerly held by F. L. Johnson.

Official F. A. M. News.

The following repair shops have registered with the Federation of American Motorcyclists:

Emerald's Repair Shop, Butte and Walnut streets, Willows, Cal.; G. P. Manchester, 109 West Fourth street, Pittsburg, Kan.; Anderson Bros. & Bultinck, 211 North Michigan street, South Bend, Ind.; Major's Motor Shop, 309 Band street, Asbury Park, N. J.; William N. Burnett, Killingly, Conn.; Raymond C. Dalley, Three Bridges, N. J.; Glendale Garage, Glendale, O.; Jay C. Ree, Jefferson, Wis.; C. H. Lang, 1704 Michigan avenue, Chicago; Kenny Motor Company, 918 Main street, Lafayette, Ind.; Hawkeye Cycle Works, 707 Jefferson street, Burlington, Ia.; W. J. Sweet, 74 West Chicago street, Coldwater, Mich.; Germantown Cycle Company, 32 Armat street, Philadelphia, Penn.; Cap's Motorcycle Garage, 1110 Broadway, Ft. Wayne, Ind.

Newly affiliated clubs listed by the F. A. M. are as follows:

Willows, 15 members; secretary, C. A. Emerald, Butte & Walnut street, Willows, Cal. Hazelwood, 16 members; secretary, Ray F. O'Brien, 39 Hazelwood avenue, Pittsburg, Penn. Greencastle, 12 members; secretary, Leslie Vandament, 415 Depot street, Greencastle, Ind. Coldwater, 23 members; secretary, F. Leslie Treat, 21 South Hudson street, Coldwater, Mich. Chicago Indian, 57 members; secretary, A. C. Hertzer, 1849 Clifton Park avenue, Chicago. Hornell, 17 members; secretary, E. S. Whitney, 34 Armory place, Hornell, N. Y.

Club Notes, Here and There.

The National Capitol Motorcycle Club and the Washington Motorcycle Club, Washington, D. C., have held runs to LaPlata, Md., 35 miles distant, where dinners were served and the outings generally enjoyed. Numerous sidecars participated in the runs.

The Philadelphia Motorcycle Club has moved into its new quarters at 1728 Cherry street, Philadelphia, Penn., and a formal opening will be held soon, with appropriate exercises.

New quarters, which include a club garage, have been occupied by the Lorain Motorcycle Club, Lorain, O. The officers for the present year are: President, Edward Clotz; vice president, John Meikle; secretary, Floyd Blackfoot; treasurer, Charles Good; captain, G. W. Williams; lieutenant, C. B. Tunte.

The Salina Motorcycle Club, Salina, Kan., will entertain the Kansas Short Grass tourists when they visit that city in August. A banquet will be given and it is likely that a series of races will be arranged.

Motorcycle riders of Beloit, Wis., are agitating an endurance run to be over a course including Beloit, Elkin and Lake Geneva. An effort was made to hold a similar run last year, but at that time there were not enough riders to make it a success.

The Toronto Motorcycle Club, Toronto, Can., is planning an active season and according to present plans four hill climbs and five endurance runs will be held. The latter will probably be two-day affairs.

The Indian motorcycle riders of Philadelphia have formed an information class and each Friday night meetings are held, when talks on technical subjects are given and discussions held.

The Union City Motorcycle Club, Union City, Ind., has arranged for five competition runs, the first of which was held May 4. The riders are checked at secret controls and the winner of the series will receive a diamond medal valued at $100. The runs will be held the first Sunday of each month.

The Suburban Motorcycle Club was recently formed by riders at LaGrange, Ill., and the following officers were elected: President, Harry Anderson; vice president, Frank Evans; secretary and treasurer, Harry Bielby; first lieutenant, Edward Bluder; second lieutenant, Roy Lantz; road captain, Edward Bestler; directors, Frank Byron, John Bestler.

1913 F. N. SHAFT-DRIVE MOTORCYCLES.

Lightweight Single, with Two-Speed Gear $275
Only Machine Built With Handle Bar Control of Clutch.
Four-Cylinder $300
With Handle Bar Control of Clutch $350
Two-Speed Gear, Extra $50
Equipment includes two brakes, footrests if desired, compound spring fork, combined luggage carrier and stand.

American F. N. Company, Boston, Mass.

Branch—415 Trumbull St., Hartford, Ct.

JOIN THE F. A. M.

which is the National Organization fostering the interests of motorcyclists along legislative and other lines. Cut this out, mail it, and you will get the reasons.

E. M. ESTABROOK
Chairman Membership Committee Federation
American Motorcyclists,
BANGOR, MAINE.

Please send me the F. A. M. Booklet and all information interesting to prospective members.

Name .....

Address .....

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NEWS OF MANUFACTURER AND DEALER.

The following concerns have been incorporated recently to manufacture and deal in automobiles, accessories, etc.:

Tottenville Garage Company, Tottenville, N. Y.; $500; I. A. Silver, Jr., G. W. Carfoot, E. L. Silvie.

St. Louis Motor Bus Company, St. Louis, Mo.; $2000; R. J. Kirkwood, J. A. Rector, W. R. Mayne.

Richmond Hill Garage & Machine Company, Richmond Hill, N. Y.; $8000; M. E. Tunon, C. H. Ryan, Jr., A. F. Ryan.

Nodens Auto Trucking Company, Brooklyn, N. Y.; $10,000; A. Noden, B. H. Noden, L. F. Senkel.

Chambray Carburetor Company, Detroit; $50,000; to manufacture carburetors and motor car accessories.

National Automobile School of Cincinnati, Cincinnati, O.; $50,000; G. A. Hawley, H. G. Williamson, W. A. Evans, C. R. McComas, J. D. McCracken.

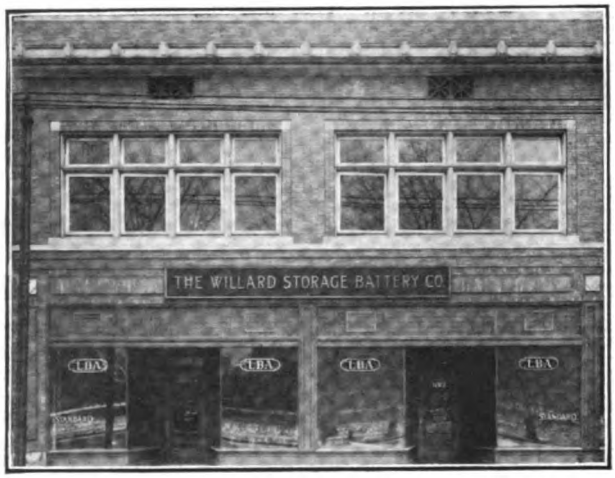
Worcester County Automobile Owners' Association, Leominster, Mass.; $5000; J. W. Healey, E. H. Divoll, H. A. Wood.

Auto Accessory Manufacturing Company, Holyoke, Mass.; $25,000; W. J. Shannon, E. A. Frary, E. N. Frary.

Vehicle Storm Apron Company, Hoboken, N. J.; $12,000; W. G. Lentz, D. Herr, A. Herr.

Platte Center Automobile Company, Platte Center, Neb.; $15,000; E. J. Macken and others.

Pressed Steel Motor Car Company, Cleveland, O.; $200,000; to manufacture parts and accessories; W. H. Milliken, F. M. Ossman, A. M. Heimberger, C. L. McConnell, L. C. Heimberger.



Willard Storage Battery Company's Detroit Branch.

Wagner Specialty Company, New York City; $5000; to deal in motor cars; A. F. Wagner, F. Walsh, M. Morris.

F. P. Motor Wagon Company, Pierre, S. D.; $250,000; L. L. Stephens, T. F. Graham, E. E. Slade, W. G. Price, R. J. Reynolds.

National Spark Plug Company, New York City; $10,000; R. L. Cherburg, C. B. Bennett, A. Boselman.

Auburn & Moravia Auto Bus Company, Moravia, N. Y.; $7000; E. C. Weaver, E. D. Parkhurst, F. W. Ackerman.

Mottlau Transmission Company, New York City; $250,000; to manufacture transmissions; A. J. Mottlau, Walter L. Post, T. F. Conrad.

Card Taxicab Company, Nashville, Tenn.; $1000; C. C. Card, G. Taylor, W. O. Taylor, C. W. Harle, C. S. Mayfield.

Still's Automobile & Accessories Company, New York City; $10,000; G. M. Still, G. Edwin Still, J. H. Still.

Carlough & Mallon, Newark, N. J.; $50,000; general motor car business; E. D. Carlough, F. V. Carlough, W. L. Mallon.

Elastic Tread Tire & Wheel Company, Cleveland, O.; $25,000; J. A. Murrey, R. E. Mollenkopf, F. J. Axel, P. Schneider, F. O. Joss, W. J. Young.

Schermerhorn Garage Company, New York City; $20,000; J. Ginsburgh, L. Rosett, P. A. Lee.

Cincinnati Alco Motor Car & Truck Company, Cincinnati, O.; $25,000; W. H. Peters, J. E. Kelding, G. S. Macduff, W. M. Macduff, H. W. Warren.

Imperial Auto Livery Company, Cincinnati, O.; $2000; S. F. Glassemeyer, W. Shullman, N. A. Michaelson, J. Lemkuhle, C. T. Ryan.

WITH THE MANUFACTURER.

The Weed Chain Tire Grip Company, maker of Weed chain tire grips and anti-skid devices, 28 Moore street, New York City, has located a plant on Logan street, Bridgeport, Conn.

The Motometer Company, Inc., New York City, has appointed W. D. Reeves of Franklin, Ky., the sole distributing agent of the company's radiator heat indicators, known as Motometers, for the entire state of Kentucky. Mr. Reeves will make his headquarters at Franklin.

The United States Tire Company has opened its new branch at Worcester, Mass., in the Graphic Arts building. L. C. Havener has been made manager.

E. W. Fowler, who was connected with the Stoddard Motor Company, New York City, previous to its suspension, has joined the Ward Leonard Electric Company, Bronxville, N. Y., maker of automobile starting and lighting equipment.

M. A. Magee, who for several years has been connected with the Motz Tire & Rubber Company, Akron, O., maker of Motz tires, has been appointed sales manager of the company, succeeding P. M. Pontius, who is specializing in the work of the electric pleasure car tire and is now in the position of manager of that department.

The Willard Storage Battery Company, Cleveland, O., maker of Elba storage batteries, has a number of branches located throughout the country, that at 1191-1193 Woodward avenue, Detroit, being shown in an accompanying illustration. This branch is in charge of Max G. Hillman, who is assisted by H. S. Gardner and E. F. Vincent, and like those at New York, Chicago and San Francisco, is prepared to charge batteries and do anything in the way of repairing. All the company's branches carry constantly in stock a large number of the most commonly used types of storage batteries and are in a positon to fill orders promptly.

J. R. Coleman, formerly connected with the E. R. Thomas Motor Company, Chalmers Motor Company, Hudson Motor Car Company and Packard Motor Car Company, has resigned as chief engineer and designer of the Atterbury Motor Car Company. Mr. Coleman is well known to the trade, having started with the Thomas company in 1904, when that concern was in its infancy. His most prominent previous connection was with the Hudson company as assistant chief engineer to C. H. Taylor. The distinct change of design in the Atterbury line of trucks is representative of his class of work.

J. C. Quimby, formerly connected with the Peerless Motor Car Company, Cleveland, O., maker of Peerless trucks and pleasure cars, and for a time manager of the Thomas factory used car department, has joined the sales force of the Packard Motor Car Company of Boston as assistant manager of the used car department.

Edward S. Babcox, formerly advertising manager of the Yawman & Erbe Manufacturing Company, Rochester, N. Y., maker of filing systems, is now advertising manager of the Firestone Tire & Rubber Company, Akron, O., maker of Firestone tires. J. S. Sleeper, former advertising manager of the Firestone company, is now general sales manager of the Colonial Printing Company, Cleveland, O.

The Wheeler-Schebler Carburetor Company, Indianapolis, Ind., maker of Schebler carburetors, has established a publicity department in connection with its advertising department. Joseph Kelly, a well known Indianapolis newspaperman, a specialist in automobile work, has been placed in charge.

The Cole Motor Car Company, Indianapolis, Ind., maker of Cole cars, has appointed the following agents: Miller Auto Company, Bay City, Mich.; B. A. Quinlan, Bennington, Vt.; Virginia City Motor Company, Danville, Va.; B. L. Taylor, Denton, Tex.; Dr. J. A. Niles, Great Falls, Mont.; S. C. Weaver, Lewistown, Mont.; C. J. Mur-

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ray and F. D. Daniels, Mason City, Ia.; Lane Manufacturing Company, Montpelier, Vt.; C. M. Crim & Son, Salem, Ind.; A. H. Tuttle, Sheffield, Mass.; J. M. Hudgens, Stamps, Ark.

W. E. Jackson has been appointed by the Henderson Motor Car Company, Indianapolis, Ind., maker of Henderson cars, as territory manager for southern Illinois, with headquarters in Indianapolis. Mr. Jackson is well known in his territory, having covered it since August, 1912, for the American & Marion Sales Company of Indianapolis.

The Walpole Tire & Rubber Company, with sales offices at 757 Boylston street, Boston, Mass., has three well equipped factories located in Walpole and Foxboro, Mass., and Granby, Que. A general view of the main plant is shown herewith, and it may be stated that the others are quite as modern in every particular, being fitted to produce tires and tubes to meet the requirements of motorists and to have a standard for quality and service which is unsurpassed.

GARAGE AND DEALER.

The Kolb Sales Company, with offices in the United States Rubber building, Fifty-eighth street and Broadway, New York City, has recently been organized to represent the interests of different automobile accessory and specialty manufacturers in the eastern territory. Milton B. Kolb, who has been identified with various branches of the motor car industry in the past 10 years, is at the head of the new organization.

The James Bailey Company, Portland, Me., has been appointed state distributor of the well known Invader lubricants, made by the Invader Oil Company, New York City. The company expects to greatly enlarge its oil sales by handling this brand of lubricants.

The G. R. Cowie Company, Inc., Washington, D. C., distributor of Cole cars, made by the Cole Motor Car Company, Indianapolis, Ind., has taken over the G. R. Cowie Company, and the following officers have been elected: President, G. R. Cowie; vice president, L. Bert Nye; treasurer, E. S. Wolt; secretary, W. H. Bennett. The new concern also acquires the Standard garage, 2121 Fourteenth street, to which improvements will be made.

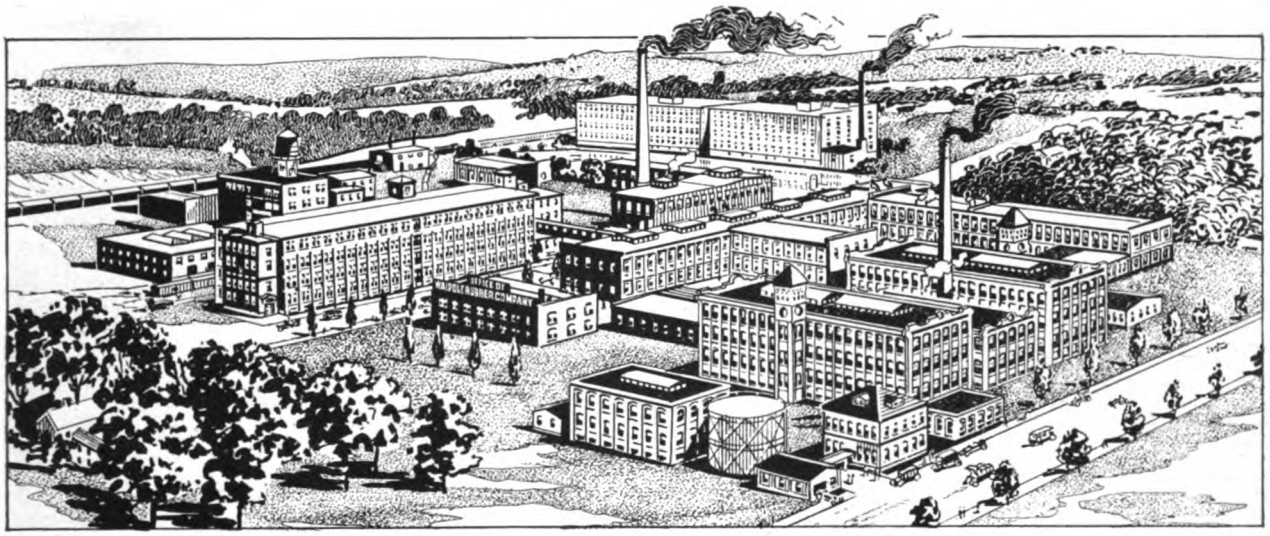
The Case Motor Sales Company, St. Joseph, Mo., was recently formed and is located in the garage formerly occupied by the Klos Motor Car Company at Second and Faron streets. G. R. Livergood is manager of the concern and J. C. Gifford is secretary and treasurer.

The Merwin Gasoline Company, Pittsburg, Penn., which was recently granted a state charter, has awarded the contract for the building of its new home in Grant boulevard, near Thirty-third street. The building will cost $3500. A large plot of ground was purchased and the unused portion will be held to await further development.

Harry J. Twitchell, who in 1911 and 1912 represented the Cole Motor Car Company, Indianapolis, Ind., maker of Cole machines at Portland, Ore., and who helped form the Christofferson Aviation Company at San Francisco, Cal., has returned to the industry. He has joined partnership with E. B. Snyder at Spokane, Wash., and they will operate under the name of Cole-Spokane Company.

E. Louis Kuhns, who for the past 18 months has been manager of the Studebaker interests in New York and New England, has retired from active service, although he will remain as a director of the Studebaker Corporation, Detroit, maker of pleasure cars and trucks. Mr. Kuhns went to New York from Chicago, where he had charge of the corporation's interests for four years. Altogether he has been 20 years in the service of the concern. He will reside in Chicago. R. T. Hodgkins is now in charge of the horse vehicle business for the Studebaker in New York City, and George H. Phelps is in charge of the automobile division.

Louis Jandorf, dealer in second hand cars, has taken a lease of the United States Motor Company building on Sixty-first street, near Central Park West, New York City, and will combine his various establishments under one roof. The building has seven stories, each floor being 200 by 75 feet. It is understood that the annual rental is about $40,000. This deal, coupled with the fact that the Times Square Automobile Company not long ago took over and remodelled the Wyckoff, Church & Partridge building at Fifty-sixth street and Broadway, is significant of the importance of the second hand automobile business. Jansdorf's former place has been taken by the Cadillac company, which will have its salesroom diagonally across the street on the Broadway corner. The factory at Fifty-eighth street and Eleventh avenue has been taken by the United States Rubber Company.



General View of the Main Plant of the Walpole Tire & Rubber Company, Where Walpole Tires Are Produced.

C. W. Robinson has completed extensive alterations to his Cole service station and electric garage at Peoria, Ill., making it one of the most modern automobile homes in the state outside of Chicago.

The W. D. Sweet Motor Car Company, Binghamton, N. Y., has purchased the business of W. A. Crandall Company, 233 Water street, and will make that city its distributing point for Speedwell cars in Pennsylvania and New York.

George M. Bullock, Great Barrington, Mass., has sold his garage business to Elton S. Jones.

Batdorf & Stampfle, Paterson and Detroiter agent, Columbus, O., has dissolved. W. H. Batdorf will continue as the Paterson agent and has joined with Frank P. Corbett, state distributor for Detroiter machines.

F. W. Trowbridge, Thomaston, Me., has purchased the Stackpole buildings on Green street, which he will convert into a garage to conduct in connection with his hotel, the Knox house.

J. W. Tyler and Walter Fisk, Harvard, Ill., have purchased the business of the Economy Garage Company. Numerous improvements will be made.

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RECENT PATENTS.

Hub for Detachable Wheels, Pierre Lapertot and Antoine Fayard, St. Etienne, France, No. 1,057,561. In a hub for detachable wheels the combination of an inner hub member having a part conical surface at its inner end, an outer hub member engaging on said inner hub member and having a part conical surface coacting with said conical surface of the inner hub member, an annular conical wedging member comprising segments adapted to be engaged between the inner and outer hub members at the outer ends thereof, a screw plug adapted to be screwed into said inner hub member to force the said wedge member between the inner and outer hubs, tongues on the sections of said wedge member engaging in a groove of the plug, a spring connecting said sections and means for preventing accidental loosening of the parts.

Tire, Elbert Charles Rhodes, Chicago, No. 1,057,580. A tire comprising a sheath, a plurality of inflatable compartments permanently connected at their ends and arranged therein, an air tube communicating with all of the compartments, an inflating valve carried by the tube, and means for cutting off communication between the tube and any one or more of the compartments.

Gas Engine Cylinder, Thomas W. Keene, Swissvale, Penn., No. 1,057,741. A sectional gas engine cylinder comprising end sections, a segmental filling ring between the adjoining ends of the cylinder sections and bushings in the cylinder sections, the outer surfaces of said bushings tapering and the bushings being inserted in the cylinder from the adjoining ends of the cylinder sections and engaging the ends of the filling ring to prevent movement of the bushings in the cylinder.

Vehicle Steering Mechanism, Samuel H. Kennedy, Tunnel Hill, Ga., No. 1,058,758. It comprises an actuating member fulcrumed upon the vehicle axle, guide members pivotally mounted in said actuating member, bars connected at their ends to the wheel spindles, the inner ends of said bars being provided with longitudinal slots to receive the pivoted guide members, and coil springs arranged in slots upon opposite sides of the guide members to yieldingly prevent movement of said bars independently of the actuating member.

Shock Absorber, Samuel H. Yancey, South Bend, Ind., No. 1,058,834. The combination with the truck and body of a vehicle and a vehicle spring interposed between said truck and body, of a shock absorber disposed centrally of the spring and including a spring arranged on a normal centre and adapted to be carried to one side or the other of said centre by the first spring and acting with said first spring in the initial movement thereof and against same on the rebound.

Headlight Steering Mechanism, Frederick H. Young, Wilmington, and George N. Cameron, Marshalltown, Del., No. 1,058,835. The combination with a spring supporting side frame bar, front axle and steering wheel of a vehicle, of a vertically disposed extensible connecting element supported for a partially revoluble movement by said frame bar and front axle, respectively, whereby when the spring yields, said element may be shortened correspondingly, said element being provided with upper and lower crank arms, a headlight mounted for a turning movement, and pivotal connections between the said crank arms and said steering wheel.

License Tag Holder, Daniel R. McCauley, Washington, D. C., No. 1,058,882. A license tag holder, comprising two gripping members arranged to grip the upper and lower edges of a plate or tag, and having tag-engaging lips, a spiral spring connecting said members, each member being provided with a vertical extension, the extensions formed to provide a smooth backing for the spring, said springs and extensions forming a backing for the face of the tag, opposed to that engaged by the lips of the gripping members.

Internal Combustion Engine, John Loftus, Albany, N. Y., No. 1,058,992. In an internal combustion engine, a power cylinder provided with a valved cylindrical abutment extending therein and forming an annular combustion chamber, and a trunk piston shell forming a compression chamber in front of said cylindrical abutment and provide with charge transfer members adapted to co-operate with said valved cylindrical abutment and open and close communication between said combustion and compression chambers.

Speedometer Driving Pinion Support, Augustus W. Wessoleck, New Britain, Conn., assignor to the American Hardware Corporation of the same city, No. 1,058,930. A speedometer driving pinion support for use in connection with yieldingly mounted wheels comprising a rigid fork, a wheel yieldingly mounted thereon to move up and down relatively thereto, an axle for said wheel, a plate rigidly carried by said axle, said plate having a concentric slot, a driving gear carried by the wheel concentrically, a driving pinion with a goose neck arm having a bearing at one end freely movable in the slot of said plate, with means at the other end for supporting the pinion, and guide means for said pinion arranged to be carried by said rigid fork.

COMING EVENTS.

May.

May 14-15—Scenic tour, West Hudson and Catskills, N. Y.
May 26-June 13—American visit, British engineers.
May 30—500-mile race, Indianapolis, Ind.
May 30—Inter-Club run, Chicago, Ill.

June.

June 16-18—Reliability run, Columbus, O.
June 19—Algonquin hill climb, Chicago, Ill.
June 25-28—Non-stop day and night run, Chicago-Boston.

July.

July 1—Manufacturers' tour, Indianapolis-San Francisco.
July 4—Track meet, Taylor, Tex.
July 4—200-mile race, Columbus, O.
July 4-5—Track meet, Sioux City, Ia.
July 11-19—A. A. A. tour, Minneapolis-Glacier Park.
July 4-6—Road race, Tacoma, Wash.
July 27-28—Road races, Tacoma, Wash.

August.

Aug. 29—Chicago Trophy race, Elgin, Ill.
Aug. 30—Elgin Trophy race, Elgin, Ill.
Aug. 30-Sept. 6—Reliability tour, Chicago, Ill.

September.

Sept. 1—Fire chiefs' convention, Madison Square Garden, New York.

November.

Nov. 24—Vanderbilt Cup race, Savannah, Ga.
Nov. 26—Grand Prize race, Savannah, Ga.

FOREIGN.

May.

May 1-31—Show, Barcelona, Spain.
May 7-21—Show, St. Petersburg, Russia.
May 8-12—De la Sarthe race meet, Le Mans, France.
May 11-12—Targa Florio race, Sicily.

June.

June 4- 6—Tourist Trophy race, Isle of Man, England.
June 10-16—Alpine trials, Vienna, Austria.
June 23-28—International road congress, London, England.

July.

July 1-16—Plowing competition, Winnipeg, Manitoba.
July 12—Grand Prix race, Amiens, France.
July 19-20—Grand Prix race, Belgium.

August.

August 10—Hill climb, Mount Ventoux, France.
August 15—Hill climb, Tonale, Italy.

September.

September 28—Hill climb, Mont Verdun, France.

NEW BOOKS RECEIVED.

Good Roads Year Book—Published by the American Highway Association, Colorado building, Washington, D. C.; from the Waverley Press, Williams & Wilkins Company, Baltimore,; edited by J. E. Pennybacker, Jr. An interesting compilation, containing the history of road building and reports of work accomplished and contemplated in the various states. The subject is treated exhaustively and the reports are authoritative. Comprises 548 pages. Price, $1.

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MERCER WINS TWICE.

Takes Challenge Trophy in Ten-Mile Event Over New Bakersfield Speedway.

At the opening meet on the new Bakersfield speedway in Bakersfield, Cal., April 27, a 300-cubic inch Mercer raceabout, made by the Mercer Automobile Company, Trenton, N. J., won the principal race of the day, a 450-cubic inch event for the $1000 challenge trophy, covering the 10 miles from a standing start in 10:10. Following this race the same car started in a 300-inch five-mile event, winning easily in 5:04.

The second day of the meet the same little car was pitted against others of larger horsepower in a handicap event and was defeated only by a wheel length by Barney Oldfield's record breaking front drive Christie machine.

NEXT YEAR'S BOSTON SHOW.

Commercial Vehicle Dealers Decide to Hold Another Truck Display.

At a meeting of the Boston Commercial Motor Vehicle Association in Boston, May 1, the matter of holding a truck show for 1914 was fully discussed. It was the almost unanimous opinion of those present, and the expression of several who were unable to attend was equally as emphatic, that the plan which has been in vogue for the past two years should be continued.

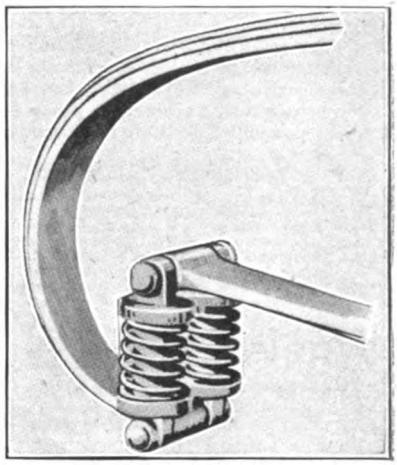
The pleasure car show has been scheduled for March 7-14, and it is proposed to hold the truck display March 17-21. Already the clerks in the office of General Manager Chester I. Campbell are busily engaged in the work of preparation, and Mr. Campbell predicts the most successful expositon of the business vehicle industry.

SUMNER ENLARGES LINE.

Acquires Patents and Rights for Prominent Foreign Accessories, Including Diva Headlight.

George Sumner, president of George Sumner, Inc., New York City, has returned from a visit to Europe, where he secured some valuable patents and manufacturing rights on automobile accessories that have become standard abroad. One of the most prominent is the Diva headlight, which although fitted with an eight candlepower bulb will throw illuminating rays for 600 yards ahead of the driver, as well as show clearly both sides of the road. It resembles somewhat a diver's headlight, and one of its several features is that glaring effects are eliminated; that is, occupants of approaching vehicles or pedestrians are not blinded by the rays, being able to see the road on either side of the machine. The upward, rising rays are also eliminated, making operation in fogs possible and with a maximum amount of light. The construction of the Diva is such that every ray is collected and utilized before leaving the headlight and the light may be said to be five powerful searchlights in one.

The company has also secured the patents and the rights to manufacture the Acme shock absorber, which is in the form of spring shackle, being substituted for the latter. It consists of two sliding, interlocking parts, both of which are alike and these are held in position by a coil spring, as will be noted by the accompanying illustration. When substituted for the regular shackle it connects the rear ends of the leaf springs, absorbing vibration and relieving the vehicle of all road shocks. The device is very compact and simple, easily fitted, and is very moderately priced.



Acme Shock Absorber.

George Sumner, Inc., is also selling agent for the celebrated English carburetor, the S. U., which is described and illustrated elsewhere in this issue. The concern is now located at 1926 Broadway, New York City, and a full line of machinery has been installed, adequate in every way to meet the requirements of fitting carburetors, Diva headlights, Acme shock absorbers and other products of the company.

Mr. Sumner has also identified himself with the Brooklyn Water Heater Company, and will represent its interests in Manhattan, the Bronx, Westchester and Staten Island. He is also agent for Hopewell Bros., Newton, Mass., in New York City, and will cover the states of New York, New Jersey and eastern Pennsylvania. Hopewell Bros. is maker of the well known Hopewell tire cases, etc. These latter two lines will be conducted at 1974 Broadway.

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"There's Where YOU Are Wise!

That Other Fellow is a Menace to Everyone's Safety"

Nine-tenths of all automobile accidents are caused by skidding and by foolish dependence on rubber alone. In these days of crowded streets and congested traffic, the motorist who does not take precaution to guard against every possibility of disaster is *next to criminal.*

"The ever-present danger that is quite as much of a terror to the experienced driver as it is to the novice is **skidding.** There is nothing that makes a man lose his nerve so thoroughly or dread a repetition of the experience so keenly as a bad skid that ends in a broken wheel against a curb, or that makes matters far worse by 'sideswiping' a moving trolley car. To feel the car start to slide from under you, aiming directly at the nearest obstruction, despite all manipulations of the wheel and brakes---well, once is too often."

Weed Anti-Skid Chains

VS.

Slipshod Traffic

Traffic policemen, by the hundreds, interviewed in all the large cities throughout the country, express the unanimous opinion that their work would be greatly reduced; that nearly all **skidding accidents would be eliminated** if motorists would take the precaution of always carrying WEED CHAINS, and putting them on when the roads and pavements are wet, slippery and uncertain, or covered with snow.

Some of these **guardians of public safety** go so far as to say that the time is not far off when State Legislatures will make **the use of WEED CHAINS compulsory,** for the protection of life and property.

Make Safety Yours

Take no chances. Fully equip your own car with WEED CHAINS and **insist,** for your own protection, that other drivers do the same.

On the Rear Tires

they afford perfect traction and adequate brake control.

On the Front Tires

they act as ladders to enable the front wheels to easily climb out of mud-ruts, car tracks and all uneven places in pavements or roads, always insuring absolute steering control, eliminating all chance of the front wheel skid.

If you haven't a set of **WEED CHAINS,** or if you have a pair for the rear tires only, **get a full equipment now.** Delay is dangerous. Stop at your dealers today and **WEED CHAIN** your car to safety.

For Sale by all Reputable Dealers

THE NAME WEED ON EVERY HOOK

WEED CHAIN TIRE GRIP CO.

28 Moore Street New York

APPOINTS FOREIGN DELEGATES.

American Automobile Association to Be Represented at Conventions in Holland and England.

The American Automobile Association will be represented in the two important international gatherings the coming summer. The first of these is the Ligue Internationale des Associations Touristes congress at Amsterdam, Holland, June 18-21, where the association's delegate will be Bernard Van H. Schultz of New Jersey, who is making a 5000-mile tour of Europe. Mr. Schultz has been a most extensive European motor traveller and in the course of his several tours abroad has traversed practically all of the important mountain passes.

For the international road congress, to take place at London, England, June 23-28, of which the A. A. A. is also a member, James H. Cook of Alabama has been appointed. This assemblage of roads enthusiasts of the world will be a most important affair, and it is not unlikely that the A. A. A. will have several delegates in addition to the one already selected. Mr. Schultz may arrange to join Mr. Cook, who, in company with Maj. W. W. Crosby of Maryland, will precede his visit to London by an automobile tour of the continent.

Men who follow the fortunes of the rubber trade estimate that the automobile tire industry alone today consumes as much rubber as was the world's total supply of crude rubber 15 years ago. Furthermore, a liberal 40 per cent. of the crude rubber product of the present goes into tires and motor car accessories. Statisticians figure the 1913 crop at approximately 108,000 tons, of which nearly 45,000 tons will be consumed in factories identified with the automobile industry..

TRADE MARK Raybestos REG. U.S. PAT. OFF.

"THE ORIGINAL AND BEST ASBESTOS BRAKE LINING",

THE ROYAL EQUIPMENT CO., BRIDGEPORT, CONN.

YOUR NEW CAR should be equipped with

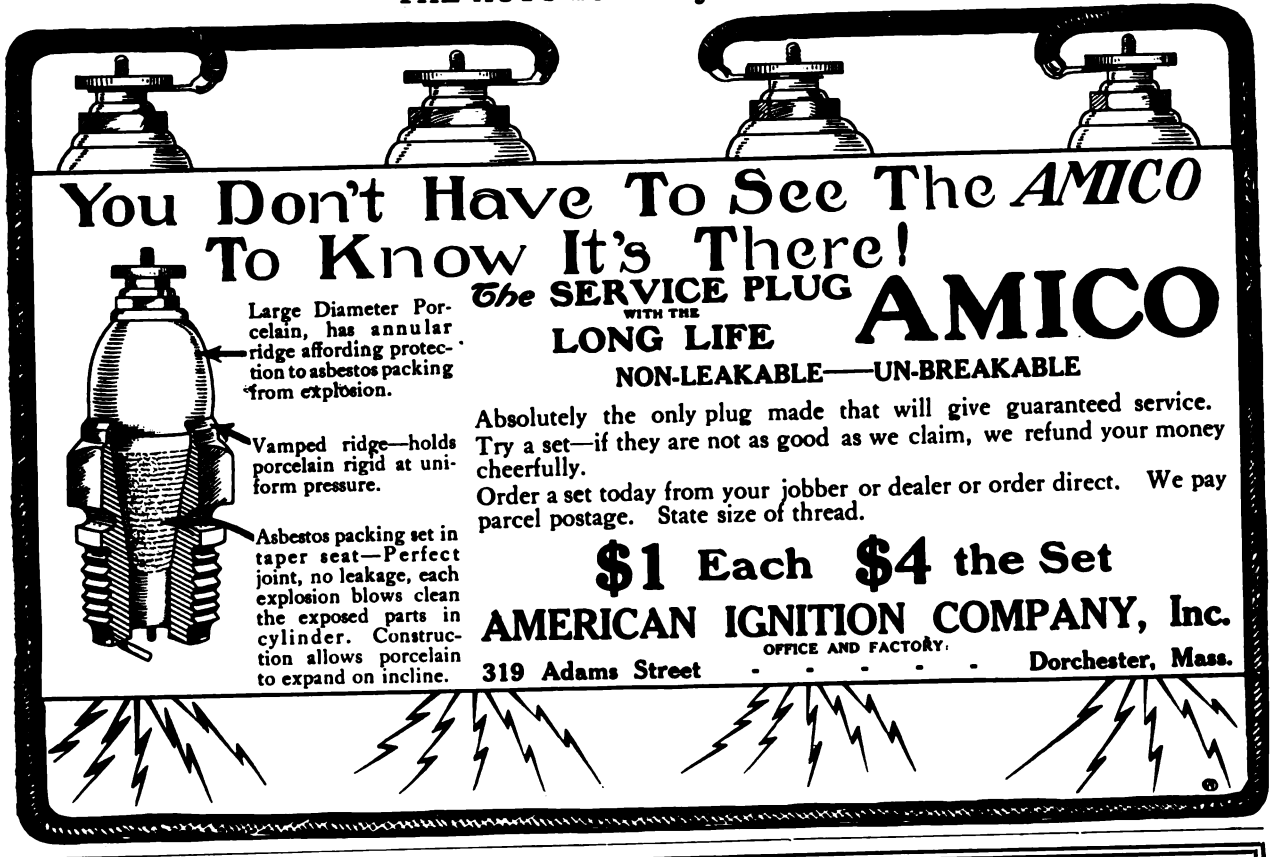
The Aplco Electric Lighting System

And Electric Engine Starter

Insist upon having Aplco and no other.

THE APPLE ELECTRIC CO. 74 Canal St., Dayton, Ohio

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You Don't Have To See The *AMICO* To Know It's There!

Large Diameter Porcelain, has annular ridge affording protection to asbestos packing from explosion.

Vamped ridge—holds porcelain rigid at uniform pressure.

Asbestos packing set in taper seat—Perfect joint, no leakage, each explosion blows clean the exposed parts in cylinder. Construction allows porcelain to expand on incline.

The SERVICE PLUG WITH THE LONG LIFE **AMICO**

NON-LEAKABLE——UN-BREAKABLE

Absolutely the only plug made that will give guaranteed service. Try a set—if they are not as good as we claim, we refund your money cheerfully.

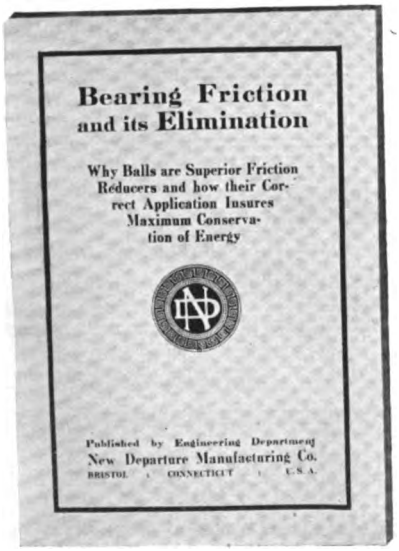
Order a set today from your jobber or dealer or order direct. We pay parcel postage. State size of thread.

$1 Each $4 the Set

AMERICAN IGNITION COMPANY, Inc.

OFFICE AND FACTORY:

319 Adams Street - - - - - - Dorchester, Mass.



Can We Send You a Copy of this Booklet?

OUR ENGINEERING DEPARTMENT has published the first of a series of booklets discussing the lastest developments in the solving of bearing problems.

¶ This first brochure is entitled "Bearing Friction and Its Elimination," and aims to show why balls are superior friction reducers and how their correct application secures maximum conservation of energy.

¶ The types of bearings particularly discussed and compared in this writing are the ball and roller bearings, as applied to all bearing points in the motor car.

¶ It discusses and explains the growing tendency among engineers and manufacturers to favor the ball type of bearing, as evidenced by the summarization figures published by the "Horseless Age" in a review of 1913 pleasure car models. These figures show that ball bearings are used in the differential of 53% of the pleasure cars for 1913, as against 37 1-2% of the 1912 models; in the transmission of 75%, as against 64%; and in the rear wheel of 52%, as against 42%.

¶ This brochure will interest you. Copy will be mailed you promptly on request.

THE NEW DEPARTURE MFG. CO. **Bristol, Conn.**

WESTERN BRANCH: 1016-17 FORD BUILDING, DETROIT

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The only oil ever made especially and exclusively for the lubrication of automobile transmission gears.

I-O-C GEAR OIL

"Puts Noisy Gears to Sleep"

¶ It works where the whole power of the engine is concentrated—in the transmission gears.

¶ It works better than—
ANY Grease
ANY Dope
ANY Compound—or
ANY form of Gear Lubricant ever put on the market.

Write for Prices and Descriptive Matter

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Lessees of CHARLES F KELLOM & CO.
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WASHINGTON PHILADELPHIA
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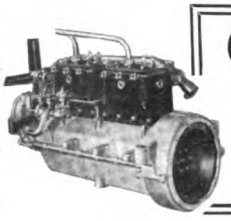
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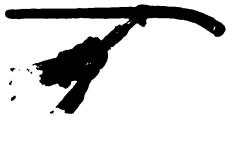


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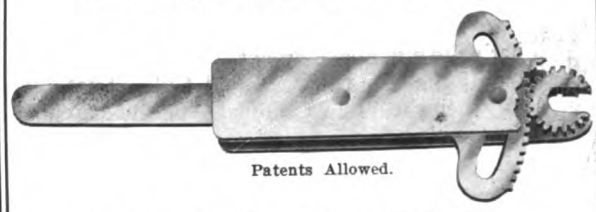
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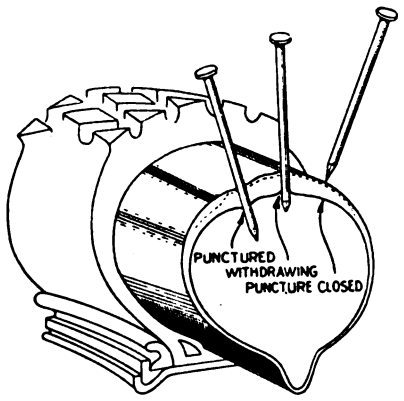
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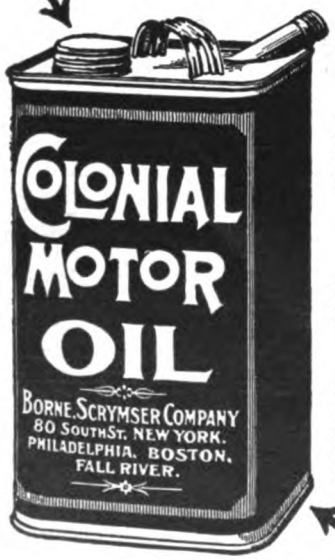
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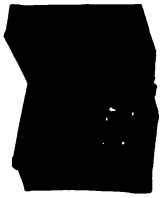
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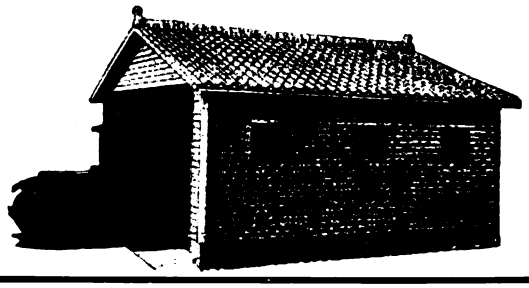
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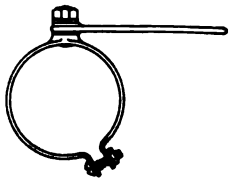


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Could Talk We Would Not Have to Advertise

The M&M is GUARANTEED to save from 40 to 50% of gasoline, and increase the SPEED and POWER 20% with less gasoline, and less carbon. With the throttle set at 12 miles per hour, by opening the M&M, your mileage will be increased to 18 or 20 miles, with the SAME AMOUNT OF GASOLINE, and less carbon.



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The M&M requires a ¾" pipe tap to insert into manifold, but same can be reduced to ½" if necessary. The Motorcycle size is ¼". The M&M is made with one ground valve and six portholes, which when open, admit auxiliary air into the manifold, giving you that uniform mixture, which is POSITIVELY NECESSARY in order to obtain SPEED AND POWER.

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Boston, Mass., No. 434 Harrison Ave., April 22, 1913.

Moller Bros., Philadelphia, Penn.

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(Signed) FRANK K. LAUE.

WE GUARANTEE THE M&M ECONOMIZER TO DO JUST WHAT WE CLAIM, or money will be refunded in 30 days. Reference—Citizens National Bank, Lewistown, Penn. No dealer or jobber is authorized to sell without our guarantee.

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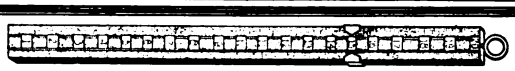
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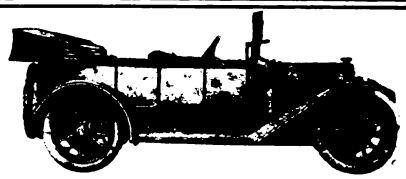


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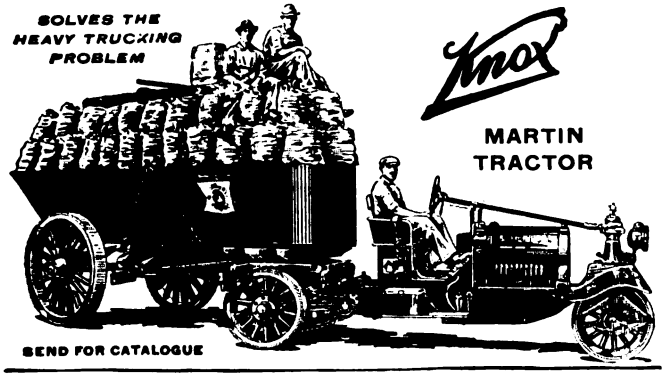
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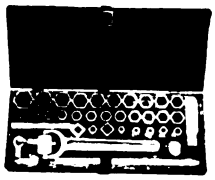
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The same chassis is used for both models.

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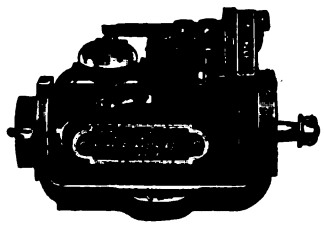
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The Completely Equipped Empire five-passenger touring car $950—

Equipment includes Mohair Top and Top Envelope, Demountable Rims, Tire Irons, Extra Rim, Accelerator, Windshield, Prest-O-Lite Tank, Horn and Speedometer.

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20 Miles to Gallon

Lawrence, Mass., July 13, 1912.
Gentlemen:—Enclosed find check for carburetor. I feel perfectly satisfied. It does 20 miles and over on a gallon. Can recommend it to anyone. G. A. Schmidt.

19 to Gallon on Cadillac

Planhard Co.—Edgewater, N. J., May 21, 1912.
I am very much pleased with my new Planhard Carburetor. I made a test of gasoline consumption from Edgewater to Hyde Park, N. Y., and return, and got a fraction over nineteen miles to the gallon. This is on my Cadillac.
John H. Hinners.

More Speed—Start Cold

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Dear Sirs:—I put a Planhard on my single cylinder 6-8 h. p. Goshen engine. It gives 50 R. P. M. more than the ——— I took off. With the Planhard I can start cold or hot without priming, which few others can do. Yours truly, E. A. Scriven.

3¾ More Miles

When Planhard Carburetors were put on the 6 cylinder, 4 cycle Frisbie motor of the fast boat Delphi II, she increased 280 R. P. M., and 3¾ more miles per hour.

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"Fifty miles without a miss."—Geo. E. Grosvenor, Crescent, Mich.
"To use the vernacular, 'some carburetor.' "—W. R. Fleming, 3311 Broadway, N. Y.

If you own a FORD!

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Gentlemen:—The Planhard Carburetor for my model S Ford Car is very satisfactory. I never bought anything for my car I paid so cheerfully for, as I have a smoother running engine with more power and get *more mileage per gallon* and my engine runs much cooler. H. W. Grandon.

Gallon Less Per Hour!

on semi-speed boat

HARTFORD III

owned by A. N. Smith, Portland, Maine, who gets better control.

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had a Planhard on her Loew-Victor on her famous trip to Nova Scotia.

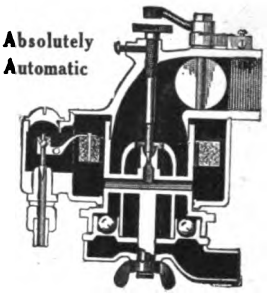
Valient II and Alfred S

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Emerson III

made a mile in 1 minute 8 seconds over the Washington government course with Planhards.

"Has them all beaten to a frazzle."—A. G. Linden, Cleveland, Ohio.



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Get your profits

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Engine .....Carburetor....Size....in.
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Hotel Lenox is modern, fire-proof and beautifully located. It is popular with tourists because of its fair rates, courteous treatment and complete equipment. The cuisine and service are the best obtainable.

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"COMMON SENSE" is, after all, the main feature of SPLITDORF PLUGS and it is only in the exercise of ordinary intelligence that the merits of SPLITDORF PLUGS are immediately apparent.

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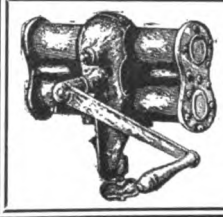
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Four cylinder, water cooled, 30 H. P. Four forward speeds. 112 in. wheelbase. Left hand drive, centre control. Starts from seat. Pointed hood, beautiful lines and finish. Equipment unsurpassed at the price.

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HAWTHORNE FOUR CYLINDER PUMP

HAWTHORNE MFG. CO., Inc.,
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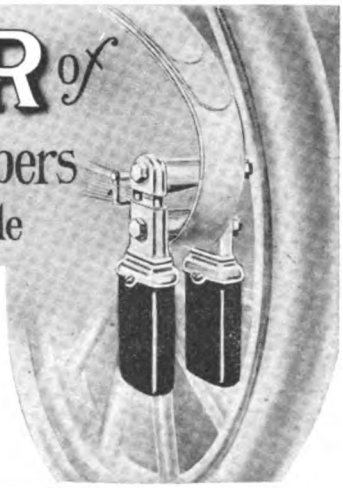
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INFRINGEMENT SUIT

We have begun suit against the J. M. Shock Absorber Company of Philadelphia, Pa., for infringement of our patent No. 988,229, granted March 28, 1911. We will prosecute all other infringers of our patents.

PIONEER of All Spring Shock Absorbers Operating on this Principle



The Blackledge Shock Absorbing Spring was first brought out in 1909.

This idea of making the spring yield at the shackle (or point of connection of the two halves of the main spring) has grown so in popularity that this principle has been copied the world over, so that today probably two-thirds of the cars in Europe are using the Blackledge Principle or an imitation.

However, for genuine merit, easy riding qualities, simplicity and durability, the imitators have never been able to equal the Blackledge, the pioneer in its class.

Insist on having your new car equipped with

We Own the Basic Patent

BLACKLEDGE SHOCK ABSORBING VELVET SPRINGS

Elegant Compact and Strong

JOHN W. BLACKLEDGE MFG. CO.
2112 Michigan Ave., Chicago, Ill.

Desirable Sales Territory Still Open—Live Representatives Wanted
Distributors in all American and European cities.

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FOR DEALERS WHO KNOW

HARRIS GASOLINE GAUGES
WOLF GASOLINE MIXERS

The Specialties with the
LITTLE PRICE
AND
BIG PROFITS

Write To-Day For Yours.

Approved Auto Specialties Co.
DEPT. D.
1731-37 Broadway
NEW YORK



Pyrene MARK
FIRE EXTINGUISHER

FOR AUTOMOBILE FIRES

Pyrene will not damage your engine, car or upholstery and is the only effective extinguisher of gasolene fires.

Pyrene is a combination of powerful gases in liquid form. As it touches the fire, Pyrene liquid is converted into a dense white gas blanket which surrounds the fire and smothers it instantly.

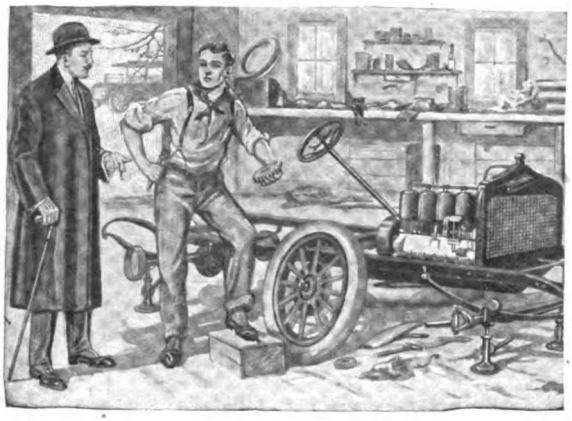
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176 Federal Street **BOSTON, MASS.**

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No one knows better than the mechanic in the repair shop that POOR LUBRICATION is the cause of worn out bearings and gears, and though NEEDED REPAIRS are the basis of part of the repair man's business, *preaching*, *practicing* or *providing* poor lubrication is the last thing he would think of doing.

His prosperity is built upon honest service, upon honest advice and honest workmanship. He gets more thanks, more good will and more business for his help in *minimizing* repairs than he does for his skill in *making* repairs.

The repair man who points out lubricating mistakes and advises the use of

TRADE MARK REGISTERED IN
NON-FLUID OIL
UNITED STATES PATENT OFFICE

for bearings and gears and sells NON-FLUID OIL to his patrons is the man to whom every motorist owes his consideration when repairs are necessary.

THE REPAIR MAN WHO SELLS THE BEST LUBRICANTS IS THE MAN WHO KNOWS THE PENALTY OF USING POOR ONES AND URGES YOU TO AVOID THEM.

Patronize the repair man who sells NON-FLUID OIL.



New York & New Jersey Lubricant Co.

165 Broadway, N. Y.

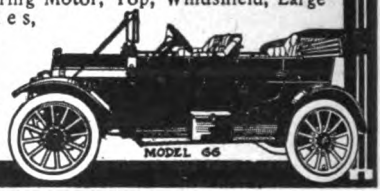
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Boston, 30 Motor Mart

The LAMBERT · QUALITY CAR

Our Model 66 is a quality car at a moderate price. It expresses all the latest developments in motor car construction. No car within hundreds of dollars of its price can equal it. Equipped with 35 H. P. Ball-Bearing Motor, Top, Windshield, Large Substantial Axles, Heavy Steel Pressed Frame.

Price $1100

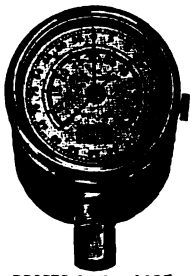
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Hoffecker

"The Steady Hand"

Speedometer



Accurate, durable---the one speedometer with a daily trip register that can be set at any mileage at any time.

THE HOFFECKER COMPANY

Motor Mart ——Main Offices——Boston, Mass.

PRICES $25 to $135

BRANCH OFFICES

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Three Great Models. Pilot 40, four-cylinders, 4 1-2x5. Brake test, 53 horse power. 120-in. wheel base. Price, $2000. Pilot 50, four-cylinders, 4 1-2x6. Brake test 59 horse power. 126-in. wheel base. Price, $2250. Pilot 60, six-cylinders, 4x6. Brake test 67 horse power. 132-in. wheel base. Price, $2,500.

The Car Without a Mechanical Defect

Teetor "T" Head Motors, full floating rear axles, Brown-Lipe differential, Warner transmission, Eisemann Magneto, Stromberg Carburetor, handsome jewel bodies with ventilating windshield. Completely equipped with every convenience and comfort. Dynamo electric lighting and electric starter (Gray & Davis system), power tire pump. We have the greatest agency proposition in the United States. Write for our beautiful art book showing cars in detail.

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For State Territory for the McVEY VULCANIZER, the Fastest Selling Auto Accessory on the Market, to take charge of state sales organization. A very profitable proposition for the right men. We also want local and traveling salesmen to call on auto trade. Write quick for full particulars.

McVEY MFG. CO.

3rd and Canal Sts. Dayton, Ohio

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The "Black Eagle" Spark Plug

PATENTED

50 Cents Is Enough

The "Black Eagle" Spark Plug has made good because it was designed and manufactured with this result in view.

A person in close touch with the supply and manufacturing ends of the trade was a visitor at our factory recently, and was shown the details of construction, including the machinery, testing, and assembling of the "BLACK EAGLE" Spark Plug. What he said we believe will be of interest to you, as it indicates the effort on our part to supply a high grade plug at a reasonable price. We therefore quote below his impressions.

> "I am simply amazed at the workmanship, material, and construction of the 'BLACK EAGLE' Spark Plug. When I saw this plug advertised at a price of 50c to the consumer, I naturally supposed it was a cheap, common, plug such as you occasionally find in jobbing houses on the bargain counter. I am convinced, after seeing these plugs tested, and examining minutely the machine parts which enter into their construction, that **no better porcelain spark plug is offered by any one, regardless of the price they ask.**"



We are not **influenced** by what our competitors **charge for spark plugs!** We have **ignored price precedent,** for the reason that a **high grade spark plug** can be manufactured and sold at **50c each, and that is enough.**

Sent prepaid on receipt of price. Made in all standard threads.

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MIGHTY MICHIGAN "40"

40-Horsepower Touring Car or Roadster, absolutely silent in operation. Oversize tires 35x4 1-2---cylinders 4 1-4x5 1-4 in.---118-in. wheel base---four-forward-speed transmission ---demountable rims---nickel mountings ---massive, straight-line body---big, roomy seats---electric lighting by generator---everything. Price $1585, includes full equipment. We also make a 33 H. P. model. Catalog on request.



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EVERYTHING FOR THE AUTOMOBILE

WAITE AUTO SUPPLY CO.

Manufacturers and Jobbers

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The Thoroughbred Car.

Electric self-cranking, electrically lighted. Four Forward Speeds.

"Six Thirty-Six" Touring Car and Roadster - $1850
Model 30 Touring Car - $1350
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Live wire dealers, write for unallotted territory.

HERRESHOFF MOTOR COMPANY, Detroit, Mich.

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Tuto, Rexo and Tally-Ho Horns
Speedometers, Ignition, Starting and Lighting Systems

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DON'T let rim rust destroy your tires; Paint them twice a season with

THOMAS' ANTI RIM RUST PAINT

One dollar a can at your dealers, or write us

The Anti-Rust Paint Co., Dept. 7, Akron, Ohio

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Heavy, Medium and Light

Automobile Oils

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"DIVA" HEADLIGHT "ACME" SHOCK ABSORBER
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Jericho ONE TONE Horn

Jericho (One-Tone) and Jubilee (Chime-Tone) are leaders in sales and popularity. Over 100,000 now in use.

B-Line Guns and McKae Blitz Spark Plugs are best.

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STOP INFLATION AND SPARK PLUG TROUBLES

The Brown Impulse Tire Pump and the B'Co. Quick Detachable Spark Plug will do it.

Give a quarter turn and lift out the core of your spark plug, drop in the pump and give a quarter turn.

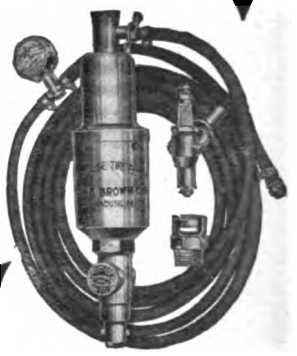
It's done in a jiffy—no wrench, no broken plugs.

The 1913 Brown Tire Pump is equipped with a B'Co. Quick Detachable Spark Plug, self opening valve connection, High Grade Recording Gauge and 12 feet of air hose.

You need this outfit as part of your 1913 equipment.

Sold by first class dealers everywhere. If you cannot be supplied locally, write us.

BROWN COMPANY, 222 Bellevue, Syracuse, New York



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"THE OIL THAT SUITS AND DOES NOT SOOT"

EAGLEINE

NO KARBON Cylinder Oil

—Registered— C that K

is guaranteed not to carbonize.

Which will YOU buy?

Oil on a guess or Oil on a guarantee?

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Cartercar

Climbs a 50% grade—Friction Transmission—any number of speeds. Five models—write.

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Studebaker

(NICKEL TRIMMED)

STUDEBAKER (FLANDERS) "20"		STUDEBAKER (E-M-F) "30"	
Touring Car	$800	Touring Car	$1100
Roadster	750	Detachable Demi-Tonneau	1100
Utility Car	800	Roadster	1100
Delivery Car	800		

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High-Grade Pleasure Car and Motor Truck Springs

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Chemically removes carbon from cylinders, pistons, rings and valves

INCREASES POWER 20 PER CENT.

Volatilizes carbon, in which form it passes out thru exhaust; injury to metal impossible. Agents wanted in certain localities. Sample quart can $1.50. Write today for particulars.

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BUILT LIKE A BRIDGE

12 to 14 INCHES LONG, 7-PLY, EXTRA HEAVY
3 inch, $1.00; 3 1-2 inch, $1.25; 4 inch, $1.50
4 1-2 inch, $1.75; 5 inch, $2.00.

Prepaid on receipt of price.

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1913 MODELS
Three Sizes
ALL FULLY EQUIPPED

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COLE MOTOR CAR COMPANY
INDIANAPOLIS, IND.

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Reo Motor Car Co., Lansing, Mich. (Reo.)

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Goodnow Manufacturing Co., 754 Old South Bldg., Boston. (Gasoline Gallon.)

National Motor Supply Co., 1911 Euclid Ave., Cleveland. (Tire Pressure and Gasoline Tank.)
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Hawthorne Manufacturing Co., 29 Spruce St., Bridgeport, Conn. (Old Sol.)

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Refineries: Georgetown, Ky.; Lawrenceville, Ill.

Invader Oil Co., 80 Broad St., New York. (Invader.)
Branches: 284 Columbus Ave., Boston; 113 Arch St., Philadelphia; 3556 11th St., N. W., Washington, D. C.

Miller, Chas. E., 97-103 Reade St., New York. (Pan-American.)
Branches: See Accessory Manufacturers and Jobbers.

New York & New Jersey Lubricant Co., 165 Broadway, New York. (MoToRol, Non-Fluid, Kejex.)

Standard Oil Co., New York. (Polarine.)
Branches: In all cities.

Texas Company, The, 7 West St., New York.
Branches: Boston, Philadelphia, Chicago, St. Louis, Norfolk, Atlanta, New Orleans, Dallas, El Paso, Pueblo, Tulsa, Houston.

Vacuum Oil Co., Rochester, N. Y. (Mobiloil.)
Branches: 49 Federal St., Boston; 29 Broadway, New York; Fourth and Chestnut Sts., Philadelphia; 154 Exchange St., Bangor, Me.; 406 Hitchcock Bldg., Springfield, Mass.; 117 Commercial St., Portland, Me.; Fisher Bldg., Chicago; Ford Bldg., Detroit; Indiana Pythian Bldg., Indianapolis.

Valvoline Oil Co., 27 State St., Boston. (Valvoline.)

MAGNETOS AND SUPPLIES.

Bosch Magneto Co., 223-225 W. 46th St., New York.
Branches: 119-121 E. 24th St., Chicago; 1250 Woodward Ave., Detroit; 357 Van Ness Ave., San Francisco.

Brets Co., J. S., 250 W. 54th St., New York. (U. & H.)

Marburg Bros., 1790 Broadway, New York. (Mea.)

Remy Electric Co., Anderson, Ind. (Remy.)

Splitdorf Electrical Co., 98 Warren St., Newark, N. J.
Branches: 10-20 W. 63rd St., New York; 1110 S. Michigan Ave., Chicago; 180-182 Massachusetts Ave., Boston; 1028 Geary St., San Francisco; 868 Woodward Ave., Detroit; 1228 S. Olive St., Los Angeles, Cal.; S. W. Corner Cherry and Juniper Sts., Philadelphia; 1823 Grand Ave., Kansas City; 1628 Broadway, Seattle, Wash.; London, Eng.; Buenos Aires.

MEASURES.

Dover Stamping & Manufacturing Co., Cambridge, Mass. (Auto and Savol.)

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CLASSIFIED BUYERS' GUIDE—Continued

MIXING DEVICES, GASOLINE.

Approved Auto Specialties Co., 1731-37 Broadway, New York. (Wolf.)
Royal Equipment Co., 422 Housatonic Ave., Bridgeport, Conn. (Gyrex.)

MOTORCYCLES AND SUPPLIES.

American F. N. Co., Boston. (F. N.)
Branches: 49 Union St., Providence; 415 Trumbull St., Hartford, Conn.
Emblem Manufacturing Co., Angola, N. Y. (Emblem.)
Branches: Los Angeles, San Francisco.
Hawthorne Manufacturing Co., 29 Spruce St., Bridgeport, Conn. (Old Sol Lamps.)
Miami Cycle & Manufacturing Co., 320 Hanover St., Middletown, O. (Flying Merkel.)

MOTORING ORGANIZATIONS.

Federation American Motorcyclists, E. M. Estabrook, Bangor, Me.

MOTORS AND POWER PLANTS.

Continental Motor Mfg. Co., Detroit. (Continental.)
Rutenber Motor Co., Marion, Ind. (Rutenber.)

PACKING, FIRE.

Johns-Manville Co., H. W., Madison Ave. and 41st St., New York City.

PAINT, ANTI-RUST.

Anti-Rust Paint Co., Dept. 7, Akron, O. (Thomas.)

PATCHES.

Invincible Puncture Proof Tire Co., 53 Sabin St., Providence, R. I. (Invincible.)
National Motor Supply Co., 1911 Euclid Ave., Cleveland.

POLISH.

International Metal Polish Co., Quill St. and Belt R. R., Indianapolis, Ind. (Blue Ribbon.)
Johns-Manville Co., H. W., Madison Ave. and 41st St., New York City.

PUBLICATIONS, AUTOMOBILE.

The Automobile Journal, 24 issues, $1.00 the year.
The Motor Truck (Commercial Car) Monthly, $1.00 the year.
The Accessory and Garage Journal, Monthly, $1.00 the year.
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The A B C of Magneto Systems..... .35
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Sent Postpaid to any address in United States upon receipt of price. Address all communications to The Automobile Journal, Pawtucket, R. I.

PUMPS, OIL AND GREASE.

Randall-Faichney Co., Boston. (B-Line.)
Branches: See Horns.

PUMPS, TIRE.

Brown Co., Syracuse, N. Y. (Brown Impulse.)
Dewey-Anderson Co., Toledo, O. (Dewey Power.)
Hawthorne Manufacturing Co., Inc., 29 Spruce St., Bridgeport, Conn. (Hawthorne.)

RADIATOR CONNECTORS.

Johns-Manville Co., H. W., Madison Ave. and 41st St., New York City.

RIMS—REMOVABLE AND DETACHABLE.

Boyd, F. Shirley, 903 Boylston St., Boston. (Dorian.)
Firestone Tire & Rubber Co., Akron, O.
Branches: In all principal cities.
Standard Welding Co., Cleveland, O. (Stanweld.)
United States Tire Co., Broadway and 58th St., New York. (Continental and Whittlesey Demountable.)
Branches: New York, Chicago, San Francisco.

ROAD BUILDING MATERIALS.

Barrett Manufacturing Co., New York. (Tarvia.)
Branches: Chicago, Philadelphia, Boston, St. Louis, Cleveland, Pittsburg, Cincinnati, Kansas City, Minneapolis, New Orleans, Seattle, London, Eng.; Montreal, Toronto, Winnipeg, Vancouver, Can.; St. John, N. B.; Halifax, N. S.

SELF-STARTERS.

Willard Storage Battery Co., 5716 Euclid Ave., Cleveland. (LBA.)
Branches: See Batteries.

SHIELDS, MOTOR.

Johns-Manville Co., H. W., Madison Ave. and 41st St., New York City. (Asbestos.)

SHOCK ABSORBERS AND SUPPLEMENTARY SPRINGS.

Boyd, F. Shirley, 903 Boylston St., Boston.
"J-M" Shock Absorber Co., 210 So. 17th St., Philadelphia. ("J-M.")
Branches: 218 W. 84th St., New York; 222 Eliot St., Boston; Teck Building, Buffalo; 10 W. Eager St., Baltimore; 41 Dexter St., Pawtucket, R. I.
Sager Co., J. H., 271 South Ave., Rochester, N. Y. (Peerless.)
Sumner, George, Inc., 1926 Broadway, New York. (Velvet Auxiliary, Acme.)

SOAPS.

Hopewell Brothers, Newton, Mass. (Paos.)
Branch: 1974 Broadway, New York.

SOLDERS.

Simplex Aluminum Solder Co., 108 Broadway, Long Island City, N. Y. (Simplex.)

SPARK PLUGS AND IGNITERS.

American Ignition Co., 819 Adams St., Dorchester, Mass. (Amico.)
Bosch Magneto Co., 223-225 W. 46th St., New York.
Branches: See Magnetos and Magneto Supplies.
Frontier Specialty Co., 734 Main St., Buffalo. (All-in-One.)
Heinze Electric Co., Lowell, Mass. (H. E. Co. Priming.)
Janney, Steinmets & Co., Philadelphia.
Johns-Manville Co., H. W., Madison Ave. and 41st St., New York City.
Mosler, A. R., & Co., P. O. Box M, Mt Vernon, N. Y. (Spit Fire.)
Randall-Faichney Co., Boston. (Mac-Kae.)
Branches: See Horns.
Splitdorf Electrical Co., 98 Warren St., Newark, N. J.
Branches: See Magnetos and Magneto Supplies.
Standard Co., The, Torrington, Conn. (Black Eagle.)

SPARK PLUG TERMINALS.

Johns-Manville Co., H. W., Madison Ave. and 41st St., New York City.
Randall-Faichney Co., Boston. (Mac-Kae Blits.)
Branches: See Horns.

SPEEDOMETERS.

Hoffecker Co., The, Motor Mart, Boston. (Hoffecker.)
Jones Speedometer, New Rochelle, N. Y.
Branches: Broadway and 76th St., New York; 109 Massachusetts Ave., Boston; 1416 Vine St., Philadelphia; 1430 Michigan Ave., Chicago; 852 Main St., Buffalo; 253-255 Jefferson Ave., Detroit; 530 Golden Gate Ave., San Francisco; 1229 So. Olive St., Los Angeles, Cal.; 329 Ankeny St., Portland, Ore.; 917 E. Pike St., Seattle, Wash.
Stewart-Warner Speedometer Corp., Chicago, Ill. (Auto-Meter.)
Branches: 116 Edgewood Ave., Atlanta, Ga.; 925 Boylston St., Boston; 720 Main St., Buffalo; 2420 Michigan Ave., Chicago; 807 Main St., Cincinnati; 2062 Euclid Ave., Cleveland; 1518 Broadway, Denver; 870 Woodward Ave., Detroit; 330½ North Illinois St., Indianapolis; 1613 Grand Ave., Kansas City; 748 S. Olive St., Los Angeles, Cal.; 1902 Broadway, New York; 302 N. Broad St., Philadelphia; 5940 Kirkwood Ave., Pittsburg; 14 N. Seventh St., Portland, Ore.; 36-38 Van Ness Ave., San Francisco; 611 E. Pike St., Seattle, Wash.; 3923 Olive St., St. Louis; 559 Yonge St., Toronto, Can.

SPRINGS FOR AUTOMOBILE SUSPENSION.

Marburg Bros., Inc., 1790 Broadway, New York. (Marburg-Hagen.)
Perfection Spring Co., No. 1 Plant, 2414 Superior Ave., N. W.; No. 2 Plant, East 65th and Central Ave., Cleveland.
Sumner, Geo., Inc., 1796 Broadway, New York City. (Acme.)

SPROCKETS.

Boyd, F. Shirley, 903 Boylston St., Boston. (Baldwin.)

STEEL PARTS, SEAMLESS.

Standard Welding Co., Cleveland.

STORAGE SYSTEMS—GASOLINE AND OIL.

Janney, Steinmets & Co., Philadelphia.
Scaife & Sons Co., Wm. B., Pittsburg, Penn.
Branch: New York City.

SWITCHES, LOCK.

Blackburn Specialty Co., 1120 Prospect Ave., S. E., Cleveland. (Autolock.)

TANKS, ACETYLENE GAS.

Prest-O-Lite Company, 271 East South St., Indianapolis. (Prest-O-Lite.)
Branches: See Cylinder Cleaning Compound.

TANKS FOR FUEL AND WATER.

Janney, Steinmets & Co., Philadelphia.
Scaife & Sons Co., Wm. B., Pittsburg, Penn.
Branch: New York City.

TANKS, TIRE INFLATING.

Prest-O-Lite Co., 271 East South St., Indianapolis. (Baby Tire Filler, The Emancipator.)
Branches: See Cylinder Cleaning Compound.

TAPE, ASBESTOS.

Johns-Manville Co., H. W., Madison Ave. and 41st St., New York City.

THERMOS CASES.

Dover Stamping & Manufacturing Co., Cambridge, Mass.

TIRE ACCESSORIES.

Firestone Tire & Rubber Co., Akron, O.
Branches: See Rims—Removable and Detachable.
Shaler Co., C. A., Waupun, Wis.

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CLASSIFIED BUYERS' GUIDE---Continued

TIRE CASES.

Hopewell Brothers, Newton, Mass. (Hopewell.)
Branch: 1974 Broadway, New York.

TIRE CHAIN GRIPS. (See Chains.)

TIRE PRESERVATIVES AND PROTECTORS.

Approved Auto Specialties Co., 1731-37 Broadway, New York. (Goodman Tire Shield.)
Gray Specialty Co., 148 Avon Ave., Newark, N. J.
National Rubber Co., 4433 Papin St., St. Louis, Mo. (Tirenew.)
Page-Lester Co. 2644 Indiana Ave., Chicago. (Tite-Wad Rubber Putty.)

TIRE REMOVERS.

O-Tak-A Tire Remover, Le Roy, N. Y.

TIRES—CASINGS AND INNER TUBES.

Dayton Rubber Mfg. Co., Dayton, O. (Dayton Airless.)
Diamond Rubber Co., Akron, O. (Diamond.)
Firestone Tire & Rubber Co., Akron, O. (Firestone.)
Branches: See Rims—Removable and Detachable.
Fisk Rubber Co., Chicopee Falls, Mass. (Fisk.)
Branches: 811-813 Boylston St., Boston; 17½ Dorrance St., Providence.
Frontier Tire & Rubber Co., 1054 Main St., Buffalo, N. Y. (Frontier.)
Gaulois Tire Co., 1926 Broadway, New York. (Gaulois.)
Goodyear Tire & Rubber Co., Madison St., Akron, O. (No-Rim-Cut.)
Branches: In all principal cities.
Hood Rubber Co., Watertown, Mass. (Shawmut.)
United States Tire Co., Broadway and 58th St., New York. (Continental, G & J, Hartford, Morgan & Wright.)
Branches: See Rims—Removable and Detachable.
Walpole Tire & Rubber Co., Walpole, Mass. (Walpole.)

TIRES—CUSHION.

Cataract Rubber Co., Wooster, O. (Cataract.)
Branches: Boston, New York, Providence.
Firestone Tire & Rubber Co., Akron, O. (Firestone.)
Branches: See Rims—Removable and Detachable.
Mots Tire & Rubber Co., The, Akron, O. (Electric Special Mots Cushion.)
Branches: Boston, New York, Philadelphia, Pittsburg, Chicago, Kansas City, Detroit, Cleveland, Los Angeles.

TIRES—MOTORCYCLE.

United States Tire Co., Broadway and 58th St., New York. (Morgan & Wright. G. & J.)
Branches: See Rims—Removable and Detachable.

TIRES—SOLID AND COMMERCIAL.

Diamond Rubber Co., Akron, O. (Diamond.)
Firestone Tire & Rubber Co., Akron, O.
Branches: See Rims—Removable and Detachable.
Fisk Rubber Co., Chicopee Falls, Mass.
Branches: See Tires—Casings and Inner Tubes.
Mots Tire & Rubber Co., The, Akron, O. (Mots.)
Branches: See Tires—Cushion.
Polack Tyre and Rubber Co., 246 W. 59th St., New York City. (Polack.)
Republic Rubber Co., Youngstown, O. (Republic.)
United States Tire Co., Broadway and 58th St., New York.
Branches: See Rims—Removable and Detachable.

TOPS AND ATTACHMENTS.

Springfield Metal Body Co., 20 Medford Ave., Springfield, Mass.

TROUBLE FINDERS.

Hopewell Brothers, Newton, Mass. (Vibrator.)
Branch: 1974 Broadway, New York.

TRUCKS AND TRACTORS—See Cars, Commercial.

TRUNK RACKS.

Connecticut Steel & Wire Co., Hartford, Conn.

TUBING, GAS.

Johns-Manville Co., H. W., Madison Ave. and 41st St., New York City.

TURNTABLES.

Beach Co., T. C., 108 Ottawa St., St. Johns, Mich. (Beach.)

UNIVERSAL JOINTS.

Brets Co., J. S., 520 W. 54th St., New York. (Hartford.)
Kinsler-Bennett Co., The, P. O. Box 124, Hartford, Conn. (Kant-Break.)

VALVE GRINDERS.

Wall, J. H., 290 Hope St., Bristol, R. I. (Ford.)

VULCANIZERS.

McVey Manufacturing Co., Third and Canal Sts., Dayton, O. (McVey.)
National Motor Supply Co., 1911 Euclid Ave., Cleveland. (Garage and Individual.)
Branches: In all principal cities.
Shaler Co., C. A., Waupun, Wis.
Vanderpool Tire & Rubber Co., Springfield, O.
Williams Foundry & Machine Co., Akron, O.

WELDING OUTFITS.

Prest-O-Lite Co., 309 W. South St., Indianapolis. (Prest-O-Welder.)
Branches: See Cylinder Cleaning Compound.

WELDING, STEEL.

Standard Welding Co., Cleveland.

WHEELS.

Eberly & Orris Mfg. Co., Mechanicsburg, Penn.

WIRES AND CABLES.

Diamond Rubber Co. of N. Y., Akron, O. (Diamond.)

WIRE MECHANISM.

Brets Co., J. S., 250 W. 54th St., New York. (Bowden.)

WRENCHES AND COMBINATION OUTFITS.

Allen Wrench and Tool Co., Providence, R. I. (Allen Friction Socket Sets.)
Coes Wrench Co., Worcester, Mass.
Cutter, George A., Taunton, Mass.
Walworth Manufacturing Co., Boston. (Stillson.)

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THE ACCESSORY AND GARAGE JOURNAL

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The Automobile Journal Publishing Company

Times Building **Pawtucket, R. I.**

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DON'T JUMP ON THE CRANK



of a stiff engine—it won't do any good—and besides, it's dangerous.

Jump on the manufacturer instead, who induced you to buy a car not equipped with an

ELECTRIC CRANKER

It is reliable always, ready to crank your engine, stiff or otherwise, and do it promptly, too.

You'll have one on your new car, of course, but don't overlook the importance of the Storage Battery that's a part of every electric cranking system.

GLBA

STORAGE BATTERIES

are used in the great majority of such systems. Look for it and demand it, if necessary, with the Electric Cranker installed on the car you favor.

Write us for full information

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Detroit Branch: 1191 Woodward Ave.

CLEVELAND, OHIO

Chicago Branch: 2241 Michigan Ave.
San Francisco Branch: 243 Monadnock Bldg.

Depots in all Principal Cities in the United States, Canada and Mexico

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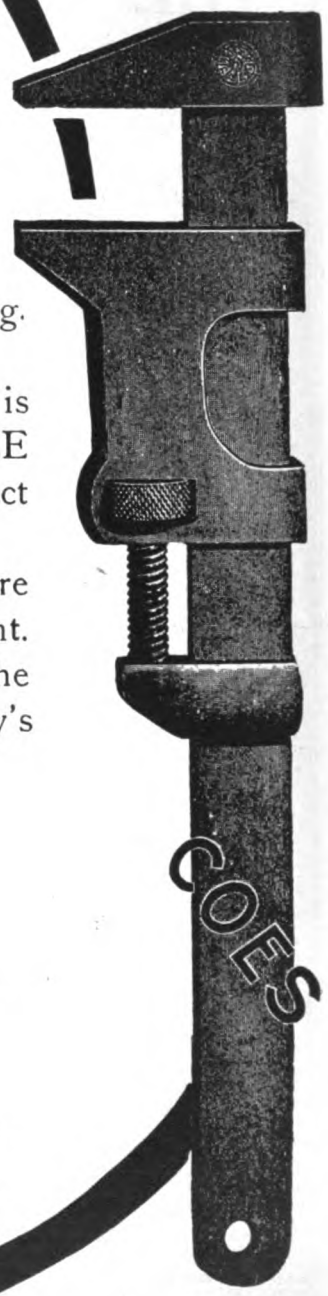
THE
Wrench Supreme

Strength without bulk or clumsiness.
Ease of handling without slipping or bruising.
Perfect balance and right grip

Everything the motorist desires in a wrench is to be found in the "COES" AUTOMOBILE MODEL, and you will never know perfect wrench service until you pin your faith to it.

It stands to reason that the 5 per cent. more you pay for a "COES" wrench goes for 60 per cent. more quality and service—put this wrench in the tool kit and shop. You will get your money's worth.

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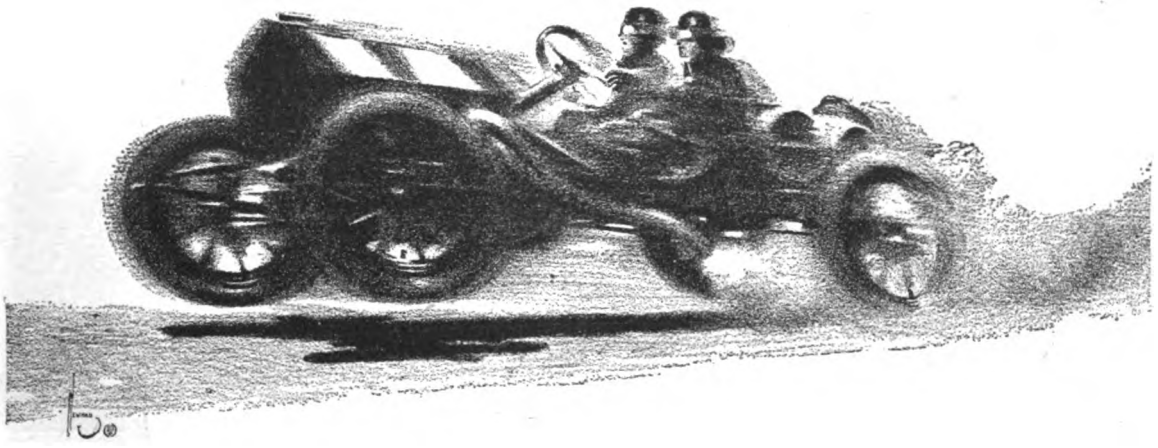
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WORCESTER, MASS.

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21 Murray St., New York City
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113 Chambers St., New York City

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"The Easiest Riding Car In The World"



RACING VICTORIES:

ARE not proofs of speed for the buyer of the car. Stock cars with regular equipment cannot hope to equal the speed of the racing cars.

Racing does prove the strength and stability of design, materials and workmanship. It demonstrates dependability, economy of oil and fuel and ease on tires.

These demonstrations in racing to mean anything to the buyer must be backed up by the records of cars in service.

Every vital part of the Marmon has been proved capable by the winning of races—it has strengthened that demonstration by years of service.

Ask for the Marmon records in races backed by the records in the hands of owners.

Detailed Information on Request.

The Marmon "32"

A sensible, logical car—a car of moderate size and capacity, meeting every requirement for touring and city use, with the economy in tires, fuel and upkeep so important to the majority of motorists. Four-cylinder, 32-40-h. p., 120-inch wheel base, electric starting and lighting system, with body types to meet every requirement and corresponding equipment. Touring Car $3,000.

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Six-cylinder, 48-80-h. p., 145-inch wheel base—a large car with small car advantages, a car with short turning ability which eliminates the old objections to long wheel base—a car of wonderful and surpassing riding qualities; electric starting and lighting system, with body types to meet every requirement and corresponding equipment. Touring Car $5,000.

Nordyke & Marmon Co.

INDIANAPOLIS (Est. 1851) INDIANA

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"Motor Mart," 12 Columbus Ave., Boston, Mass.

Sixty Years of Successful Manufacturing

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THE 8-DAY HIGH GRADE "CHELSEA" AUTO CLOCK

"SPECIAL"



"OFFSET"



"ROUND"



"LIMOUSINE"



Primarily intended for use inside the bodies of large enclosed cars, and for such use its case can be given a variety of fine finishes. It also makes an attractive clock for use on dashboards. Only made in 2¾-inch size.

The Justly CELEBRATED 8-Day, High-Grade "CHELSEA" AUTO CLOCK (*Trade-mark*)

NOW and for YEARS the RECOGNIZED STANDARD of EFFICIENCY

Clocks built with a view to stand the jars and jolts and rough riding of Automobiles. Reputation the highest. Used by parties demanding the BEST.

☞ ALL SIZES STATED ARE THE APPROXIMATE DIAMETERS OF THE DIALS.

All are 8-day High-Grade. All are in DUPLEX (patent applied for) polished cast brass cases, the most thoroughly waterproof case on the market. The "SPECIAL" clocks show dial on an angle; its inner cased clock, when removed from the outer (locked) case, is excellent for use on mantels, bureaus, etc., when touring; its outer case is screwed to dashboard by hidden screws. The "SPECIAL" clocks are in large demand from dealers for owners of finest cars.

The MOTOR CLOCK has the same clock movement which for years we have supplied for the hard use on Locomotives, Steam Fire Engines, etc.; its dial is of same appearance as the Auto Clock dial, but the Auto Clock movement has a somewhat finer train.

The 3½ MOTOR "OFFSET" is likely to prove a quick, ready seller. Very attractive.

Ask for our new Auto Clock Circular and Price List, dated Oct. 1, 1911, illustrating and pricing the above and three new models, C, D and E.

PRICE LIST (Per Clock)

		"Round"	"Offset"	"Special"	"Limousine"
"CHELSEA"	2¾-in. Auto Clock.....	$26 00	$28.00	$36.00	$28.50
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	3½-in. Motor Clock.....	24.00	26.00	41.00	2¾-inch size

If wanted fitted with outside (patent applied for) stem-winding and stem-setting device—the best of its kind—**Add $3.00 to above Price Lists.** (Such device we do not apply to the "Motor" Clocks or "Special" Auto Clocks.)

For Use on AUTOMOBILES and MOTOR BOATS

You want the Best? Ask your DEALER for the "CHELSEA"

On Sale by Leading Jobbers and Dealers

CHELSEA CLOCK CO., 16 State St., Boston, Mass.

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TIRE-SERVICE



4000 MILE GUARANTEE

Mr. Motorist:—

Cataract Tires are the finest produced Only the best of materials and workmanship enter into their construction. They cost more to produce per tire than any other tire made in America.

This season equip with Cataract Tires —They wear longer and give better service.

We guarantee them 4000 miles, but let us send you our book of testimonials. It will surprise you.

Mr. Dealer:—

A few territorial rights still open—get in touch with us by wire, phone or letter.

WHEN YOU TIRE OF OTHERS RE-TIRE WITH US

Cataract Rubber Company

WOOSTER, OHIO.

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Is the National Authority On Highway Haulage

It Is the One Certain Source of Dependable Information Relative to the ECONOMIC USE OF ALL FORMS OF WAGONS AND TRUCKS.

It Is the Only Magazine That Specializes in Results Obtained by the Owners with Machines Operated Under Actual Conditions.

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It Rejects Theory and Illustrates the Possibilities as Seen by Those Who Have to Deal with Varying Needs and Locality Limitations.

It Is the One Publication That Is Devoted to Systematization and to Organization as Applied to Vehicular Transportation.

It Is the Only Magazine That Presents the Problem of Motor Vehicle Use from the Aspect of the Men Who Are Using It and Have to Meet Their Own Service Requirements.

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THE MOTOR TRUCK

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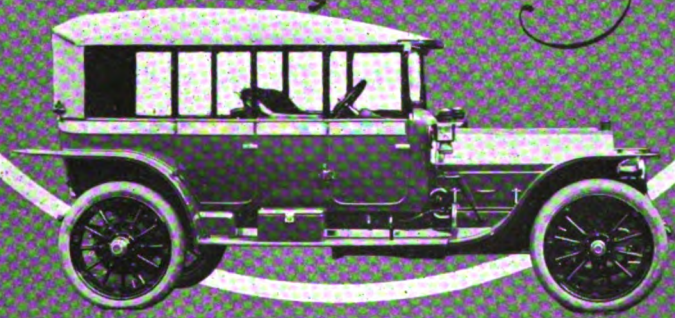
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Springfield Convertible Bodies
A Construction Giving the Qualities of a Limousine & Touring Equipment That May Be Converted as Quickly as a Folding Top Can be Raised or Lowered. When Folded the Full Space of the Touring Car is Available — When Raised It Is a Regular Top or It Can Be Glass Enclosed.

Dealers, Who Insist on Quality Equipment, Specify The Springfield Convertible Body.



SPRINGFIELD, MASSACHUSETTS

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THE SEVENTH ANNUAL

TOURING NUMBER

.... OF ....

THE AUTOMOBILE JOURNAL

Will Be Issued July 10, 1913

Recognized as the most complete compilation of authoritative touring information published in one volume, this number will be bigger and better in every respect than ever before. The routings have been selected not only with a view to supplying detailed driving directions for both outward and return trips, but they have been so arranged as to cover the entire country, each itinerary connecting with all others. Special departments are devoted to separate sections, these comprising: New England, North Atlantic States, the South, the Middle West, the Far West and Canada. The transcontinental routings include four complete tours from the Atlantic to the Pacific, or vice versa, and the data supplied are sufficient to afford opportunity for visiting every part of the United States and Canada where practical motoring can be enjoyed.

In addition to the American routings, several European tours will be presented with the same attention to detail in every respect. Full information concerning the motoring laws of the several states and foreign countries also will be incorporated, as well as timely suggestions respecting the proper enjoyment of touring, including camp life, wearing apparel, etc. The mechanical side of touring is not forgotten, special articles having been prepared by experts in their respective fields, covering the preparation of the car, carburetion, ignition, tire care and all other details.

THE SEVENTH ANNUAL TOURING NUMBER, like all of its predecessors, will be preserved in the car and referred to constantly throughout the entire year—until the appearance of its successor. The manufacturer of cars, accessories or supplies, who desires that his product shall have permanent value in reaching the owner, will not neglect the opportunity for being represented in this number. Based upon the experience of the past, a specially large edition will be printed, anticipating the increasing demand, thus affording even wider distribution to all patrons.

The regular issue of THE AUTOMOBILE JOURNAL will be incorporated as well, all of the features and departments being retained in addition to the hundreds of tours and other touring information.

Make Space Reservations Early

THE AUTOMOBILE JOURNAL PUBLISHING CO.

Times Building PAWTUCKET, R. I.

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HENDERSON



New De Luxe $1785 Complete

The Year Ahead Car!

Wire Wheels (*Wood wheels optional*)
Left Drive *Logical method—up-to-date*
Center Control *On seat—like an electric*

Electric Lights *Controlled by one switch from seat*
Cowl Dash *Control button within easy reach*
Cowl Gasoline Tank *Positive power on hills—economy*

Electric Starter *Dynamo System—independent*
Long Stroke Motor *4⅛ x 5½ 44 h. p.—silent*
Oversize Tires *Wire wheel 34x4—Wood 35x4½*

Stylish Big Body—*more room front and rear*

Turkish upholstery—ebony finish woodwork.
Electric horn.
Imbedded clock and speedometer on cowl dash.
Special tailored top.
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Index To Advertisers

Abbott Motor Co.....86
American F. N. Company.....73
American Ignition Co.....88
Anti-Rust Paint Co.....91
Apple Electric Co.....92
Approved Auto Specialties Co....89
Austin Automobile Co.....88
Barrett Manufacturing Co.....88
Beach Co., T. C.....90
Belleclaire, Hotel.....87
Borne, Scrymser Company.....90
Bosch Magneto Company.....85
Boyd, F. Shirley.....84
Bretz Company, The J. S.....85
Brown Company.....85
Buckeye Manufacturing Co.....90
Cameron Mfg. Co.....88
Cartercar Company.....92
Cataract Rubber Co..... 5
Chelsea Clock Co..... 4
Coes Wrench Company..... 2
Cole Motor Car Company.....92
Continental Motor Mfg. Co.....83
Cutter, Geo. A.....83
Cutting Motor Car Co.....88
Dayton Rubber Mfg. Co.....85
Dean Electric Company.....91
Detroit and Cleveland Navigation Co. 85
Dixon Crucible Co., Jos.....82
Dover Stamp. & Mfg. Co.....85
Eagle Oil & Supply Co.....92
Empire Automobile Co.....90
Federation Amer. Motorcyclists..73
Gaulois Tire Co.....86
Geiszler Bros. Storage Bat. Co....82
Goodnow Mfg. Co.....90
Goodyear Tire & Rubber Co.....92
Gray Specialty Co.....84
Harris Oil Company, A. W.....87
Haynes Automobile Co.....83
Henderson Motor Car Co..... 9
Herreshoff Motor Co.....91
Hoffecker Company, The.....90
Hotel Belleclaire.....87
Ideal Motor Car Company.....81
Indian Refining Co.....Cover
Invader Oil Co.....82
Invincible Tire Co.....90
Jackson Automobile Co.....85
Johns-Manville Co., H. W.....83
Jones Speedometer Company.....85
Kissel Motor Car Company.....88
Knox Automobile Company.....92
K-R-I-T Motor Car Co.....90
Lenox Motor Car Company.....82
Marburg Bros.....82
Mea Magneto.....82
Mercer Automobile Company.....86
Miami Cycle & Mfg. Co.....71
Michigan Motor Car Co.....91
Miller, Chas. E.....Cover
Moller Brothers Controller & Economizer Co.....86
Mosler & Co., A. R.....83
National Motor Vehicle Co.....16
New Departure Mfg. Co.....90
Nordyke & Marmon Co..... 3
N. Y. & N. J. Lubricant Co.....11
O-Tak-A Tire Remover Co.....83
Owen & Co., R. M.....91
Paige-Detroit Motor Car Co.....86
Perfection Spring Co.....92
Pierce-Arrow Motor Car Co..Cover
Pilot Car Sales Co.....90
Planhard Mfg. Co.....82
Pyrene Co. of N. E.....89
Randall-Faichney Co.....92
Remy Electric Company.....84
Reo Motor Car Company.....91
Royal Equipment Co.....87
Sager Company, J. H.....84
Shaler Co., C. A.....89
Speedwell Motor Car Co.....86
Splitdorf Electrical Co.....88
Springfield Metal Body Co..... 7
Standard Co., The.....91
Standard Oil Co.....83
Standard Welding Co.....86
Standard Woven Fabric Co.....84
Stewart-Warner Speedometer Corp. .....Cover
Studebaker Corporation.....92
Sumner, George, Inc.....91
United States Tire Co.....88
Valvoline Oil Company.....91
Waite Auto Supply Co.....91
Wall, J. H.....84
Walpole Tire & Rubber Co.....82
Weed Chain Tire Grip Co.....86
Willard-Storage Battery Co..... 1
Willys-Overland Company.....13

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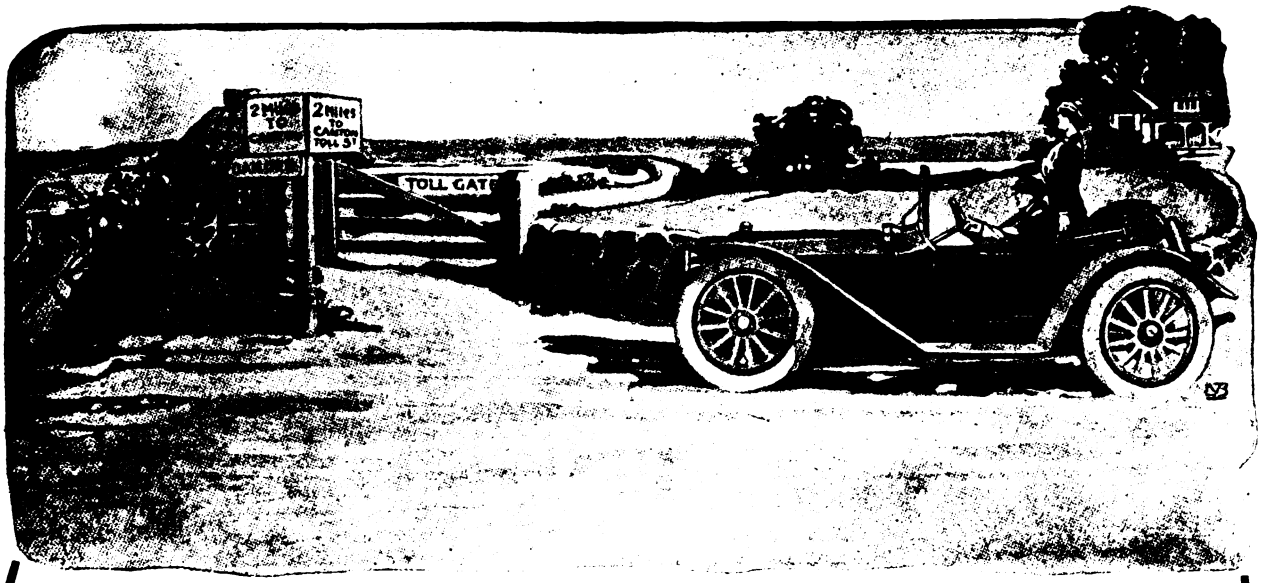
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Page

*The Need of National Highways, Charles Henry Davis, C. E. 17
*Third Annual Sweepstakes Race 24
*American Visit of British Engineers 28
*General News of the Industry—
Automobile Chamber of Commerce 30
Divides with Employees 30
Stewart-Warner Personnel 30
Only One Change Made 31
Joins Stearns Company 31
With G. C. Vaporizer 31
Announces Kerosene Carburetor 32
Shock Absorber Suit 32
To Add New Buildings 32
Treasury Stock Sold 32
To Produce New Rim 32
Utilizing Cheaper Fuels 33
Leaves International Motor 33
Joins Empire Forces 33
First Cyclecar Factory 33
Garage Owners Organize 34
Erecting Large Addition 34
Gilbert Succeeds Jewett 34
To Cross Continent 34
*New and Novel Accessories 35
*High-Tension Magneto on Ford Car, C. P. Shattuck 38
National Dealers' Body 40
Long Distance Touring 40
Annual Orphans' Day 40
*Correspondence with the Reader—
Examination for License 41
Adjustments to Ford Car 41
Adjusting Schebler Carburetor 41
Double Sets of Spark Plugs 42
Maker of Speedometer 42
Anti-Dazzle Lens 43
Gasoline Gasket Material 43
Gobron-Brillie Motor 43
Dirt in Carburetor 43
*With the Motoring Interests Abroad—
New Paris Fire Engine 44
Three Days a Week 44
Ontario Motor League 45
Important British Conference 45
Notes from Foreign Lands 45
*Mechanical Notes for Owners—
Timing Ford Valves 46
Remedying Slipping Cones 47
Starting Small Screws 47
Adjusting Mechanical Oilers 47
Wire Stripper 47
The Guests of the Industry, Editorial 48
Concerning Reckless Driving, Editorial 48
*Overhauling the Motor Car Chassis, C. P. Shattuck 49
*New Rayfield Carburetor 55
*Bosch Spark Plug Hood 55
Motoring Laws and Their Enforcement—
Amended New York Law 56
The Maine Legislature 56

Page

Protest Tariff Schedule 57
Taxing Motor Trucks 57
Legislative Briefs 57
*In the Commercial Vehicle Field—
Details of New Kelly Line 58
Reo Delivery Wagon 59
Brown Uses Internal Gear 59
Well Pleased with Knox 60
Panama-Pacific Exposition 60
Wants License No. 1 60
Available Liquid Motor Fuels 61
*G. C. Vaporizer Utilizes Heavy Fuels 63
*Garage and Repair Shop Equipment—
American Wheel Tank 65
Walworth Washer 65
*Abbott-Detroit Made in Seven Models 66
Vulcan Wins Truck Run 68
Nazarro Takes Targa Florio 68
National, Sweepstakes Winner 68
*Testing Continental Motors 69
*In the Realm of the Motorcyclists—
Ohio State Convention Planned 70
Attleboro Riders on Outing 70
Old Sol Lamp Winners 70
Yale as Business Producer 71
Coming Sanctioned Events 71
Racing Riders in Canada 71
Police Ride Harley-Davidsons 71
New Members Last Month 71
Touring on Flying Merkel 72
Oscar Hedstrom Retires 72
Change Convention Date 72
New Affiliations and Repair Shops 72
Results in Newark Contest 72
Pittsburg Opens Season 73
Good Racing at Denver 73
Club Notes, Here and There 73
*News of the Manufacturer and Dealer 74
Recent Patents 76
Coming Events 76
New Books Received 76
Motor Exceeds Record 77
Recovers from Dayton Flood 77
Still Identified with Concern 77
President Joy on Price Maintenance 78
Campaign of Education 79
"Fully Equipped—Nearly" 79
Increases Capital Stock 79
Harroun Carburetor 80
The Haynes Pioneer 80
Smith Succeeds Warren 80
An Appreciative Allegory 80
Empire as Pathfinder 81
Hood Goes to Coast 81

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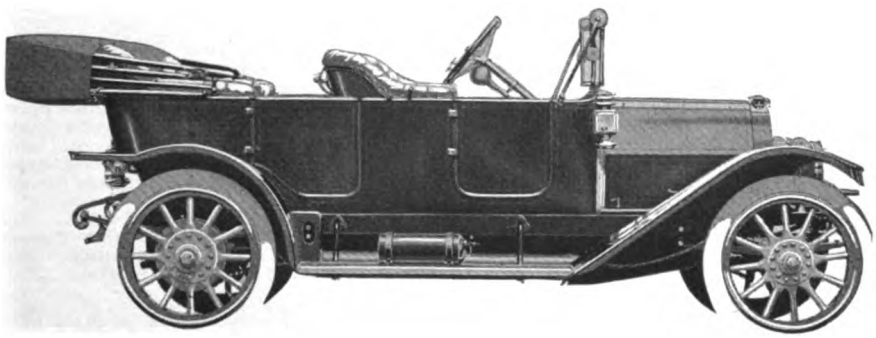
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THE AUTOMOBILE JOURNAL

VOL. XXXV, No. 8 MAY 25, 1913 Price, $1.00 the Year

THE NEED FOR NATIONAL HIGHWAYS.

A Plea for a System of Good Roads Built and Maintained by the United States Government---Why the Plan Is Feasible and What It Will Accomplish.

(By Charles Henry Davis, C. E.)

THERE are over 1,000,000 automobiles in the United States. There are 92,000,000 people and 20,000,000 families. This means an average of one automobile to every 92 people, or every 20 families. While the pleasure vehicle has had a phenomenal growth, it is as nothing to what the motor truck is destined to accomplish, but this will be retarded instead of accentuated unless road building receives a decided impetus. And what greater impetus can there be than a system of national highways that shall be built and maintained by the United States government?



Good Roads—Good Schools—Knowledge—Prosperity.

Such a system will bring about the construction of more state highways to connect therewith. It will increase appropriations therefor, and extend the county and town roads as feeders to the trunk lines. Good roads will increase the radius of motor truck traffic; department stores will make their deliveries free at distances not now attempted and the distribution of wholesalers direct to consumers will be effected by the same means. Pleasure car traffic, local and long distance, will be increased beyond the bounds of present belief.

There are about 300,000 proprietors of manufacturing and mining establishments, and these have about 800,000 salaried employees. There are, likewise, about 6,400,000 farmers. This makes a total of 7,500,000 persons who some day will have automobiles as they now have buggies or wagons. In addition, there are

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Poor Roads—Poor Schools—Ignorance—Poverty.

about 7,700,000 wage earners in the above establishments, some considerable number of whom eventually will have a small cheap car, such as will shortly be produced. There surely is an enormous business ahead of this industry.

During all ages it has been of primary importance to provide a people with means for intercommunication. People, like water, must move or stagnate. They must run and play like the brook itself or become sluggish and dull—to themselves as well as to others. Of the seven modes of intercommunication—water, roads, postal, railroad, telegraph, telephone and wireless—only one, roads, is free to all the people of the earth. Roads are the most universally used and are, therefore, the most beneficial to the greatest number of people.

The railroads of the United States now carry approximately 1,000,000,000 passengers a year. This means that if every inhabitant rides his proportionate number of times each individual takes only 10 trips one way each year. As he must return, this means only five round trips—or only five days out of every 365—that he travels each year. Probably not 50 per cent. of the population travels on railroads at all.

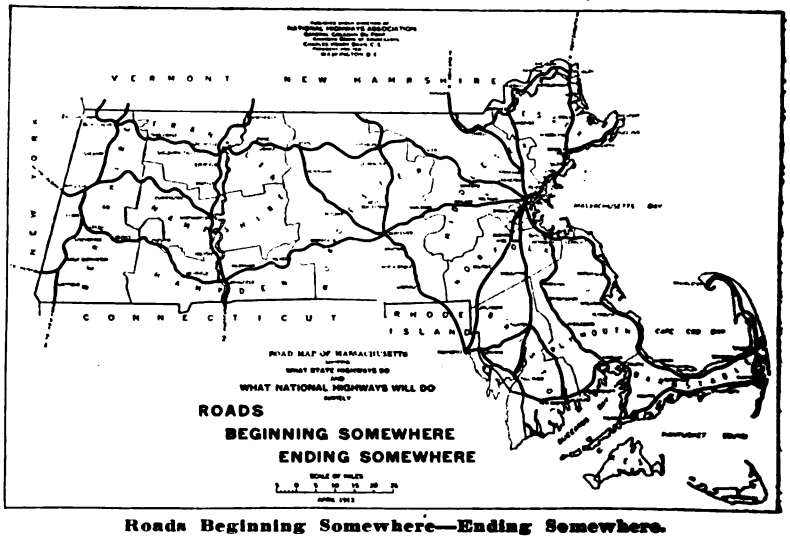
But how about roads? There is scarcely a man, woman or child who does not pass over or along a road or street, not only every day, but several times a day. If each such passage were considered a trip, as on railroads, the passenger traffic on the highways probably would reach a figure something greater than 200,000,000,000, or 200 times the traffic on steam railroads. Furthermore, nearly 100 per cent. of the population travels—or would if they were passable—every day of the year on or along the highways, while probably not to exceed 50 per cent ever ride on a railroad train at all.

The railroads of the United States approximate 250,000 miles in length. They have cost about $25,000,000,000, or an average of $100,000 a mile. Of this vast sum the United States government has furnished more than $1,000,000,000, or four per cent. of their present cost. At the time of such appropriation this amount was more nearly 20 per cent. of their then cost.

These railroads have been operated at a profit by and for a few favored individuals, and to which the entire community contributes to the extent of $3,000,000,000 a year in gross receipts, one-third of this, or $1,000,000,000, being profit to the security holders. These are estimated not to exceed 500,000 favored individuals, or not more than one-half of one per cent. of total population.

On the other hand, the highways of the United States have a mileage of about 2,300,000, or nearly 10 times the length of the steam railroads. But they carry 200 times, or more, the passenger traffic of the railroads. The average density of passenger traffic is therefore more than 20 times greater on the highway than on the railroads.

The steam railroads carry nearly 2,000,000,000 tons of freight a year. Probably more than 60



Roads Beginning Somewhere—Ending Somewhere.

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per cent. of this goes over highways to reach the railroads. Probably more than 80 per cent. again passes over the highways to reach its destination from the point of railroad delivery. Probably more than 50 per cent. must again be transported over the highways to the consumer. It is conservative to say that 50 per cent. more tonnage exists in the raw state prior to reaching any railroad where it can be considered in the state of net tonnage. On the above basis there is a tonnage passing over the highways amounting to something over 5,000,000,000 tons. But how about the increases caused by manufacturing processes; by hauling back and forth; delivery and redelivery of the same article in bulk as it is divided and sub-divided and again redivided in manufacturing specialization? And how about the tonnage passing over the roads which never reaches the railroads? No one can tell exactly. It is possible only to make a guess, but surely it is several times the total as given above. Shall it be believed to be 10, 15 or 20, or more billions of tons? It does not much matter, because it is evident that the highway freight traffic is many times that which passes over the railroads.

It is possible to build a system of national highways not to exceed 50,000 miles, which shall be so located as to serve more than 50 per cent. of the entire population. It would not exceed two per cent. of the entire highway mileage of the United States and therefore, if improved, would not cost more than two per cent. of the total for improving all the roads of the nation. But the United States government has paid four per cent. of the present cost (equal to 20 per cent. of cost at the time of the appropriation) of the steam railroads for the benefit of not to exceed 500,000 of the people, who gain a profit from the rest of $1,000,000,000 a year. In the face of such facts can anyone advance a sound argument against the national government building and maintaining such a system of national highways? They will be used by all. They will be paid for by everyone. They will be free to all. They will be of untold daily advantage to each. If it were wise for the government to help build railroads for the benefit of a few, how much wiser to build national highways for the benefit of all!

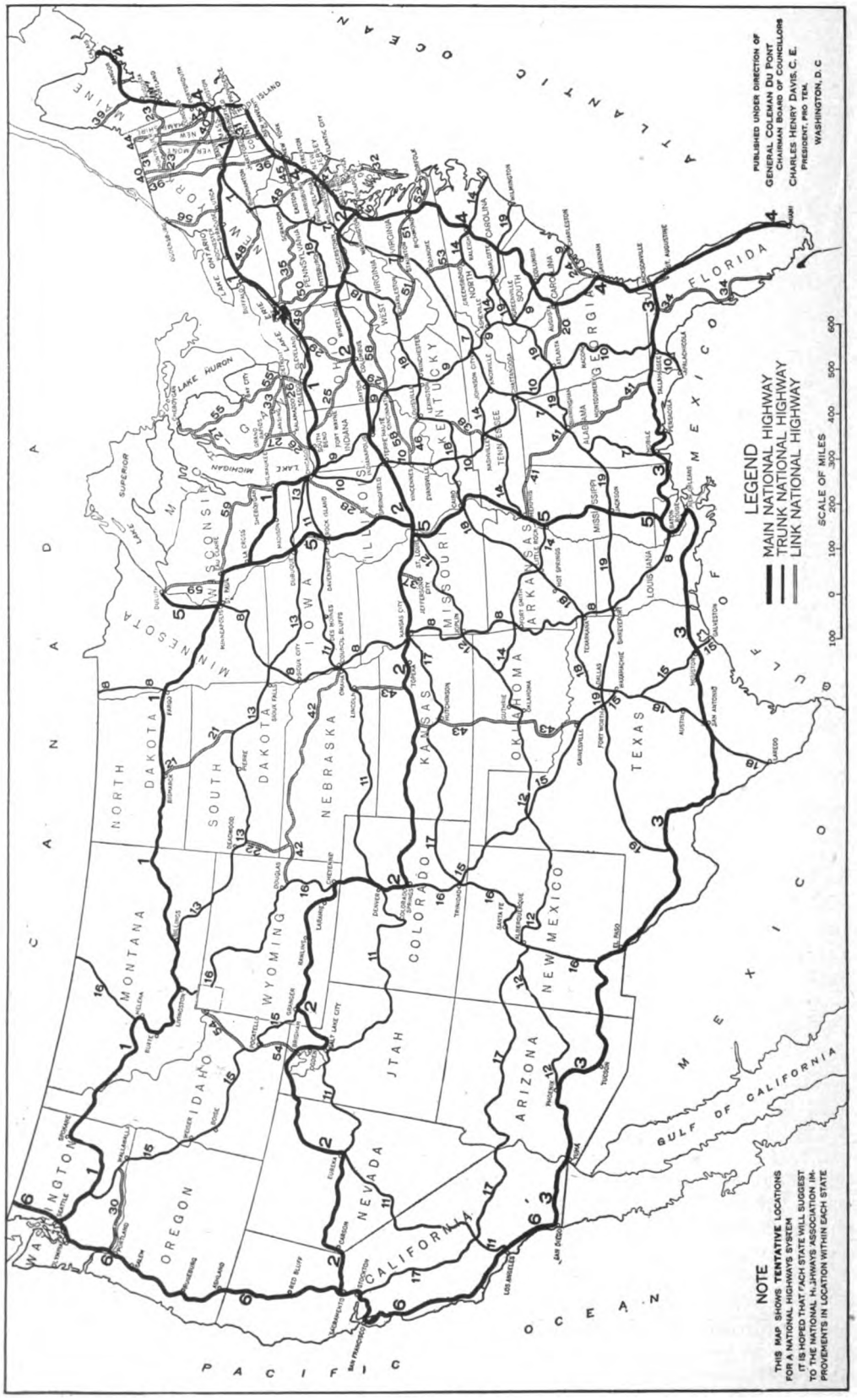
Fifty thousand miles of national highways at $20,000 a mile would make them cost $1,000,000,000, a sum which does not exceed the amount spent by the government on the steam railroads, which are privately owned—not publicly owned, as would be these national highways. It is estimated that more than 90 per cent. of highway traffic is confined to less than 20 per cent. of their length. If true—and it is in substance—then such a system of national highways would today carry by far the bulk of the traffic now passing over the entire system of highways.

Fifty thousand miles of national highways will increase the value of adjacent lands within one mile thereof by more than $600,000,000, or more than half of their estimated cost. If 50 per cent. of the population produces and handles its proportion of tonnage (as a matter of fact, it is much greater), then much more than 2,500,000,000 tons would move over such a system of highways. If only 10 cents a ton were saved in hauling charges (a ridiculously small estimate of saving) due to the improvement of these highways, then more than $200,000,000 a year will accrue to the benefit of the people of the United States. This allows interest at five per cent. a year on the investment in such highways. This saving will pay for these highways in five years. And yet there are some legislators who say, "The na-



Roads Beginning Nowhere—Ending Nowhere.

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National Highways System Proposed by the National Highways Association, Washington, D. C., Embracing 50,000 Miles of Main, Trunk and Link Lines, as Follows: Main National Highways—1, Northern; 2, Central; 3, Southern; 4, Atlantic; 5, Mississippi; 6, Pacific. Trunk National Highways—7, Appalachian; 8, Canada-Gulf; 9, Great Lakes-Atlantic; 10, Great Lakes-Gulf; 11, Lake-Mountain-Pacific; 12, Missouri-Arizona; 13, Northwest; 14, Oklahoma-Carolinas; 15, Puget-Gulf; 16, Rocky Mountain; 17, Santa Fe; 18, Southwest; 19, Texas-Atlantic. Link National Highways—20, Atlanta-Augusta; 21, Bismarck-Pierre; 22, Black Hills; 23, Burlington-Portland; 24, Charleston-Savannah; 25, Chicago-Columbus; 26, Chicago-Detroit; 27, Chicago-Mackinac; 28, Chicago-St. Louis; 29, Cleveland-Cincinnati; 30, Columbia River; 31, Connecticut Valley; 32, Delaware-Chesapeake; 33, Detroit-Grand Rapids; 34, Florida West Coast; 35, Harrisburg-Erie; 36, Hudson-Adirondacks; 37, Jefferson City; 38, Louisville-Nashville; 39, Maine-Quebec; 40, Massachusetts-Vermont; 41, Memphis-Florida; 42, Nebraska-Texas; 44, New Hampshire; 45, New York-Scranton; 46, Ohio-Wabash; 47, Philadelphia-Atlantic City; 48, Philadelphia-Buffalo; 49, Pittsburg-Erie; 51, Richmond-Charleston; 52, Richmond-Norfolk; 53, Roanoke-Greensboro; 54, Salt Lake-Montana; 55, Toledo-Mackinac; 56, Utica-Ogdensburg; 57, Washington-Annapolis; 58, West Virginia-Indiana; 59, Wisconsin.

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Why Living Is Costly.

tion cannot afford to build national highways!"

There are more than 27,000,000 horses and mules in the United States; more than 4,000,000 horse drawn vehicles; more than 2,000,000 bicycles; more than 100,000 motorcycles, and more than 1,000,000 automobiles. These are valued at more than $5,000,000,000. Again, if 50 per cent. of this traffic passed over such a system of national highways and, due to their improvement, there was a saving in depreciation of only 10 per cent. the gross amount so saved a year would be $250,000,000. This would pay for such a system of national highways in five years. With such facts before one, what is the inevitable thought when considering the hesitation and uncertainty displayed by law makers in their treatment of this, the most important subject before the nation?

There are 18,000,000 children who endeavor to attend school. There are over 30,000,000 who should attend school. Why don't they? Obviously, because the schools are not provided or attendance required. Why not? Largely because during much of the school term a considerable portion of 2,000,000 miles of roads is impassable. This is shown by the fact that only .9 of one per cent. of the urban white population of the United States of native white parentage is illiterate, while rural illiteracy is 600 per cent. greater in the same class of inhabitants. How is it possible to have or obtain good schools in the rural districts if there are not good roads to reach them at all times and in all seasons?

The relation of good and bad roads to illiteracy is indicated by the table above. This tabulation does not, of course, include foreign born, native born of foreign parentage, or negroes, all of which are excluded for obvious reasons. The

Table Showing Relation of Good and Bad Roads to Illiteracy in Several States.	Total Population: Native Whites of Native Parentage (1910)	Per Cent. Improved Roads (1909)	Per Cent. of Illiterate Native Whites of Native Parentage (1910): Total	Urban	Rural
New England:	**6,522,681**	22.2	0.7	0.5	1.2
Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut.	2,135.801				
South Atlantic:	**12,194,895**	6.0	8.0	2.2	9.8
Delaware, Maryland, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida.	5,397,864				
Pacific:	**4,192,304**	14.2	0.4	0.3	0.6
Washington, Oregon, California.	1,684,658				
West South Central:	**8,784,534**	5.6	5.6	1.4	6.8
Arkansas, Louisiana, Oklahoma, Texas.	4,101,510				



How to Cut Down the Cost.

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Small Road Tax—No Saving.

children of today are the electors of tomorrow. The population is increasing by leaps and bounds. If education means liberty, and if poor roads mean illiteracy or worse, has the country the right not to build roads, even if they would not pay for themselves well within the generation which builds them?

It is believed that the foregoing facts and the arguments based upon them are unanswerable by those who may be opposed to the national government participating in road building. But how is the desired end to be gained?

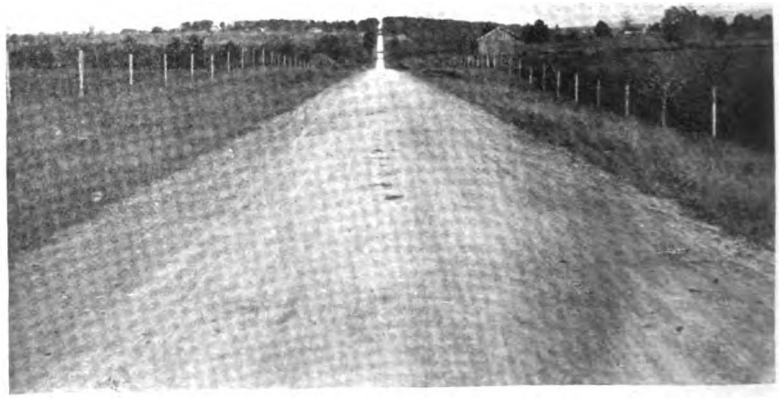
Agitation is desirable and wise. Road associations of various kinds and in various places are both necessary and desirable. The more the better, and the more effective their activities. But this is not enough. To get concrete action they must unite on some plan that can be supported loyally. Otherwise, Congress will not act, or will adopt some plan calculated eventually to retard road building, rather than accentuate it. In fact, Congress already has taken one step in the wrong direction to the extent of $500,000.

To those who know, federal aid is but a repetition of the errors of state aid, long since abandoned by those states which have best developed their highways. On the other hand, national highways, built and maintained by the national government, are but an extension of the present relationship between the states and their counties and towns where state highways are built.

The annual appropriations by Congress now approach $1,000,000,000, approximately distributed as in the table below. How absurd to liberty loving, peace loving Americans to spend any such amount on war—past, present and to come—and refuse to spend one-tenth thereof ($50,000,000) a year in giving the nation a road system that will be a benefit far outstripping any other within the knowledge of mankind! Such appropriations would build a system of 50,000 miles of national highways in 20 years. Such a system would encourage and accentuate the building of good roads everywhere by states, counties, cities, townships and towns, and these roads will act as the collecting and distributing medium of the national highways.

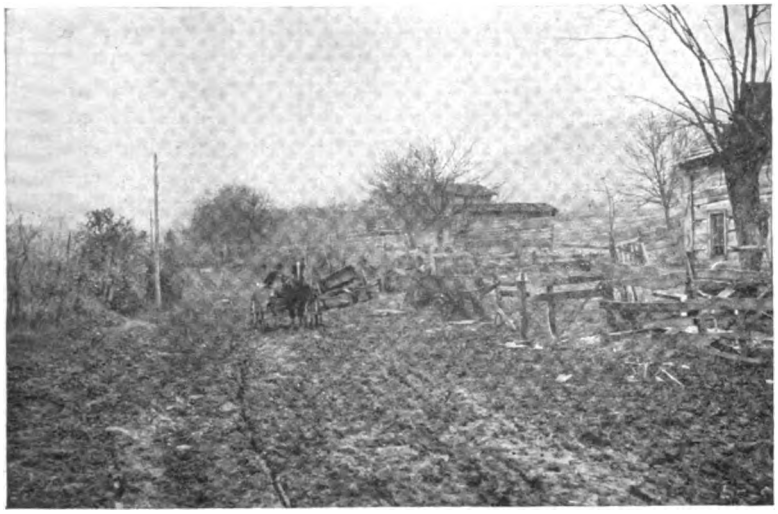
1. WAR—past, present and to come	420 millions	=	42% of total
2. POSTAL SERVICE	230 millions	=	23% of total
3. GOVERNMENT — legislative, executive, foreign, customs, immigration, interest on public debt, etc.	200 millions	=	20% of total
4. PUBLIC WORKS—buildings, rivers, harbors, reclamation, forestry, public lands, Panama Canal, etc.	110 millions	=	11% of total
5. EDUCATIONAL AND STATISTICS — census, public printing, agriculture, surveys, public health and life, etc.	40 millions	=	4% of total
Totals	1000 millions	=	100% of total

"What's in a name?" Everything, or almost



Fair Road Tax—No Losses.

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Poor Roads—Sterile Farms—Worthless Lands.

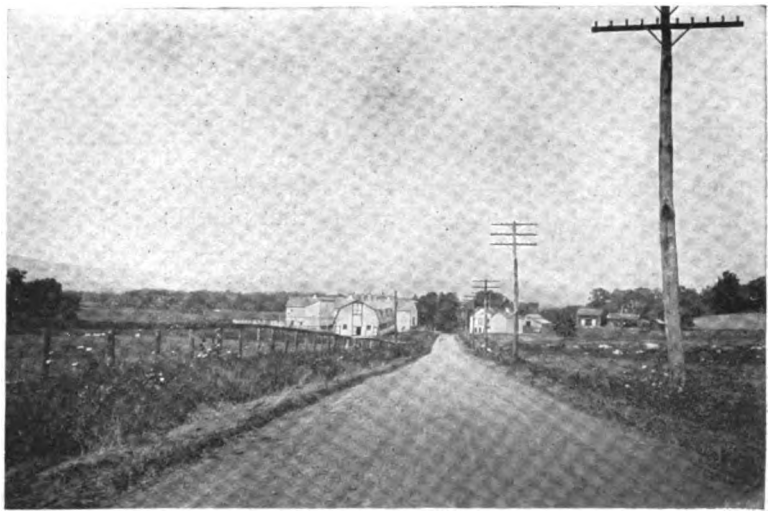
everything. "Give a dog a bad name and it sticks to him." It is the same with roads. They are now laboring under that infernally confusing, false and misleading epithet, "Federal Aid." It is responsible for delay in congressional action. It is responsible for the differences of opinion, on the part of the body politic, as to the wise plan to advocate. It sounds well. It can be made to mean anything that suits the desires of the user. Look at the two maps! Look at the illustrations! In looking, does the country want to have "Roads Beginning Nowhere, Ending Nowhere?" It is unthinkable.

If an appropriation is demanded by its advocates for any particular highway, the advocates of another advance their claims. Failure to agree on which shall be built first prevents action. But if a system of national highways is agreed upon, everyone will be willing to leave when, where and how to a national highways commission.

No plan should be determined upon until after a most thorough investigation and report on the part of a properly constituted commission with an appropriation sufficient to not only do the work, but to give adequate publicity thereto. Such publicity will not only crystallize public opinion, but likewise guide the commission itself in arriving at a wise conclusion.

Substantially no great government work has been undertaken, or large appropriation made therefor, without a careful preliminary investigation and report to Congress thus enabling it to act wisely and with discretion. Why should the building of a system of national highways—the greatest and most important of all—be undertaken with little or no knowledge before Congress of the subject or its needs? The magnitude of the project is such, and many of its aspects are so technical, that it cannot properly be considered in the first instance by a congressional committee; and to refer it to one of the regularly constituted executive departments would unduly burden such department and interfere with routine work, even assuming it was qualified. The wisest course would seem to be the creation of a special national highways commission to investigate the entire subject and report to Congress at the earliest practicable date. Such has been the course pursued with all great public works, including the Panama Canal.

Why should not this be done for highways before the nation is committed to either a system of national highways, or federal aid, so-called? If national highways, it should be known: Where? How long? How wide? How built? What material? At what cost? What proportionate traffic will they carry? What will it cost to maintain them? How much will they reduce the cost of transportation? How much will they increase land and other investment values? Can such investigation and a wise determination be arrived at except by the efforts of an expert commission? It is believed that they can not.



Good Roads—Productive Farms—Valuable Lands.

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THIRD INTERNATIONAL SWEEPSTAKES RACE.

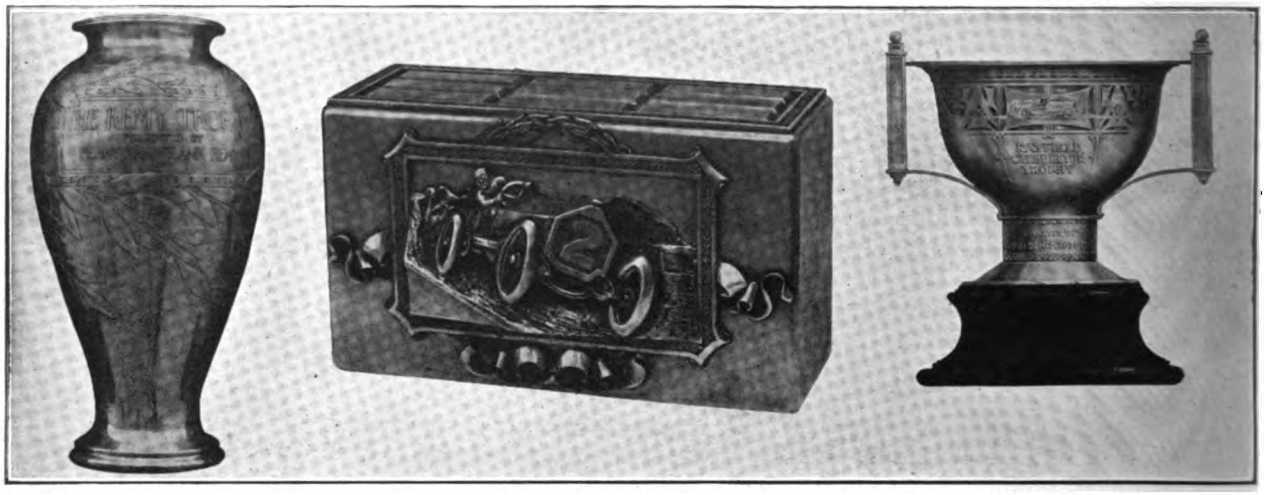
WHEN Joseph Dawson in a National car completed the last lap of the second 500-mile International Sweepstakes race on the Indianapolis motor speedway, Memorial Day, 1911, he not only won the international championship, but he set new world's records for 400 and 500 miles. The car and driver which finishes the third event May 30 will be declared international champion, regardless of whether or not the marks set by Dawson and the National are exceeded. The National took the title from the Marmon, which was driven to first place in the initial 500-mile contest, Memorial Day, 1911, by Ray Harroun.

Harroun's Marmon covered the 500 miles in 6:42:08, or at an average speed of 74.59 miles an hour. Dawson's National lowered the first figure to 6:21:06, the second being increased to 78:72. As an indication of Dawson's consistent driving, reference may be had to the following table, giving the time for each 20-mile period throughout the race (To find the elapsed time at any point add the various times to that point):

Miles	Time	Miles	Time	Miles	Time
20	14:55	200	18:10	360	17:36
40	14:50	220	16:18	380	14:19
60	14:47	240	14:32	400	14:30
80	14:51	260	14:31	420	14:32
100	15:01	280	17:59	440	17:31
120	14:51	300	14:31	460	15:22
140	14:33	320	14:24	480	15:12
160	14:33	340	14:35	500	14:15
180	14:28				

This year's event will be international in every sense of the word. Heretofore, foreign cars have competed, but with American drivers. This year, not only are there foreign machines which have not been seen in an American contest before, but several of the drivers are foreign as well—some of them unable to speak the English language. Among the latter may be mentioned Jules Goux and Albert Guyot of France, Zucarrelli and Trucco of Italy, and Pilette of Belgium. The cars that are new in this country include an English Sunbeam and two French Peugeots. No less than two machines, a Mercedes and a specially reconstructed Stearns, will use Knight sliding sleeve motors.

Thirty-one cars have been entered, and this list may be reduced slightly as a result of the preliminary trials. But 30 cars will be permitted to start, and only those capable of showing an average speed of 75 miles an hour are eligible. The entry list comprises the following:



At Left, Remy Grand Trophy; Centre, Prest-O-Lite Award; at Right, New Rayfield Punch Bowl.

Stutz, Anderson; Stutz, Merz; Nyberg, H. Endicott; Keeton, Burman; Mason, Evans; Mason, Tower; Unknown, ———; Stutz, Herr; Sunbeam, Guyot; Henderson, Knipper; Fox Special, Wilcox; Smada, Adams; Peugeot, Goux; Peugeot, Zucarrelli; Amel, Liesaw; Schacht, Jenkins; Mercer, DePalma; Mercer, Bragg; Mercer, Wishart; Mercedes-Knight, Pilette; Pennebaker-Stearns-Knight, Pennebaker; Tulsa, Clark; Mercedes, Mulford; Isotta-Fraschini, Grant; Isotta-Fraschini, Tetzlaff; Isotta-Fraschini, Trucco; Case, Disbrow; Case, W. Endicott; Case, J. Nikrent; Unknown, ———; Mason special, Haupt.

The Indianapolis track is one of the best known in the world. The course is 2.5 miles long, and the surface is of vitrified brick. A cement wall, three feet high and 11 inches thick extends around the outer edges of the turns. All stands are protected by a heavy wire fence of wide mesh. During the race the course will be patrolled by a special organization of 350 men

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under the command of Capt. W. P. Carpenter, I. N. G.

The speedway management has posted a purse of $50,000, divided as follows: First prize, $20,000; second, $10,000; third, $5000; fourth, $3500; fifth, $3000; sixth, $2200; seventh, $1800; eighth, $1600; ninth, $1500; 10th, $1400. In addition, the Bosch Magneto Company, maker of Bosch magnetos and plugs; Hartford Suspension Company, maker of Truffault-Hartford shock absorbers, and Emil Grossman, maker of Red Head spark plugs, offer special cash awards for certain place cars, conditional upon the use of their equipment. The Findeisen & Kropf Manufacturing Company, maker of Rayfield carburetors, has donated a handsome gold and silver punch bowl, valued at $1000, and $1000 in cash, for the winner, provided the car uses its make of carburetor. To the leader at 200 miles, the Remy grand trophy and Remy grand brassard, the latter carrying a salary of $50 a week, will be awarded by the Remy Electric Company, conditional upon the use of Remy ignition. The Prest-O-Lite trophy, a solid silver brick with a replica of the speedway in bas relief on its obverse, will go to the car which is ahead at the end of 300 miles. The Wheeler-Schebler trophy, a heroic cup of silver, valued at more than $10,000, will go to the driver leading at 400 miles, and $1000 in gold will accompany it if the car is using a Schebler carburetor. It will be seen that the inducements are many and well distributed.

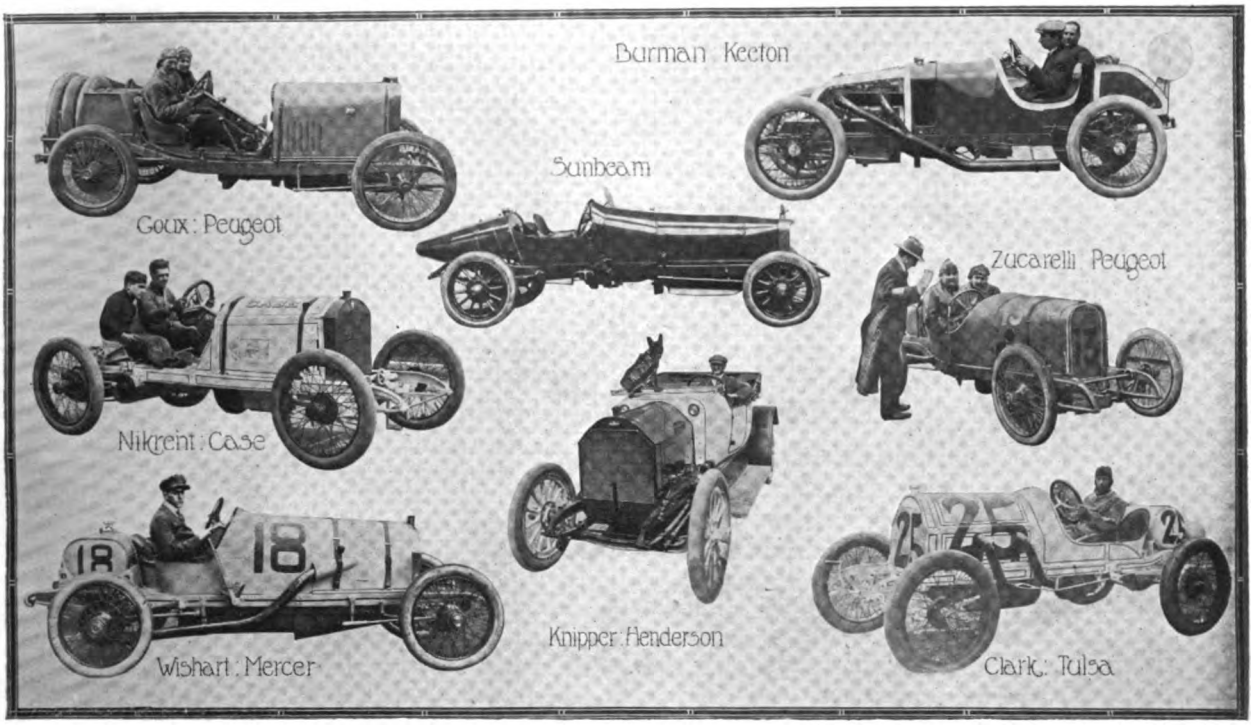
As a further indication of the importance of this year's event, may be cited the fact that the visiting members of the Institute of Automobile Engineers of Great Britain will be the official guests of the speedway during the race. Another distinguished guest will be Charles Faroux, editor of La Vie Automobile of Paris, France, who accompanies the Peugeot team. A special entertainment programme has been arranged for the evening preceding the race.

The officials of the meet are:

President, C. G. Fisher; vice president, A. C. Newby; second vice president, F. H. Wheeler; secretary-treasurer, J. A. Allison; director of contest, C. W. Sedwick; auditor, T. E. Myers; director of public safety, Capt. W. P. Carpenter; general press director, Paul R. Martin; chairman contest board, William Schimpf; representative contest board, David Beecroft; honorary referee, Larens Enos.

Referee, A. R. Pardington; chairman technical committee, F. E. Edwards; starter, Charles P. Root; director of timers, Joseph Frisby; director of scorers, John Cox; scorers, Ellis Hunter, Will J. Dobyns; judges, Howard Marmon, H. B. Joy, Henry Ford, Roy Chapin, F. A. Seiberling, H. S. Firestone, Howard Coffin, J. N. Willys, W. H. Brown, Thomas Hay, J. L. Gavin, C. A. Pfeffer, George M. Dixon; umpires, George Weidley, Harry Hammond.

Announcing director, John P. Dods; director of signals, J. A. Barclay; clerk of course, Carl Walerick; assistants to contest director, Homer McKee, W. L. Esterly, T. B. Shoemaker; assistant starter, John G. DeLong; assistant technical committee, B. Salzgaber, Henry Law, Chester Ricker, Harry Vissering; assistant scorer, A. S. Heiskell; chairman press reception, H. C. Bradfield; surgical director, Dr. Frank R. Allen; superintendent of gates and roads, Frank L. Moore; paddock manager, W. S. Gilbreath; superintendent, E. B. Pierce.



A Few of the Machines Which Will Compete in the Third Annual International 500-Mile Sweepstake Race.

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WHO IS WHO AMONG THE DRIVERS

George H. Clark—Tulsa.

Although connected with racing for some years, Clark came into prominence while driving a Mercedes car at the Galveston beach races of August, 1912. He formerly was with the Cutting team, driving in many western meets with Burman and others. He also drove Mercedes cars in last year's Elgin, Vanderbilt and Grand Prize events.

Albert Guyot—Sunbeam.

Guyot is one of the best known racing drivers in France, where he has finished a winner in a number of events of importance. This is his first appearance in America.

Joseph Nikrent—Case.

While his brother Louis was better known in the industry previous to 1912, Joseph Nikrent has gained an enviable reputation since he first came into national prominence while driving a Marmon in California races in 1911. Last year he drove a Case, winning third place in a number of victories for the year.

Paul Zucarrelli—Peugeot.

Zucarrelli is an Italian, but has been driving French cars for years. Both he and Goux have driven together in many of the important races in Europe, including the French Grand Prix, and Zucarrelli has returned a winner several times.

Jules Goux—Peugeot.

While Burman still holds the world's record for speed, Jules Goux of France recently created a new world's record with his Indianapolis Peugeot on the Brooklands track, when he covered 106 miles, 307 yards in an hour. Burman's speed was 141.73 miles an hour, but for only a single mile. Goux and the Peugeot have a long list of victories to their credit, including the 1912 Sarthe Grand Prix, and others almost as important in Europe.

Ralph Mulford—Mercedes.

Mulford is best known as the winner of the Vanderbilt cup in 1911, in which event he drove a Lozier, although with a car of this make he won the Elgin National trophy in 1910, and created numerous 24-hour records. His first race was on the Point Breeze track in Philadelphia in 1907, this being a 24-hour event. In 1908, he set a new 24-hour record and three weeks later finished in second place in another event of this character, lowering his former time. Last year he drove a Knox.

Louis Disbrow—Case.

Disbrow finished the racing seasons of 1911 and 1912 in second place, considering the list of victories. He has been racing for seven years, his first mount being a Pope-Hartford, which he designed and built himself. Most of his driving, until within the past two years, has been in cars of this make, although he has created a number of hill climbing records in the Knox.

Howard Wilcox—Fox Special.

Wilcox is best known as one of the National racing team in 1911, helping to place cars of that make in the first rank among winners that year. He also has an enviable record as a driver in hill climbing events. He holds the stock chassis record for a mile, having covered the distance in a National car in 0:40.32, and the five-mile beach championship also in a National.

William Endicott—Case.

William Endicott retired from racing at the end of 1910 and bought a farm. He was the first racing driver of the Cole Motor Car Company, and when he learned that this concern was not to be represented in the first 500-mile race, he returned to the track for that event. Previously he had won a number of events with Cole cars, including that for the Massapequa Sweepstakes trophy. Last year he drove a Schacht.

Harry Grant—Isotta-Fraschini.

Few men in America are better known than Grant, chiefly because of his having won the Vanderbilt cup two years in succession with an Alco car. He made his racing debut with a car of this make at Readville, Mass., in 1907. His Vanderbilt victories of 1909 and 1910 brought him into international prominence, and his style of driving—consistent from the beginning to the end of the race—has been adopted by a large number of drivers since that time. He retired from racing in 1911, although last year he was seen at the wheel of a Stutz in a few events in New England.

William Knipper—Henderson.

This will be Knipper's third appearance in a 500-mile race on the Indianapolis speedway, although in 1911 he was relief driver for Burman and in 1912 he acted in the same capacity for the Stutz team. He has driven in races all over the country, but is better known as a driver in long distance endurance trials and as a pathfinding driver.

F. L. Adams—Smada.

Adams has the distinction of being the youngest racing driver in America. The machine he will drive in this event was designed by himself, and it will be noted that its name is that of the driver spelled backward. This is his first race of prominence.

William Liesaw—Amel.

Liesaw is the tallest driver registered by the American Automobile Association, being six feet high. He is a college graduate and a mechanical engineer by profession, but since 1906 has been driving in races in a limited way. Last year he drove a Marquette-Buick in this event, and this year his mount will be a special machine built at Battle Creek, Mich.

Caleb Bragg—Mercer.

Bragg's most notable victory was with a Fiat in the Grand Prize race of 1912. He was an amateur until 1910, and soon after turning professional he astonished the spectators at one of the Brighton Beach races by piloting his car back onto the track after it had crashed through a fence. In last year's 500-mile race he acted as relief driver for Tetzlaff.



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IN THE INDIANAPOLIS 500-MILE RACE.



Spencer Wishart—Mercer.

Wishart is known as a millionaire driver, and until last year he always was seen at the wheel of his own cars, these being machines of foreign make. He acted as relief driver for DePalma in the 500-mile event, and later went with the Mercer, creating new world's dirt track records at Columbus, O.

Gilbert Anderson—Stutz.

The first Stutz car was designed for the first 500-mile race, and Gilbert Anderson drove it the entire distance without stopping. He has driven Stutz cars ever since, and with splendid credit to himself and the maker of these machines. Anderson is a Norwegian by birth. He began his racing career in 1909, when for about 50 miles he lay on the hood of a Marion car, driven by Monsen, adjusting a carburetor.

Harry Endicott—Nyberg.

Harry Endicott has been driving cars since 1904, when he first appeared on the Harlem race track in Chicago. Unlike his brother, he has been something of a free lance, changing from one make of car to another with some little frequency. During the past two years he has been a consistent winner, finishing a victor in a Mason car in the race for the Wisconsin trophy at Milwaukee last fall.

Robert Burman—Keeton.

Besides holding the world's speed record, for which he was crowned the "Speed King" just before the 500-mile race of 1911, Burman has a list of victories to his credit which would fill a small volume. He stood at the head of the list of winners last year. His world's record was made in the "Blitzen" Benz.

Donald Herr—Stutz.

Herr was one of the members of the victorious National team in 1911, and last year went with the Stutz team. His most notable victory was in the race for the Illinois trophy in 1911. He began his career as a car tester and entered the racing field incidental to his other duties. For some 90 miles he relieved Dawson in the winning National in last year's 500-mile event.

John Jenkins—Schacht.

Jenkins began racing as a teammate of Venus, a noted Italian driver, in Europe several years ago. Subsequently he became a pugilist, and it was while on the Pacific Coast early in 1911 that he returned to this field, taking part in a 24-hour event. The Cole Motor Car Company secured him as a member of its team, where he did good work. Among his best known victories was the race for the Hamilton trophy in Cincinnati in 1911.

Charles Merz—Stutz.

While still a boy in short trousers Merz had his first experience at the wheel of a National racing car in Indianapolis, Nov. 4, 1905. The machine crashed through a fence and was badly smashed, but within two weeks Merz was back at the wheel of a National, alternating with Clemens in a 24-hour race, in which new records were created from 650 miles to 24 hours. Since that time he has been a consistent winner, until last year with National cars. He won the Illinois trophy in 1912 with a Stutz.

Ralph DePalma—Mercer.

In last year's 500-mile race DePalma was at the wheel of a Mercedes car, which failed him on the next to the last lap. A similar experience befell him on the last lap in the Grand Prize event, when he was taken to the hospital with what was expected to prove to be fatal injuries. He won the Vanderbilt cup, the Elgin National trophy, the Jepson cup and the Elgin free-for-all in 1912.

Teddy Tetzlaff—Isotta-Fraschini.

Tetzlaff is another California boy. He came into prominence by winning the Santa Monica road race in 1910 with a Lozier, creating a new American road race record. He was less fortunate in 1911, but last year he finished the Santa Monica race in a Fiat with a new world's road racing record. He also took the 200 and 250-mile events at Tacoma, Wash., and finished the 500-mile race in second place, with the same machine.

Robert Pennebaker—Pennebaker.

Pennebaker has had no track experience, although he has driven cars on the road for a number of years and is reputed to be an expert driver, cool headed and scientific. He is a wealthy garage owner in Memphis, Tenn., and his car is a rebuilt Stearns-Knight.

T. Pilette—Mercedes-Knight.

Pilette is a Belgian driver of some little prominence, although he has not been seen on this side. The car he will drive was built especially for this race and has a Knight motor.

Robert Evans—Mason.

Evans and Tower have been teammates for a number of years. Early in 1911 Evans won a one-hour race at New Orleans in a Warren-Detroit. He assisted Tower in a Jackson in the first 500-mile race, and in the fall of 1911 he finished in second place with an E-M-F in the race for the Tiedeman trophy at Savannah, when three E-M-F cars finished in one, two, three order. Last year he drove a Flanders.

Jack Tower—Mason.

Tower began racing in 1901, but it was not until 1907 that he came into prominence. After Heath won the first Vanderbilt Cup race, his Panhard was sold to Edward Hearne. Tower was given the job of rebuilding it, after which he drove it in a number of races in the middle west. He has driven the Buick, Jackson, Warren-Detroit, E-M-F and Flanders.

Harry Haupt—Mason Special.

Haupt has been devoting his attention to the sales end of the industry during the past few years, although he formerly was one of the country's best drivers.

Vincenzo Trucco—Isotta-Fraschini.

Trucco is an Italian driver with a long record in Europe. He is understood to represent the Isotta-Fraschini factory in the race.



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AMERICAN VISIT OF BRITISH ENGINEERS.

SOME 30 members of the Institution of Automobile Engineers and the Society of Motor Manufacturers & Traders of Great Britain and



The Two Presidents: Howard Marmon, S. A. E.; T. B. Browne, I. A. E.

relatives left London, England, for Tillbury, where they boarded the Minnewaska for New York. Thus was begun the official visit of the British engineers to the Society of Automobile Engineers of America. The party is due to arrive in this country Monday, May 26. A tour of inspection and the midsummer meeting of the American society will occupy the attention of the visitors for the succeeding three weeks. The members of the party include the following:

Institution of Automobile Engineers—President T. B. Browne, London; Secretary Basil H. Joy, London; Councillors T. C. Pullinger, Paisley, and Charles Wheeler, London; F. S. Bennett, H. Massac Buist, F. E. Filer, London; Carl F. Benson, T. A. Mackle, Lucien Bollack, Coventry; C. A. Branston, Cambridge; T. Clarkson, Chelmsford; J. B. Ferguson, Belfast; J. Inglis Ker, Glasgow; J. A. Prestwich, Tottenham; R. W. Smith, Redditch; E. B. Wood, E. Wooler, Bristol.

Society of Motor Manufacturers & Traders—J. B. Dunlop, Dublin; C. Gilbert Moore, Twickenham; Tom Norton, Llandrindod Wells; E. C. Paskell, Birmingham.

Relatives—Mrs. T. B. Browne, London; Mrs. T. Clarkson, Chelmsford; Mrs. T. C. Pullinger, Paisley; Mrs. E. B. Wood, Bristol; Mr. Smith, Jr., Redditch.

The event is of decided importance to the industry, both in this country and in Great Britain. The trip was planned as a return visit for that which was enjoyed by members of the Society of Automobile Engineers while abroad in November and December, 1911. As such it will serve to renew friendships made at that time, but it also will afford opportunity for British engineers and manufacturers to become familiar with production methods in vogue in America, and for American manufacturers and others to gain valuable information from their guests.

The exact time of arrival in New York is uncertain, but it is expected that it will be between 10 in the morning and 3 in the afternoon. The party will be met at the pier by officials of the Society of Automobile Engineers and members of the Metropolitan section, the latter being the New York hosts, and conducted to the Hotel McAlpin, which will be the official headquarters during the two-day stay in the city. Thereafter the programme of entertainment will be as follows:

Monday, May 26—Afternoon, baseball game; evening, beefsteak dinner.

Tuesday, May 27—New York City. Morning, visit to the tower of the Woolworth building, Battery park and Wall street, Brooklyn bridge, Prospect park in Brooklyn, Williamsburg bridge, and inspection of testing laboratory of Automobile Club of America. Luncheon at the club. Afternoon, drive uptown, going through Central park, Riverside drive, Eastern boulevard and Grand concourse. Demonstration of fire department apparatus. Evening, regular May session of the Metropolitan section, S. A. E., at which papers on the various phases of motor starting devices will be read.

Wednesday, May 28—En route to Pittsburg. Leave New York over the Pennsylvania railroad at 10:50 in the morning and arrive in Pittsburg at 7:55 in the evening.

Thursday, May 29—Pittsburg. Breakfast at Pittsburg Athletic Club. Trolley to Carnegie-Homestead Steel Works for inspection of plant. Luncheon on the boat to McKeesport for inspection of works of the National Tube Company. Dinner at Fort Pitt hotel. Leave for Indianapolis at 8:55 in the evening.

Friday, May 30—Indianapolis. Arrive at 7:20 in the morning. As guests of the Indianapolis motor speedway management, party will be conveyed to the speedway, where a special stand will be reserved during the 500-mile international sweepstakes race.

Saturday, May 31—Indianapolis. Morning, inspection of Wheeler & Schebler and Prest-O-Lite plants. Luncheon at the Canoe Club. Afternoon, drive around the city, ending in a barbecue. Leave for Detroit at 9 in the evening.

Sunday, June 1—Detroit. Arrive at 7:20. Party will be met by delegates to the annual midsummer meeting of the S. A. E., and escorted to the Hotel Pontchartrain. Automobiles will be placed at the disposal of the guests that they may visit points of interest at their discretion.

Monday, June 2—Detroit. Morning, inspection of Ford Motor Company's plant. Luncheon at Ardussi's. Afternoon at the works of the Cadillac Motor Car Company. Evening at Temple theatre.

Tuesday, June 3.—Detroit. Morning, inspection of Packard Motor Car Company's plant, the party being the



Vice President John G. Perrin, S. A. E.; Councillor T. C. Pullinger, I. A. E.

guests of the company at luncheon. Afternoon, visit to Timken-Detroit Axle Company's factory. Evening, official banquet of the S. A. E. to the I. A. E. at the Hotel Pontchartrain.

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Wednesday, June 4.—Detroit. Morning, inspection of the works of the Hudson Motor Car Company, the Continental Motor Manufacturing Company and the Chalmers Motor Company, with luncheon as the guests of the last named concern. Afternoon, embark at 3 on the lake





Vice President Russell Huff, S. A. E.; Councillor Charles Wheeler, I. A. E.

steamer City of Detroit III for the three-day midsummer outing and meeting of the S. A. E.

Thursday, June 5—Saulte Ste. Marie. First and second sessions of the midsummer meeting will be held on board the boat traversing Lake Huron on the way to Saulte Ste. Marie, which will be reached in the afternoon. Return to the boat at 6 in the evening, with special entertainment on board, leaving late at night for Mackinac island.

Friday, June 6—Mackinac island. Morning, third session of S. A. E. meeting on board ship. Arrive at Mackinac island at 3 in the afternoon. Ashore during the afternoon. Leave at 7 in the evening, with entertainment on shipboard.

Saturday, June 7—Detroit. Morning, fourth session of S. A. E. meeting on shipboard. Arrive at Detroit at 3 in the afternoon. Leave at 10 in the evening by D. & C. steamer for Cleveland.

Sunday, June 8—Cleveland. Arrive at 7 in the morning. Party will be met by local reception committee and escorted to Hotel Statler. The day will be devoted to motor car drives about the city and at country clubs in that vicinity.

Monday, June 9—Cleveland. Morning, inspection of the factories of the Peerless Motor Car Company, Winton Motor Car Company and White Company. Afternoon, drive to Akron, O., for inspection of Goodyear Tire & Rubber Company's plant. Leave by boat for Buffalo at 8 in the evening.

Tuesday, June 10—Buffalo. Arrive at 7 in the morning. The party will be the guests of the Pierce-Arrow Motor Car Company, and will be conveyed in automobiles from the boat to the factory, where luncheon will be served after the inspection of the plant. Afternoon, trolley to Niagara Falls for the inspection of the electric power plant. (Those who desire to return to England on board the Mauretania will leave Buffalo for New York during the afternoon. The remainder of the party will take the extension trip to New England.)

Wednesday, June 11—Providence. Arrive at 11 in the morning, after a night trip from Buffalo with a change of cars at Worcester. Breakfast on the train. Inspection of works of the Brown & Sharpe Manufacturing Company and Potter & Johnson Company, Pawtucket. Leave at 6:35 in the evening. Dinner on the train en route for Bridgeport. Arrive at 9:30.

Thursday, June 12—Bridgeport and New Haven. Morning, inspection of plants of the Locomobile Company of America and the Spring Perch Company. Luncheon as guests of the Locomobile Company of America. Afternoon, motor to New Haven. Arrive 2:30. Visit to plant of New Haven Carriage Company. Night at Hotel Taft.

Friday, June 13—Hartford. Leave New Haven by automobile at 9 in the morning for Hartford. Inspection of Pratt & Whitney, Pope Manufacturing Company and Hartford Rubber Works Company (subsidiary of the United States Tire Company). Leave by boat for New York at 4 in the afternoon.

Saturday, June 14—New York. Arrive at 7 in the morning. Official tour ends.

It will be seen that the programme is one which leaves but little time unaccounted for, and it may be added that it was with difficulty that the committee of arrangements was able to decide which plants should be inspected, when there was so much to be considered. There remains the programme for the midsummer meeting of the Society of Automobile Engineers, at which papers will be presented by members of the Institution of Automobile Engineers and Society of Motor Manufacturers & Traders. This follows:

Morning, June 5—Presidential address, Howard Marmon; treasurer's report; election of new members; new business; reports of iron and steel division, Henry Souther, chairman, and ball and roller bearings division, David Ferguson, chairman; paper, "Manufacture and Physical Properties of Malleable Iron," Enrique Touceda; paper, "A New Tensile Test-Piece and Holder," K. W. Zimmerschied; paper, "Pneumatic Tires," Paul W. Litchfield; paper, "Lubricating Oils," Harry Tipper; topics for discussion, "Design and Treatment of Leaf Springs" and "Worm Gears."

Afternoon, June 5—Paper, "Public Service Vehicles," T. B. Browne, president I. A. E.; paper, "Steam Buses," Thomas Clarkson, member of Society of Motor Manufacturers & Traders; paper, "Calculating Depreciation on Commercial Automobiles," Charles Wheeler, I. A. E.; paper, "Jackshaft vs. Double-Rear-Wheel Brakes," Arthur M. Laycock; paper, "Metal Wheels," Arthur J. Slade; report of truck standards division, William P. Kennedy, chairman; report of commercial car wheels division, William P. Kennedy, chairman; topic for discussion, "Comparative Efficiency of Solid Motor Tires."

Morning, June 6—Paper, "Automobile Production Inspection Methods," F. F. Beall; paper, "Influence of the Sales Department on the Design of Motor Cars," F. E. Moskovics; paper, "Wire Wheels," George W. Houk; paper, "Motor Construction," Claude E. Cox; reports of divisions, electrical equipment, Andrew L. Riker, chairman; broaches, C. W. Spicer, chairman; pleasure car wheels, Henry Souther, chairman; nomenclature, Elliott J. Stoddard, chairman; miscellaneous, Arthur Holmes, chairman; topics for discussion, "Electric Motor Starters," "Possibilities and Limitations of Utilization of Electricity in Operative Motor Car Functions," "Possibility of Weight Reduction in Motor Car Design" and "Hobbing Methods."

Morning, June 7—Paper, "Engine Testing," E. B.





The Two Secretaries: Coker F. Clarkson, S. A. E.; Basil H. Joy, I. A. E.

Wood, I. A. E.; paper, "Motor or Carburetor Test Data," Herbert Chase; paper, "Tests of Automobiles," Prof. L. V. Luddy; report of motor testing division, John O. Heinze, chairman; topics for discussion, "Gasoline Motor Fuels," "Carburetor Nozzle Action" and "Motor Manifolds."

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GENERAL NEWS OF THE INDUSTRY.

Automobile Chamber of Commerce Supplants Older Manufacturers' Organizations—Announcement of First Kerosene Car—Concerns Increase Capital.

AS FAR as active work is concerned, the National Association of Automobile Manufacturers, organized 13 years ago, and the Automobile Board of Trade, organized two years ago, after the dissolution of the Association of Licensed Automobile Manufacturers, have ceased to exist and all affairs of both organizations are now transferred to the Automobile Chamber of Commerce. The first steps to bring about a consolidation were taken at a meeting in Chicago in 1912, when each of the associations appointed a conference committee.

The Automobile Chamber of Commerce was incorporated March 18 by the 14 men who had composed the executive committee of the N. A. A. M., and C. C. Hanch, the only director of the Board of Trade who was not also a member of that committee. The necessity of observing certain legal requirements delayed the actual transfer of all funds, records and books of both bodies to the new organization until now. All the departments of the old associations will be continued under the same management. S. A. Miles, for 10 years general manager of the N. A. A. M., retains that position with the new organization, with H. A. Bonnell as assistant general manager. The traffic department remains in charge of J. S. Marvin and the commercial vehicle work in charge of H. W. Perry, to whose department will probably be added a bureau of publicity with particular reference to the interests of good roads. The officers of the Chamber of Commerce are:

President, Charles Clifton; vice president, Wilfred C. Leland; vice president in charge of gasoline vehicle department, Hugh Chalmers; vice president in charge of commercial vehicle department, W. T. White; vice president in charge of electric vehicle department, H. H. Rice; treasurer, George Pope; secretary, R. D. Chapin; patent committee, C. C. Hanch, W. H. Van Dervoort, L. H. Kittredge, Alvan Macaulay, L. E. Latta; show committee, George Pope, H. O. Smith, Wilfred C. Leland; traffic committee, A. L. Pope, W. E. Metzger, H. H. Rice; legislative committee, J. N. Gunn, G. H. Stilwell, J. I. Farley.

DIVIDES WITH EMPLOYEES.

Williams Foundry & Machine Company Presents Men with Part of the Profits.

J. K. Williams, president and founder of the Williams Foundry & Machine Company, Akron, O., recently personally presented each and all of the employees of that concern with an envelope containing a substantial sum of money. An accompanying card presented the reason for the gift. The company has had a prosperous year and recognizing the part played by its faithful non-salaried employees dispensed among them $1500.

Five hundred dollars was divided according to the length of service with the company, by which was meant uninterrupted service, except for necessary absence, for more than a year previous to March 29, 1913, and $1000 was apportioned according to the number of hours worked during the year regardless of amount earned. Last year the company distributed $1000 among its employees and that labor troubles are and have always been unknown in its factory may be ascribed, in part at least, to the above action.

STEWART-WARNER PERSONNEL.

Three Well Known Men Selected to Head Various Departments.

The Stewart-Warner Speedometer Corporation, Chicago, announces the appointment of three new men as department heads. Gridley Adams, who throughout the life of that organization was a member of the staff of the United States Motor Company, becomes advertising manager with headquarters at the Chicago plant. Mr. Adams is not only well known in the automobile industry, but has a wide acquaintance in the musical field, having at one time been connected with the Aeolian Company. He is regarded as an advertising man of large capabilities and his many friends are confident of his success in the accessory field.

F. W. Baum, for many years one of the best known figures in the motorcycle industry and with a wide reputation as a brilliant writer on motorcycle subjects, has become the head of the motorcycle speedometer department. Mr. Baum will devote his entire time to the demonstration of the new Stewart two-belt instrument in various sections, spending a week or more in each of the Stewart-Warner branch houses.

W. G. Tennant, who has been connected with the sales department of the Peerless Motor Car Company, will call on the entire trade in the interests of the Stewart-Warner instruments. He

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will devote much of his time to special sales work with motor car manufacturers and large dealers.

ONLY ONE CHANGE MADE.

Officers and Directors of Paige-Detroit Company Re-Elected With This Exception.

Only one change was made in the official personnel of the Paige-Detroit Motor Car Company, Detroit, maker of Paige cars, at the annual meeting of the directors. Alexander McPherson announced his resignation from the directorate and his place was filled by J. F. Borquin, general manager of the company. The election resulted as follows: President, H. M. Jewett; vice president, E. H. Jewett; treasurer, Gilbert Lee; secretary, William B. Cady; general manager, James F. Borquin; directors, E. J. Jewett, H. M. Jewett, Sherman L. DePew, E. D. Stair, Willis E. Buhl, C. B. Warren, Charles H. Hodges, Gilbert Lee, J. F. Borquin.

Plans were discussed to provide for increased facilities needed to care for future business. Beginning May 1, H. M. Jewett, president of the corporation, severed all active participation in all other interests to devote the major portion of his time to the development of the Paige industry.

JOINS STEARNS COMPANY.

Guy Vaughan Leaves Olds Motor Works to Take up New Engineering Work.

Guy Vaughan, automobile designer and engineer, well known throughout the country, has resigned from the General Motors Company and severed his connection with the Olds Motor Works, Lansing, Mich., a subsidiary of that concern, to take an executive position with the F. B. Stearns Company, Cleveland, O., maker of Stearns-Knight cars. His connection with the Stearns company gives Mr. Vaughan a newer and broader field of endeavor and his activities with that company will be of a general engineering nature, covering every phase of automobile engineering, motor, chassis and body designing.

Mr. Vaughan at one time brought out a car under his own name, which was very successful both from an engineering and selling standpoint. Later his health compelled him to give up active association with the company building his machine, and take a rest of about a year. Just previous to his connection with the General Motors Company as consulting engineer of the Olds Motor Works, he designed the light duty electric truck chassis for the Buffalo Electric Vehicle Company.

WITH G. C. VAPORIZER.

Well Known Advertising Man Becomes General Manager of New Concern.

Arthur Waterman is now general manager of the G. C. Vaporizer Company of America, Inc., recently organized to produce the G. C. vaporizer, a device for using kerosene and the heavier products of petroleum as fuel for motor cars, motor trucks, motor boats and practically all internal combustion engines. Mr. Waterman has been connected with the automobile industry practically since its inception and has had a highly successful career.



Arthur Waterman, General Manager, G. C. Vaporizer Company.

He is perhaps best known in conjunction with his eminently successful record as manager of the advertising and sales departments of the Hartford Suspension Company, Jersey City, N. J., maker of the Truffault-Hartford shock absorber, which position he held for six years. During his incumbency his progressive methods and keen insight into the exigencies of the business served to create a large and insistent demand for the company's product, thereby greatly increasing the output of its factory and necessitating provision for additional manufacturing facilities.

Mr. Waterman resigned his position last winter and has been closely identified since that time with the organization of the G. C. Vaporizer Company of America. His many friends in the industry are congratulating him upon his advancement and judging from his past record there is every reason to believe that his future success will be as pleasing to them as is the contemplation of his past achievements.

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ANNOUNCES KEROSENE CARBURETOR.

Henderson for 1914 Will Be Fitted with Harroun Device if Desired.

Following the plan adopted last year, the Henderson Motor Car Company, Indianapolis, Ind., will make its formal announcement of the 1914 Henderson line during the progress of the 500-mile race on the Indianapolis motor speedway, Memorial Day. The new cars will be on exhibition at the Claypool hotel.

A particularly interesting feature in connection with this announcement, some advance information concerning which has been supplied by the company, is that the new series will offer what the maker believes to be the first practical kerosene carburetor. It is understood that this will be supplied in the nature of an optional equipment, and the device is the invention of Ray Harroun, the performance of which was mentioned in these columns in the last issue.

SHOCK ABSORBER SUIT.

Blackledge Company Alleges That J. M. Concern Infringes Its Patent.

The John W. Blackledge Manufacturing Company, Chicago, maker of the Velvet shock absorbing springs, has brought suit in the United States district court for the northern eastern district, eastern Illinois, against the J. M. Shock Absorber Company, Philadelphia, maker of the J. M. shock absorber, alleging infringement of patent 988,229, issued March 28, 1911. The Blackledge company claims that it owns the basic patent applying to spring shock absorbers, operating on the principle of connecting at the shackle joint.

According to the plaintiff in this action the Blackledge Velvet spring, operating on the principle in question, was placed on the market and in general use before the J. M. company was in existence, either in Europe or this country.

TO ADD NEW BUILDINGS.

United States Tire Company to Enlarge Its Production Facilities at Detroit.

Several of the 16 new buildings which are contemplated as additions to the United States Tire Company's Detroit plant, the capacity of which will be more than doubled, have been completed and are being utilized in maintaining an increased tire production which this year's business has demonstrated will be necessary.

In addition to extensive improvements at its three other plants, it is the aim of the United States Tire Company to make the Detroit factory its chief base of operation and as a result of this determination more than 1,000,000 feet of floor space will be added to the present dimensions of this mill. President Samuel P. Colt of the company reports that the company's sales the first three months this year show an increase of about 40 per cent. over those of the corresponding months last year.

TREASURY STOCK SOLD.

Miller Rubber Company Plans to Increase Capital to $2,000,000.

Subscriptions for the $200,000 treasury stock of the Miller Rubber Company, Akron, O., maker of Miller tires, which was offered to the stockholders, were received up to and including May 5. Payments are to be made in three installments and the new stock certificates will be issued July 5. A meeting will be called later to increase the capital stock from $1,000,000 to $2,000,000.

A letter to stockholders states that the company is completing buildings which will practically double the factory space. With new machinery which has been ordered the company will be in a position to make about 1000 automobile tires a day and increase all other producing departments.

TO PRODUCE NEW RIM.

George Drake Organizes Company in Detroit to Develop His Invention.

George Drake, 200 King avenue, Detroit, who recently obtained a patent on a new type of demountable and detachable automobile rim, has planned to organize a stock company to place the rim on the market. The plant of the company will be located in Detroit, according to the plans of the inventor and those associated with him in the enterprise. The firm name will be Drake-Promenchenkel Rim Company.

The rim works with intersecting threads and grooves. It can be used on either side, according to those who are familiar with the device. An inner flange works on the same principle and a fork contrivance prevents the rim from slipping off when the automobile is backed up.

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UTILIZING CHEAPER FUELS.

Manufacturers Adopt Plan Which Is Expected to Result in Decided Gasoline Saving.

As a reaction against the high price of gasoline, automobile manufacturers are beginning to employ cheaper fuels for testing purposes and while this practise has not yet become general, from present indications it is safe to predict that it represents a possible saving of upwards of 3,000,000 gallons of gasoline within the next 12 months. On the same basis of calculation the employment of cheaper fuels for motor testing will involve a direct saving of at least $1,750,000.

This was one of the many phases of the gasoline situation considered at a meeting held at New York City by the special investigating committee of the Society of Automobile Engineers recently appointed to co-operate with the gasoline producers and others in seeking a solution of the automobile fuel problem. A preliminary canvass of the work to be done has disclosed that the investigation should be organized upon a rather more elaborate basis than seemed needful at the outset. In view of this actual productive work cannot be undertaken until certain pending arrangements with respect to laboratory facilities and other matters are perfected.

LEAVES INTERNATIONAL MOTOR.

R. W. Hutchinson, Jr., Well Known Motor Truck Writer, Resigns.

Rollin W. Hutchinson, Jr., advertising manager of the International Motor Company, New York City, maker of Mack, Saurer and Hewitt trucks, has resigned his position, to take effect June 1. His future plans are not yet announced. Mr. Hutchinson has had charge of the advertising and publicity of the International company and its predecessor, the Saurer Motor Company, since their establishment, and has acquired a unique reputation among motor writers for his broad and comprehensive knowledge of motor truck subjects and the attitude of business interests toward them.

Being a graduate engineer and a student of mechanical sciences, his view of the motor industry has been especially intelligent and comprehensive and his articles on trucking subjects and traffic economies have given him a national reputation as a writer and student of these topics. As a producer of genuinely educational publicity he has been prolific and distinguished.

JOINS EMPIRE FORCES.

Lawrence R. Wilbur Becomes Assistant General Manager, Aiding C. E. Gibson.

Lawrence R. Wilbur, a prominent member of the Indianapolis motor world, has been made assistant general manager of the Empire Automobile Company, Indianapolis, Ind., maker of Empire cars, popularly known as the "Little Aristocrat." Mr. Wilbur has been identified with the automobile industry since 1908, when he became connected with the Willys-Overland Company at Toledo, O.

In the fall of 1910 he went to Indianapolis and as secretary-treasurer helped to organize the Marion Sales Company, which at that time sold the entire Marion output. When in July the new Marion Motor Car Company took over the sales and manufacturing of Marion cars, the new A. & M. Sales & Service Company of Indianapolis, Marion and American distributor, was organized with Mr. Wilbur as secretary-treasurer.



Lawrence R. Wilbur, with Empire Automobile Company.

In his new connection with the Empire Automobile Company he will have direct charge of the business management of the company's executive office and this will permit C. E. Gibson, general manager, to devote more time to the production of the plant, which in view of the extensive enlargement planned for next year, is of utmost importance.

FIRST CYCLECAR FACTORY.

Economycar Company of Indianapolis Claims That Honor in America.

Since the appearance of the Bedelia, which is regarded as the first cyclecar of Europe, 87 dif-

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ferent factories have been established abroad for the production of this type of machine. Reports from Detroit indicate that no less than four companies are contemplated in this field during the present year. Indianapolis claims the honor of having the first factory in operation, this being the plant of the Economycar Company, which expects to have its first machine for inspection by manufacturers and dealers during the 500-mile race, Memorial Day.

More details are promised later, but it may be stated that the motor is a two-cylinder, air-cooled unit rated at 8-10 horsepower, drive is by chain or V belt as with conventional motorcycles, wheelbase is 106 inches and tread 36. Wire wheels will be utilized, these taking 28 by three or four-inch tires.

GARAGE OWNERS ORGANIZE.

Massachusetts Concerns Form Association to Benefit Conditions.

The Massachusetts Garage Association, Inc., was formed in Boston, May 1, the object being to place the garage owners of the state on a much higher plane than they have occupied heretofore. It also is expected that the organization will aid greatly in impressing the automobile owner that by dealing with a member he will be safeguarded against overcharge for service rendered or supplies furnished. Any garage owner in the state, who is vouched for by a member of the association, is eligible to membership.

The following officers and directors have been elected:

President, J. S. Hathaway, White Company, Boston; vice president, J. E. Savell, Motor Car Service Company, Boston; secretary-treasurer, Chester I. Campbell, Boston; directors, V. A. Charles, Inter-State Automobile Company, Boston; F. W. Boynton, Hyde Park Auto Station, Hyde Park; John F. Fleming, Brookline Garage, Brookline; J. S. Hathaway; C. E. Harris, Harris Garage Company, Easthampton; J. W. Robertson, Robertson Motor Car Company, Taunton; R. H. Hartley, Church Street Corporation, Lowell, and J. E. Savell.

ERECTING LARGE ADDITION.

Rauch & Lang Carriage Company to Increase Plant for Production of Electrics.

The Rauch & Lang Carriage Company, Cleveland, O., maker of the Rauch & Lang electric automobile, has broken ground for a four-story building at West Twenty-sixth street and Chatham avenue. The new structure will have a frontage of 199 feet on West Twenty-sixth street and 112 feet on Chatham avenue. It will be of brick and steel and will have an unusual amount of light, the walls being largely a framework for the windows.

The structure will be in architectural keeping with the buildings of the present plant, but it will also be designed with regard to the ornamental. A sprinkling system will be installed throughout. This will represent an addition of 78,000 square feet to what is claimed already to be the largest manufacturing plant in the world devoted exclusively to the production of electric pleasure vehicles.

GILBERT SUCCEEDS JEWETT.

Latter Retires as Lozier Head to Devote Entire Time to Paige Cars.

Joseph M. Gilbert has become president and general manager of the Lozier Motor Company, Detroit, maker of Lozier cars, having resigned the general management of the United States Tire Company to engage directly in the manufacture of the automobile. At the election of new officers of the Lozier company held at Detroit, Mr. Gilbert was chosen to succeed Harry M. Jewett of Detroit, who for some months has been president of the company, making a considerable sacrifice of time and business interests to act in that capacity until the contemplated reorganization could be carried into effect.

At the same meeting Harry A. Lozier was elected vice president; Fred Gies, secretary and assistant treasurer, and N. R. Feltes, treasurer. Mr. Jewett, who is a large coal operator in Detroit, will hereafter devote himself chiefly to the Paige-Detroit Motor Car Company, maker of Paige cars, of which he is president and in which he is heavily interested financially. He remains a director and member of the executive committee of the Lozier company.

TO CROSS THE CONTINENT.

Maker of Haney Fire Apparatus to Remove from California to Florida.

The Haney Fire Fighting Apparatus Company, Stockton, Cal., through its president, Edward H. Haney, and its general manager, Edward Olds, announces that it will move to Tampa, Fla., where it will manufacture fire fighting apparatus and motor trucks. The company, which is incorporated for $2,000,000, is said to have purchased 31 acres of land southwest of Tampa and has contracted to build a plant at a cost of $50,000.

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NEW AND NOVEL ACCESSORIES THAT APPEAL TO MOTORISTS

Maxi Carburetor.

The Maxi carburetor, type B, manufactured by the Maxi Company, 37 Wall street, New York City, has a mixing chamber which is virtually a tube with two openings to the outer air, either one of which may be utilized for connecting to the source of hot air. There are two fuel adjustments, a low and high, also a low speed air control. There is no adjustment to the main air supply, the object being to admit air to the motor without restriction. A channel leading from the float chamber supplies fuel to the high speed regulating valve, and also furnishes gasoline to the low speed nozzle, which has a gauged orifice at its upper end. When the engine is idling the vacuum is allowed to operate through a low speed regulating valve having a seat, taking the proper amount of fuel through an orifice. The emerging liquid is mixed with air and the mixture passes up through a channel entering the mixing chamber above the throttle valve. Here it is further mixed with air controlled by the low speed air member. The channel has a number of drilled holes, which when the throttle valve is closed, are open to the atmosphere by way of the main air ports. The air passing through the holes partially reduces the vacuum around the orifice member, A bushing, also open to the atmosphere, operates in a similar manner to the holes. As the throttle valve is opened the holes are successively brought into a position above it, increasing the vacuum about the orifice, and supplying more liquid. From one-quarter to the full open position of the throttle valve, high speed jets are brought successively into action, increasing the suction, resulting in the supply of fuel being augmented in proportion to the air supply. All fuel before entering the carburetor passes through two fine screens.

Miller Polishing Cloth.

Chas. E. Miller, 97-103 Reade street, New York City, is marketing salesmen's sample blankets, which are used for washing, wiping and polishing cloths. They are made in three sizes, 20 by 5.5, 20 by 8.5 and 20 by 11.5 inches, and are double and crochet stitched around the edge. The cloths are strong and elastic, will not tear and can be washed and used over and over again. They are inexpensive.

Vesta Motorcycle Rear Lamp.

The Vesta Accumulator Company, 2100 Indiana avenue, Chicago, is manufacturing a lamp especially adapted to motorcycles. It is an electric unit, is provided with the conventional red semaphore and has a vertical ray of white light for illuminating the license number. The last named is secured to the bracket and the lamp is adjustable. The construction is sturdy and the workmanship and material are high grade.

Blue Ribbon Radiator Cement.

Blue Ribbon leak proof radiator cement is the product of the International Metal Polish Company, Indianapolis, Ind., and is guaranteed by the maker to repair an ordinary leak in a few minutes. It is placed in the radiator and mingling with the water, is carried throughout the circulating system, stopping leaks through the composition hardening when exposed to the air. It is pointed out that the cement will not injure the metal, nor is the efficiency of the radiator impaired by its use. It comes in small screw top cans and is a valuable addition to the equipment when touring as leaks may be mended in out of the way localities.

Sly Steel Tool Box.

The Sly steel tool box is marketed by Smalley Daniels, Detroit, and all sizes are made to order at short notice to meet individual requirements. The finish is made to match that of the car and the fittings may be brass or nickel plated as desired. The best type of toggle or suit case lock is utilized. Battery boxes are also constructed to order.

Velvet Springs.

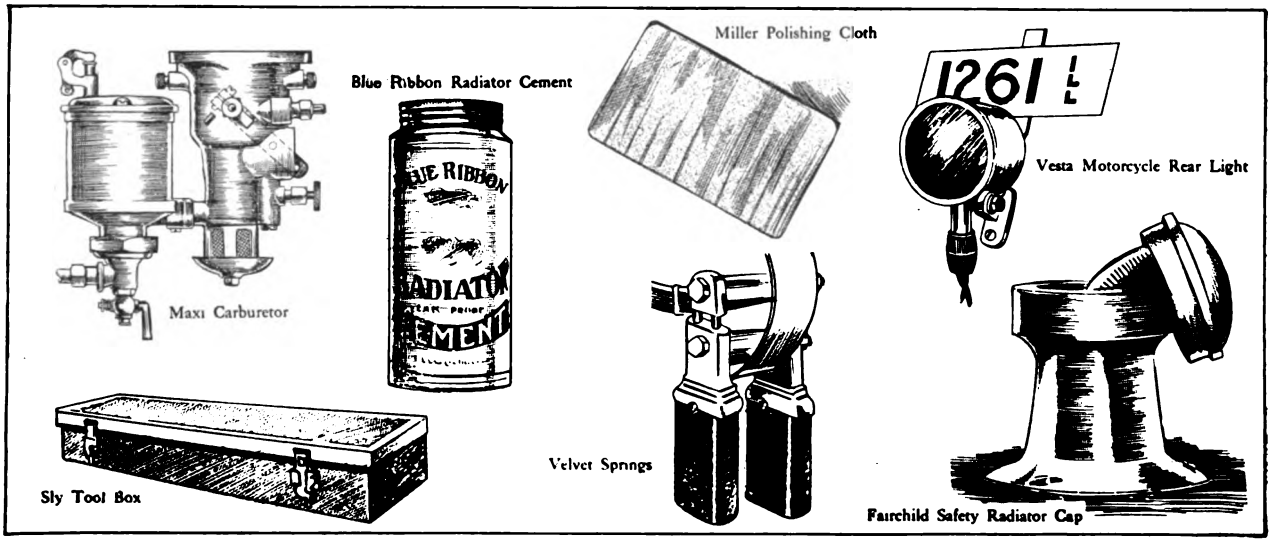
The Blackledge shock absorbing Velvet springs are marketed by the John W. Blackledge Manufacturing Company, 2112 Michigan avenue, Chicago, and are noticeable for their compactness and neat design. When attached to the car they become a part of the main springs and the design of the shock absorbers is such that they adjust themselves to varying loads and roads. The springs are so held that side sway is eliminated and among the advantages of the Velvet springs is that they may be attached in a few minutes. No boring or special fittings are necessary. They come in sets of two for the rear springs of the car and are designed for machines of varying weights.

Fairchild Safety Radiator Cap.

H. C. Fairchild, Maplewood, N. J., is manufacturing the Fairchild safety spring radiator cap, which is designed for model T Ford cars. The device replaces the usual member, is neat in appearance, and being retained by a spring is easily removed and replaced. It is impossible to lose the cap, and considerable time is saved in examining the radiator to note if it contains the proper supply of water, as there are no threads. Sticking caps are eliminated and the device serves as a safety valve as it is displaced when steam is generated by the overheating of the motor, thus notifying the operator of a hot engine. The Fairchild cap is easily attached and is moderately priced.

Apco Ford Foot Accelerator.

The Auto Parts Company, Providence, R. I., maker of Ford specialties, is marketing the Apco foot accelerator, designed especially for model T Ford cars. By its use the driver is enabled to control the throttle by the foot, leaving both hands free to operate the car, an advantage when travelling in crowded traffic or on long trips. It enables the setting of the wheel throttle lever to 10 miles an hour for example, and when high car speed is desired,



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the accelerator is depressed. The device requires but a short time to attach and does not interfere in any way with the regular control of the machine. The pedal is secured by two screws and does not multilate the floorboard.

Simplex Water Economizer.

The B-L Sales Company, Chicago, is manufacturing the Simplex water economizer, which is designed to be attached to the end of a hose. It is fitted with a nozzle and includes a valve actuated by a thumb plunger which when pressed, allows the water to pass through and automatically closes when the pressure is released. It is claimed that the device saves a large percentage of water from being wasted. It is moderately priced.

Harris' Gasoline Gauge.

The Approved Auto Specialties Company, 1731 Broadway, New York City, is marketing Harris' gasoline gauge, which presents practical features in that the height of the fuel in the supply tank is correctly indicated, and the readings are not affected when the car is on grades, etc. The gauge operates on the principle of liquid balance and is free from mechanism or moving parts. The gauge proper comprises a short section of heavy glass tubing, protected by nickel plated metal trimmings. An U tube carrying a red fluid is connected to the gauge and the rise and fall of the fuel in the tank raises or lowers the colored liquid in the gauge through compression of the air, compressed by hydrostatic pressure. All connections are made air tight and a small cup in the gasoline tank has a small notch at its lower edge. This allows the fuel to flow into the cup when it is poured into the container. Upon the liquid reaching the height of the notch the tube leading to the U shaped member is closed. As the fuel rises in the tank the air in the tube is compressed, the red liquid rising in the gauge proportionately to the amount of gasoline, and vice versa. When a pressure feed is utilized an additional tube connects the top of the tank to the top of the gauge. The gauge may be placed at any height above or below the tank, and is adaptable to fuel or oil systems.

Dover Safety Waste Can.

The Dover Stamping & Manufacturing Company, Cambridge, Mass., is marketing the Dover safety can, which is a receptacle for oily waste and a positive safeguard against spontaneous combustion. It is constructed of heavy galvanized metal and is provided with a self-closing cover, making it impossible for the workmen to leave the container open. The can is fireproof and is made in varying sizes.

Triplex Auto Lock.

The Bremer-Wilson Manufacturing Company, 1421 Michigan avenue, Chicago, is producing the Triplex auto lock, designed for model T Ford cars and others of a similar size. It comprises a lock with steel shackles, these being secured to a semi-circular clip, which is placed around the starting crank, preventing the latter from being pushed in or meshed with the crankshaft of the motor. The padlock is sturdily constructed and is so arranged that the shackle springs open when unlocked. A stop is also provided so that the device may be fitted easily in the dark. Two keys are supplied with each lock and there are no duplicates outside of those furnished.

New Scott Automobile Curtains.

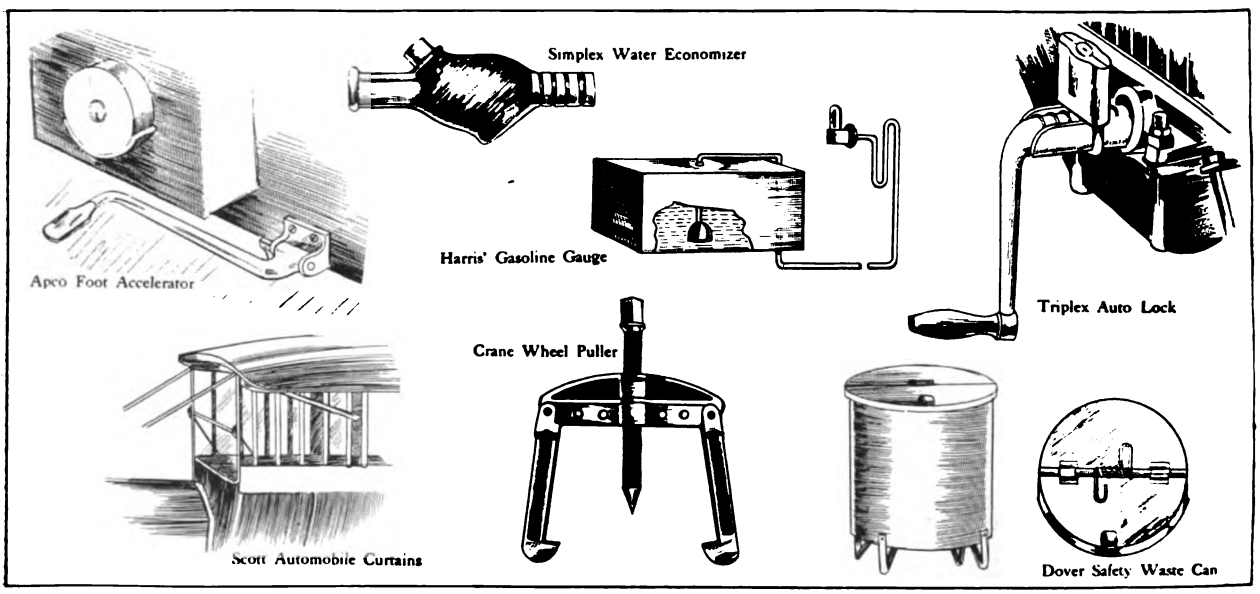
The Star Storm Front Company, Troy, O., is manufacturing what is termed the New Scott automobile curtains, which make for convenience in that they are not removed and may be placed in position in a few seconds. The fixtures consist of a pair of double-channel housings of pressed sheet metal, one for either side of the car, and each contains two all-metal rollers on which the curtains operate automatically. The fixtures, which are attached to the front bow, are held in place at the top and bottom, and the connections are rattle proof. All curtains are operated and fastened from the inside, and when drawn are held securely in place by hooks. The tension of the spring members is said to keep the curtains free from wrinkles. Any size or shape celluloid lights may be fitted. When not in use the curtains roll up and the fixtures do not detract from the appearance of the car.

Crane Wheel Puller.

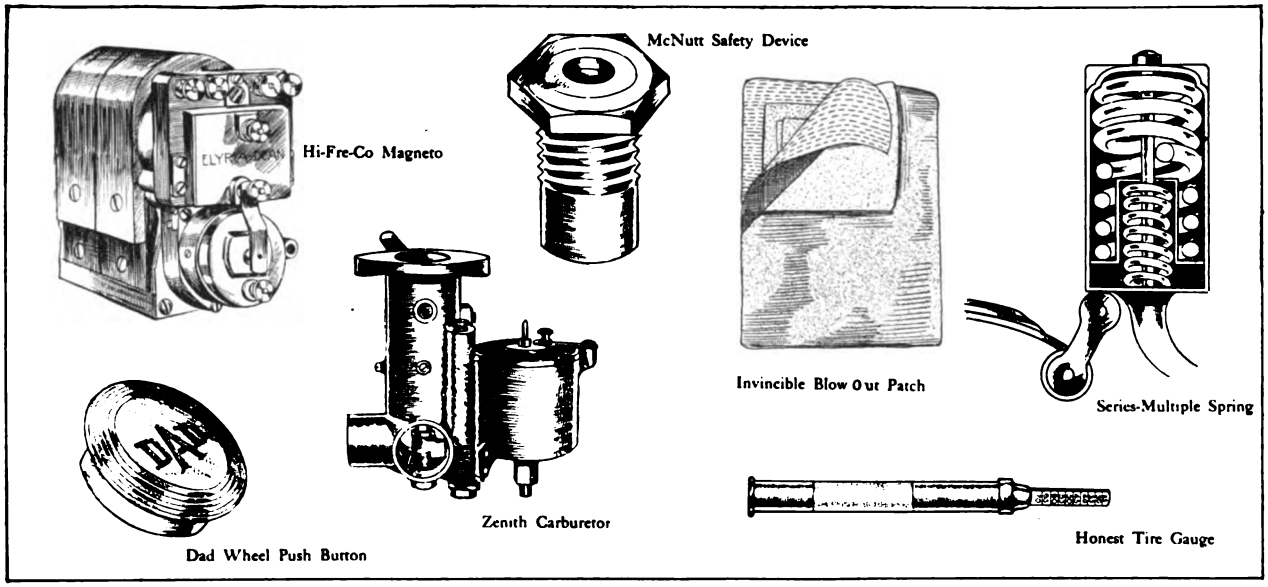
The William Crane Company, Boston, is marketing the Crane improved patent wheel and gear puller, which is constructed in two sizes. The larger tool has two or three arms, beam radius of seven inches and hook and extension arms 10 inches long. The small size is made with two or three arms, has a five-inch beam radius, with hook arms six and nine inches long. The puller is drop forged from a high grade carbon steel, and the screws are cut by special machinery and case hardened all over. It can be employed on work of considerable diameter by heating the arms and bending them to fit. The company offers to replace any puller broken on any legitimate work. The Waite Auto Supply Company, 81 Exchange Place, Providence, R. I., is distributor.

Hi-Fre-Co Magneto.

The Hi-Fre-Co magneto is an Elyria-Dean product, being manufactured by the Dean Electric Company, Elyria, O. It differs from the conventional types of magnetos in that a high frequency spark is produced. It is oscillatory in character, 500,000 to 1,000,000 cycles a second being used. The gas is ignited by ionizing, and embracing a larger volume of gas molecules, makes for a more rapid and complete combustion. It is stated that poor mixtures are easily ignited. The wiring carries low voltage currents and little resonator coils step-up the pressure. It is held that leakage is eliminated and that the use of high insulation in the magneto, switch and connecting wires is not necessary. High cylinder pressures are held to have less effect on the spark than with conventional systems. A feature of the Hi-Fre-Co is



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that wide spark plug gaps are permissible, .0625 to .09375-inch, and that the disruptive action of the spark overcomes fouling. It is pointed out that the motor may be operated on the magneto at very low speeds and that the gas will ignite below 50 revolutions a minute, making the magneto especially adaptable to motor starting systems. The Hi-Fre-Co is made with resonators, also with a dual coil and combined dash switch, and for four and six-cylinder motors.

McNutt Safety Device.

The McNutt safety device is the product of the McNutt Can Company, 352 Pearl street, New York City, and is designed for installation in fuel tanks of all dimensions. It sounds a warning as soon as a dangerous pressure occurs by making a loud whistling noise, and a safety valve releases the pressure. The screw cap is provided with a fusible disc valve, which when the tank is subjected to contact with fire, will give vent to the pressure, thus preventing explosion. The valve seat will melt at 300 degrees Fahrenheit, and the entire valve will blow out, leaving a clear opening and preventing bursting of the container. Further protection is afforded by a fire sceen located at the bottom of the device, it preventing the flame back-drafting into the tank. The safety screw cap is provided with a check valve for gravity systems, preventing vapors from leaving the tank, but permitting air to enter to break the vacuum. It is utilized on the battleships of the United States navy.

Invincible Blow-Out Patch.

The Invincible Tire Company, 53 Sabin street, Providence, R. I., has brought out a blow-out patch in which is incorporated the non-puncture and non-blow-out features of the Invincible tire. The patch differs from those of conventional practise in that in addition to the usual fabric there are two layers of chrome leather. These are between the layers of fabric, and being very pliable conform readily to the casing when inserted. One side of the outer fabric is coated with pure para gum, protected from dirt, etc., by a holland cover. When use of the patch is desired, the cover is stripped and the gum surface moistened with gasoline. This side of the patch is applied to the interior of the casing and being self-vulcanizing, it is impossible for the patch to creep or slip. With the Invincible blow-out patch the use of an outside sleeve is not necessary as the chrome leather reinforces the construction and posseses an additional advantage in that it cannot be punctured. The Invincible is moderately priced and can be utilized over and over again.

Series-Multiple Springs.

The Series-Multiple springs are marketed by the Series-Multiple Spring Company, 1926 Broadway, New York City, and comprise two spirals superimposed and of different capacity. The small spiral yieldingly supports the empty car, the larger member the partly or fully loaded machine, and the leaf spring takes the overload, all working in series. The Series-Multiple are attached to the end of the leaf spring, the spirals being separated by a pressed steel thimble. The nut on the top is to give the small spiral initial tension for either a runabout or a five-passenger car. The housing is of bronze, the spring bracket a drop forging, and all parts are water and dust proof.

Dad Wheel Push Button.

The Dad steering wheel push button is marketed by the Dean Auto Devices Company, 120 South Sangamon street, Chicago, and presents interesting features, among which is that it will close the electrical circuit by touching it at any portion of the moving element. The device is mounted on one of the spokes of the wheel, about .25 inch from the rim, and is so constructed that the slightest touch will operate it. The button member is constructed of a high grade insulated material, nicely finished, and is roughened to prevent slipping of the finger. One of the advantages of the Dad push button is that it may be actuated when the hands are covered with mittens, etc. The equipment includes suitable length of braided cable, and the outfit is moderately priced.

Zenith Carburetor.

The Zenith carburetor, employed on leading makes of cars abroad, is being manufactured in this country by the Zenith Carburetor Company, Detroit. It is claimed that it will provide a perfect mixture regardless of car speeds and is not affected by changes in altitude or by various grades of fuel. The usual springs, valves, pistons, etc., are eliminated, and the throttle is not connected to any moving part to correct operation of a single nozzle. The spraying nozzle is of the compound type and is such that the motor receives a constant mixture at all speeds, and all the air goes past the nozzle. Two jets are utilized, a compensating member which corrects the action of the main jet, and which has a predominating influence at low speeds, as when climbing grades. Easy starting is obtained by a priming tube which extends into the secondary well and opens just below the butterfly valve. When the latter is partially open, a powerful suction is created, effectively priming the cylinders. The Zenith is made in several sizes and enjoys an enviable reputation abroad.

Honest Tire Gauge.

The Honest tire gauge is manufactured by the National Motor Supply Company, Cleveland, O., and by it the pressure of the tires may be ascertained easily and quickly. It is of the pencil type, is very accurate, and is nicely finished. The pressure of the shoes is recorded automatically, the plunger coming to a stop until released. The Honest tire gauge comes in a box on which is printed the proper pressure for each size of tire marketed. It is moderately priced.

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HIGH-TENSION MAGNETO ON FORD CAR.

Novel Installation of Bosch Without Altering Power Plant Increases Speed About 20 Per Cent.—Provides Two Independent Ignition Systems.

(By C. P. Shattuck.)

RARE indeed is the motorist who at times has not wished that his engine developed about five horsepower additional in order to cope with

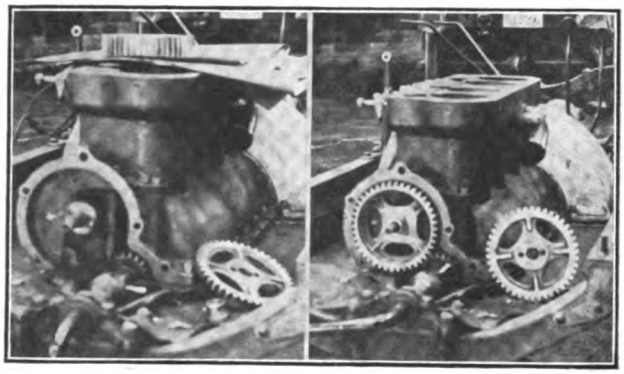


Fig. 1—Showing the Old Gear Displaced (at Left) and Special Gear in Place (at Right).

temporary conditions, such as a strong head wind, steep grades, sandy roads, etc. It is but natural to desire to do as much driving as possible on the high gear, and if this be of such ratio as to give good results normally, more power is usually wanted under abnormal conditions. A given motor to develop its maximum horsepower must in addition to having its reciprocating parts in first class condition and in harmony with each other, be supplied with a perfect mixture and an absolutely synchronized spark. The advantages of synchronization may be summed up as follows: Maximum power, a smooth operating and cool motor, and economy of fuel.

An improvement over normal conditions came under the observation of the writer recently, the car in question being a model T Ford, the owner of which was influenced to install a true high-tension magneto by the performances of similar chassis fitted with such magnetos on the Brooklands track, Weybridge, England. Reports state that mile-a-minute and better speeds were attained.

The installation of the magneto, the various steps of which are shown in the accompanying illustrations, was complicated in that the owner desired the retention of the standard ignition system—the flywheel magneto, commutator and coil—stipulating that no changes were to be made that would interfere with the use of the regular equipment. The silent chain drive utilized on the models abroad was not adaptable under these conditions without alterations involving considerable expense, etc. Ordinarily it would have been possible to replace the timer by a gear, meshing the latter with a gear on the armature shaft of the magneto, and obtaining crankshaft speed by suitably proportioning the driving and driven members.

The problem was solved by Walter G. Swift of the A. C. Danver Company, Inc., Providence, R. I., whose installation presents interesting features in that the magneto is positively driven and the gears are completely enclosed, without altering or cutting the crankcase of the motor. It provides for two separate and independent systems of ignition by utilizing a double system or dual spark plugs, and a triple system may be obtained by the use of dry cells or a storage battery. The third source of current would not, however, be necessary.

Figs. 1 and 2 present the installation clearly. The usual gear on the camshaft, which is retained by dowel pins integral with the shaft, was replaced by a specially designed gear, one providing room for a bearing on the shaft for the commutator. This gear is shown in place at the right at Fig. 1, as well as the old member, the former

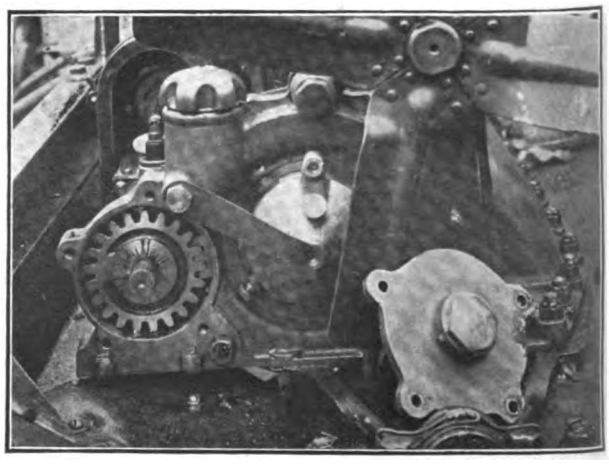


Fig. 2—The Usual Gear Housing Plate Is Replaced by a Special Design, One Carrying a Gear, and the Magneto Is Mounted on a Base Bolted to the Crankcase and Cover Plate.

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having the same number of teeth as the displaced gear, 42.

In order to obtain a magneto drive at crankshaft speed, necessary with four-cycle, four-cylinder motors, the pinion driving the magneto was cut with 21 teeth. A pattern was made for a special front cylinder cover or housing, it being machined carefully to make it oil tight as the gears operate in lubricant supplied from the crankcase. A removable cover was fitted to the housing, making the magneto gear accessible for timing, etc.

Similar ingenuity is noticeable in the mounting of the magneto, which is a Bosch, made by the Bosch Magneto Company, New York City. A plate is bolted to the upper half of the crankcase and to the special cover, the method of retention being shown at Fig. 2. The magneto is secured in the usual manner, a strap being em-

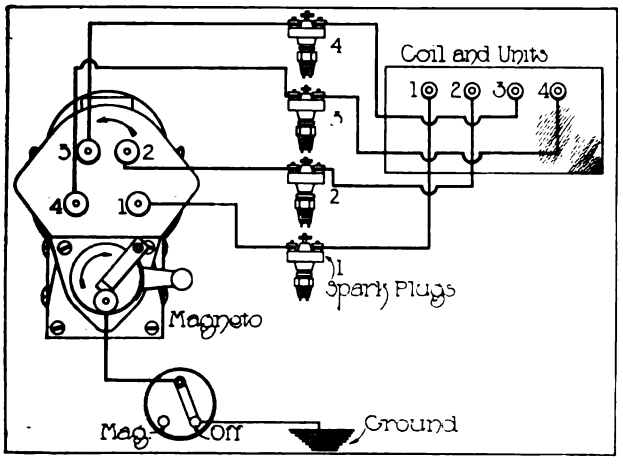


Fig. 3—Wiring Diagram of True High-Tension Magneto and Regular Ignition, Providing Two Independent Systems by Use of Dual Spark Plugs.

ployed. Drive is through a special form of Oldham coupling, which compensates for any possible misalignment.

The advance and retard of the magneto and commutator are simultaneous and are controlled by the usual spark lever. A rod connects the timer with the control rods of the breaker box, bell cranks and ball and sockets being utilized, although these are not shown in the illustrations, as the photographs were taken before the work of the installation was completed.

The writer accompanied Mr. Swift in the trial trips during which three different makes of carburetors were utilized. The first gave the most satisfactory results, the other types showing a tendency to starve the cylinders at high speeds, although apparently providing a good mixture up to 45 miles an hour. The tests were conduct-

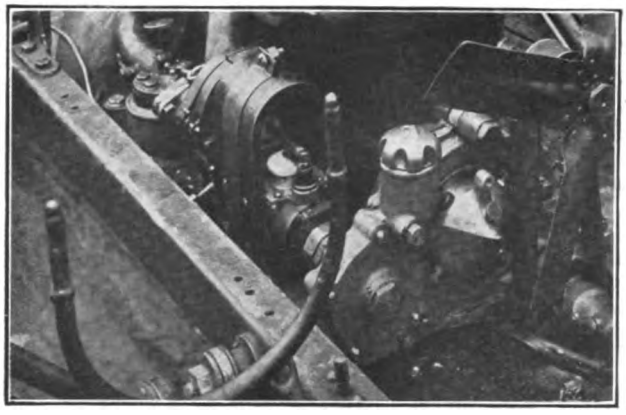


Fig. 4—Showing the Installation of the Magneto on Model T Ford Without Altering the Design of the Power Plant or Removing the Timer.

ed on the road and after the final tuning up a trial was made early in the morning to ascertain the limit of speed.

Previous to the installation of the magneto the car is said to have attained 56 miles an hour, and in explanation it should be stated that it is geared up, the ratio being about 1.4375:1, the usual gearing being 4:1. A standard high grade speedometer was fitted to the chassis and upon entering a straight, level stretch of road the throttle was gradually opened. The motor responded quickly in spite of the high gearing and the indicating hand of the speedometer climbed rapidly, reaching 40 miles an hour in a very brief period. A maximum throttle resulted in 68 miles an hour, and although the adjustment of the carburetor was changed, this speed was not exceeded. Later, the writer was informed that the chassis was driven at a rate of 72 miles an hour.

The car held the road remarkably well in spite of the high speed and in turning out to pass a team straightened up without undue skidding. Although driven at high speeds, there was no in-

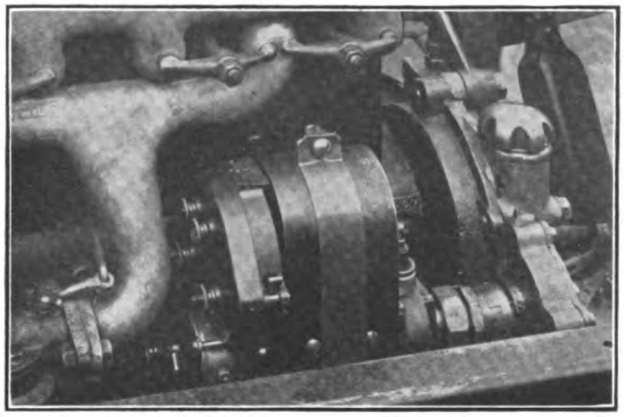


Fig. 5—Side View of the Magneto, Showing Method of Drive Through an Oldham Coupling.

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dication of heating and the hands could be placed on the radiator without discomfort. During the trip several stops were made to set the carburetor and the motor was subjected to racing that would ordinarily result in boiling of the cooling fluid.

The car showed exceptional hill climbing qualities in spite of the high gearing and took several steep grades much faster, in the opinion of the writer, than similar cars with stock gearing. The engine responded quickly to the throttle and was started easily by a quarter-turn on the Bosch magneto. Mr. Swift is authority for the statement that the mileage a gallon of fuel was considerably more than formerly, according to speedometer readings.

It is the intention of the owner of the car to utilize the flywheel magneto for lighting, the machine being equipped with standard electric headlights. Although the expense of the installation was considerable, due to the special cover, etc., the A. C. Danver Company, Inc., intends to manufacture the fittings in quantities which should bring the cost within the reach of those of moderate means. Any true high-tension magneto of suitable proportions may be utilized and as all parts are accurately machined, the installation should not require any knowledge other than that of timing a magneto.

NATIONAL DEALERS' BODY.

Proposed Meeting for Organization Purposes Scheduled for Indianapolis.

It is understood that a meeting will be held in Indianapolis, Ind., shortly before the holding of the 500-mile race, at which steps will be taken toward the organization of a national association of automobile dealers. This decision was reached at a conference in New York City recently, the details being left to Frederick H. Elliott.

The proposition embraces a plan for united endeavor on the part of the various local associations throughout the country, and it is felt that the interests of dealers would be greatly served by co-operation in such matters as credits, legislative campaigns, etc.

LONG DISTANCE TOURING.

Mr. and Mrs. Williams Plan to Visit Every State in the Union.

To say that he has driven his car into every state in the Union will soon be the proud boast of Howell L. Williams of Bristol, R. I., if present plans do not miscarry. Mr. and Mrs. Williams made a long trip from Rhode Island to Los Angeles, Cal., last summer in a Knox four-cylinder car, made by the Knox Automobile Company, Springfield, Mass., going by way of Chicago, Denver, Salt Lake City, Seattle, and thence down the Pacific Coast, visiting a large number of states en route, as a result of numerous side trips.

They now plan to return by a zig-zag route through the Grand Canyon to Texas, thence north to Montana and the Dakotas, east to Chicago, down the Mississippi valley to the gulf and finally north again, through the Atlantic Coast states. This routing will take them through all the remaining states of the Union.

ANNUAL ORPHANS' DAY.

New York Dealers Place Cars at Disposal of the Committee.

Judging by the way the automobile dealers of New York City and vicinity are offering their machines to give the orphans of New York City their annual automobile ride and outing on June 5 at Glen Island, New Rochelle, N. Y., it is evident that this year's outing will be a most successful one. Thus early touring cars have been offered by the following:

Whiting Motor Company, Mercer; Knox Automobile Company, Knox-Martin tractor and touring car; Rodney K. Haines, two Regals; W. A. Allen, Metallurgique; K. C. Pardee, two Detroiters; A. G. Spalding & Bro., Stevens-Duryea; De Dion-Bouton Selling Branch, two De Dion-Bouton touring cars and one truck; C. H. Larson, Oldsmobile; F. L. Sample, Chalmers; Poertner Motor Car Company, three to seven Nationals; Thomas B. Jeffery Company of New York, Rambler; American Locomotive Company, Alco; Oakland Motor Company, Oakland; Garland Auto Company, Velie truck; Francis H. Leggett & Co., Alco truck.

With the Chicago-Boston non-stop reliability run starting June 25, a number of Indianapolis manufacturers who had hoped to enter the event will be unable to do so. The Indianapolis Automobile Manufacturers' Association tour to the Pacific Coast starts July 1. This would not allow time after the run to Boston to get the cars back and in shape for the long, hard grind west.

A San Francisco, Cal., man has computed that the tires on his machine have had 10,500,000 chances to blow out. They are still in good condition after 3.5 years of use. His estimate is based on 7000 miles of European touring and 13,500 miles through California. By multiplying the mileage by the number of revolutions each wheel makes a mile he has arrived at his big total of blow-out risks.

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CORRESPONDENCE WITH THE READER.

Examinations for License.

(1584)—What states, if any, require an owner of a motor car to pass an examination the same as a chauffeur?

What is the meaning of a poppet valve and where derived? M. P. F.

Boston, May 11.

There is little uniformity in the provisions of the laws of the various states respecting the issuance of driving licenses. It would appear that only the states of Massachusetts, New Jersey and Rhode Island require both the owner and chauffeur to take the same examination. New Hampshire provides for the examination of both, but the wording of the law would indicate there was to be a separate and special examination for chauffeurs. Maryland calls for the examination of all operators between the ages of 14 and 16, and the secretary of state may require examinations for others. Connecticut permits the secretary of state to require an examination of either owner or chauffeur at his discretion. Chauffeurs are required to pass an examination in Illinois, Minnesota and New York, and the new law in Indiana, which goes into effect, July 1, makes the same provision. In Maine and Vermont, chauffeurs are required to give evidence of their qualifications.

The term poppet or mushroom valve is derived from its mechanical action, it being a lift valve and defined as a small member. It consists of a rounded or flat disc like head attached to a cylindrical shaft or spindle, called the valve stem, and having a seating in the head or port of the cylinder.

Adjustments to Ford Car.

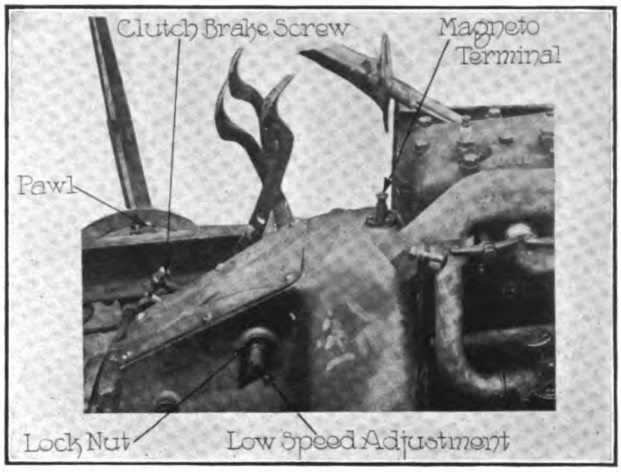
(1585)—Noting that you supply information to owners I am availing myself of the privilege. I purchased a second hand model T Ford automobile which has given good satisfaction up to the present time. I am having trouble when the motor is running on the magneto, but not on the batteries. What is the cause? The low speed does not take hold; that is, the motor races when I use this speed. How is it remedied? When I use the emergency brake lever to secure a neutral position in going down hills the brakes take hold when the lever should be neutral, and the clutch is not entirely out. How can this be overcome? Sometimes the lever will jar out of place and let the high speed in. How can this be fixed? I do not possess an instruction book and would like to get one. Where can I secure the book? SUBSCRIBER.

Phenix, R. I., May 15.

The fact that the motor runs smoothly on the batteries indicates magneto trouble. It is probable that the magneto terminal spring in the transmission cover is covered with metal particles attracted from the crankcase. In the accompanying illustration is shown the terminal which may be removed easily and cleaned. This will doubtless cure the trouble. If not, the services of an expert will be required to test the magnets.

The low speed is easily adjusted. As will be noted by the illustration there is a threaded member extending from the crankcase and locked by a nut. Loosen the latter, turn the screw to the right and relock with the nut. If the speed fails to operate properly and further adjustment does not give the desired results, the transmission cover should be removed and the band examined. It may be worn so badly that a new one will have to be fitted.

The emergency brake lever trouble may be corrected by adjusting the screw member shown in the illustration. This is secured by a lock nut. By screwing the adjusting member in, the clutch



Showing Low Speed Adjusting Screw of Model T Ford and Clutch Brake Control.

will be thrown out earlier or quicker. By changing the position of the screw the clutch can be moved to neutral without the brakes dragging. Any of the Ford agencies will supply you with an instruction book. Dutee Wilcox Flint, 17 Snow street, Providence, R. I., is the state agent.

Adjusting Schebler Carburetor.

(1586)—I have a Schebler carburetor on my car and there are two dials with pointers. I took the carburetor down to clean it and must have changed the adjustments in the work as it does not act right on any speed. If you will supply me with instructions I believe I can reset it.

A JOURNAL READER.

Willimantic, Conn., May 11.

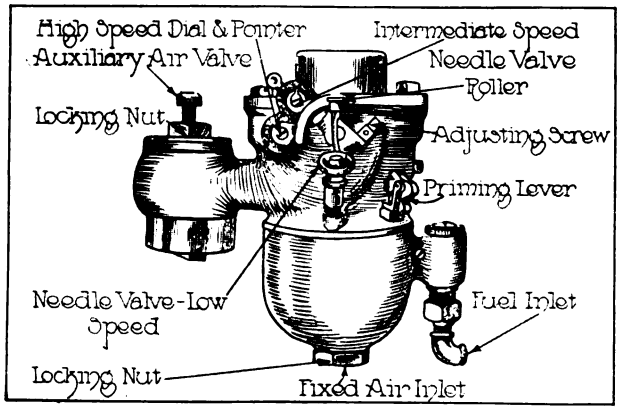
The type of carburetor referred to with its components lettered is shown in an accompanying illustration. Three adjustments besides the air are provided, these being for low, intermediate and high speeds.. The first step is to set the low. Screw in the needle valve until it seats, being

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careful not to exert pressure. Next turn it to the left about a turn and a half, and prime or flood the carburetor.

Open the throttle about two-thirds of its movement and close it slightly, retard the spark and start the motor. If the engine does not run smoothly change the low speed adjustment by means of the needle valve, cutting down or increasing the amount of fuel as may be necessary. To throttle down the motor, screw in the adjusting screw just above the needle valve member. This restricts the opening in the intake pipe by closing the butterfly valve.

After securing the desired adjustment on the low speed, the needle valve will not require further attention as the intermediate and high speeds are secured by moving the arms or pointers on the dials. The latter are provided with figures 1, 2, 3. First adjust the pointer on the intermediate speed dial by moving it from the figure 1 toward



Illustrating Components of Schebler Carburetor Utilized in Making Adjustments for the Various Speeds.

the figure 3, about half-way between these numbers. Next advance the spark and open the throttle so that the roller moving on the track like member beneath the dials is in line with the intermediate speed dial. The auxiliary air valve should seat lightly.

If the motor backfires with the throttle and spark lever in this position, increase the amount of fuel by moving the pointer toward the figure 3. If the mixture be too rich, which can be noted by watching the exhaust for black smoke, or by acrid or pungent odors, the pointer should be moved toward the figure 1.

The adjustment for high speed is made with the throttle wide open and in the same manner as the intermediate. In adjusting the carburetor in this manner there is apt to be a tendency of too rich a mixture and it is suggested that in making three adjustments, low, intermediate and high, the fuel be cut down until the motor shows signs of slight backfiring, then increase the supply until it operates evenly and smoothly. In utilizing the needle valve, turn it one notch at a time, and in setting the pointers on the dials, do not move these members more than half way. It is possible that although the motor runs perfectly when idle, a slight change may be necessary when under load. A slight variation of the adjustments should obtain the desired results. A lean mixture is to be preferred to a rich one as greater efficiency and economy will be possible.

It may be that in replacing the carburetor the gaskets do not fit tight and that auxiliary air is being taken in. This would cause irregular operation at low speeds and affect higher ratios, in that the mixture would have to be enriched at low to compensate for the extra air being taken in. Examine the gaskets, especially those between the intake manifold and cylinders.

Double Sets of Spark Plugs.

(1587)—I have a four-cylinder car with eight spark plugs. Most of the automobiles have only four. Can you explain the advantage, if any, of having eight?

A SUBSCRIBER.

New Bedford, Mass., May 17.

Eight spark plugs are utilized with ignition systems of the true dual or double type. One set is employed on the battery side and the current to the other is supplied by the magneto. Of course both sets could be used with two sets of batteries or two magnetos. In the system referred to the advantage is that either set of plugs may be used independently of the other, providing two separate systems. Usually current to the plugs on one side of the motor or over the exhaust valves, is furnished by a battery, and the other plugs are supplied by a true high-tension magneto. The advantage of such an installation is that in the event of one system failing to operate the other can be employed.

It differs from the dual ignition now in general use in that the circuit breaker of the dual system is utilized to interrupt the primary current and the distributor distributes the spark to the plugs, both when the instrument is generating current and when electricity is being supplied by dry cells or a storage battery.

Maker of Speedometer.

(1588)—Will you kindly inform or ascertain for me the name of the company making the Ever Ready Autocrat speedometer? It bears the name of the Auto Improvement Company, N. Y., but I have been unable to reach them, and would like to know what company is making it as I want a new front. W. F. D.

Bristol, R. I., May 10.

The name and address of the maker of the Ever Ready speedometer is the American Ever

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Ready Company, 308 Hudson street, New York City.

Anti-Dazzle Lens.

(1589)—I noticed an article in a recent issue of your publication on an anti-dazzling lens. Will you kindly give me the name and address of the concern making the device or the company that is marketing it? Any information concerning same will be very much appreciated.

H. L. S.

Cleveland, O., May 8.

The lens referred to is made by Salisbury Lamps, Ltd., 124 Long Acre, London, W. C., England. The writer does not know of any company in this country handling the device. George Sumner, Inc., 1926 Broadway, New York City. has taken over the rights of the Diva headlight, another English product, a feature of which is the elimination of the anti-dazzling rays. Elsewhere in this issue will be found a description of the lamp.

Gasoline Gasket Material.

(1590)—As a subscriber to your book I wish you would kindly advise me as to what material to use as a gasket or washer in the gasoline strainer along the gas line assembly; that is to say, the gasket between the lid and the bowl of the strainer? We have tried leather and asbestos, both of which have been but a partial success.

R. S. S.

Bethelehem, Penn., May 9.

Cork is an excellent material as it is not affected by gasoline. Leather or asbestos is not suitable for the reason the fluid penetrates these materials. If a cork washer cannot be secured chamois might be tried or a gasket made of heavy paper or cardboard and treated with shellac or hard soap. Charles D. Brown & Co., 43 Federal street, Boston, markets a special gasket for this work called vellumoid, which is impervious to the action of gasoline, grease, etc., and which is not expensive.

Gobron-Brillie Motor.

(1591)—Kindly give me information regarding the Gobron-Brillie motor. What advantages a motor of this type (two-piston) has over the ordinary, or vice versa? Why is such a design not more popular? C. H. B.

Chicago, Ill., May 19.

The earlier forms of the Gobron-Brillie motors were designed by Frenchmen in an attempt to solve the vibration problem by mechanical means. One was a double-cylinder, vertical engine and the four pistons were actuated by a three-throw crankshaft. The cylinders were open at both ends, two oppositely moving pistons sliding in each, with the valves, ignition apparatus and compression space located midway in the length of the bore.

The lower pistons worked on one crank, and the two upper, through a crosshead bar at the top, upon two other cranks set at 180 degrees from the first. The result was that both cylinders had the out-strokes and in-strokes of the pistons simultaneously, the power stroke in one cylinder taking place with the suction stroke in the other.

According to some authorities the arrangement is exceedingly efficient in overcoming motor vibration, while the highest velocity of expansion is secured, the rate being nearly doubled, as compared with the ordinary type of motor. Of course the connecting rods between the upper pistons and their cranks must be twice as heavy as those from the lower pistons to their common crankpin. Structurally, the main advantage presented is that all joints are absent from the cylinders; hence no leakage is possible, as in some motors. The principle is incorporated in aviation engines.

The Gobron-Brillie aviation motor is of the inclined type, having eight cylinders. One design has a bore of 90 mm and stroke of 160. Another has a bore of 120 mm and stroke of 200. The stated number of revolutions of both is 1400, and weight 330 and 352 pounds respectively. The smaller motor is rated at 53.8 horsepower, the larger unit, 120. Both are water-cooled.

The last question is difficult to answer, being a matter of individual opinion.

Dirt in Carburetor.

(1592)—I am troubled with dirt getting into my carburetor. The car is not fitted with a pan or shield, and I have to take the carburetor down and clean it every so often. I find that it is full of dust and when scraping carbon off the tops of the pistons found more or less dirt on these. As I do not care to go to the expense of fitting a pan, what can I do to prevent the entrance of the dust?

INFORMATION.

St. Louis, Mo., May 13.

More or less road dust finds its way into the carburetor and to the cylinders, especially where the air intake is not protected. The trouble may be overcome by fitting a tubing of the same diameter as the carburetor, 1.25 inches inside diameter for example, if that be the size of the vaporizer, and carrying the other end of the tube to a hood encircling the exhaust pipe or manifold. This will prevent to a great extent the entrance of foreign elements and will be an advantage in that the vaporization of the fuel will be accelerated. This method is largely employed on modern cars. The attachments and tubing complete may be purchased, being carried by any large supply house. One can be made, but the manufactured article would be more advantageous.

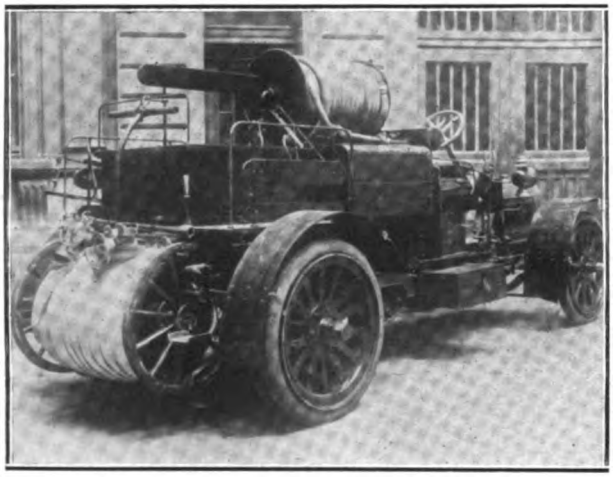
Several makers of carburetors manufacture hot air attachments which can be fitted easily and without alteration.

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WITH THE MOTORING INTERESTS ABROAD.

Features of New Type of Fire Fighting Apparatus Recently Introduced in Paris—Motoring Permitted in Prince Edward Isle—Important British Conference.

THE fire fighting service of Paris, France, has undergone a complete transformation, automobile apparatus having entirely transplanted horses. Changes, however, are still taking place, the latest being that of installing what is known as first aid pumping engines. The city is divided into 12 sections, each having a barracks and stations, the company of firemen being quartered in the former, while the latter are served by a detachment from the barracks and relieved every 24 hours. The so-called regiment of firemen is under the command of Col. Cordier, who conceived the idea of restricting the larger pumping engines to certain stations and of supplying the others with the first aid apparatus. These are light ve-



Delahaye-Farcot Frst Aid Pumping Engine Used by Fire Department in Paris, France.

hicles, so designed as to reach the scene of blaze rapidly and extinguish the fire before it has attained serious proportions.

The chassis does not differ materially from the usual truck chassis produced by Delahaye. The pump was designed by Farcot. The same four-cylinder motor operates both. A reel of small hose carrying a nozzle 10 millimeters in diameter is located directly back of the driver's seat in the space sometimes occupied by the chemical hose in the combination wagons in the United States, and serving a similar purpose in a measure. This is connected with a reservoir, directly underneath, with a capacity of about 100 gallons of water. The size of the nozzle permits direct attack where the blaze commences.

When the apparatus reaches the scene of the fire a lever is so placed that the power of the motor drives the pump, which is a multiple-cylinder unit said to have a capacity of 7500 to 8000 gallons an hour. A suction tube is joined to a three-way valve, which permits the discharge of the pump into the reservoir, the suction of the pump and pipes from the reservoir, the directing of the pump onto the fire or the filling of the reservoir without the aid of the pump. The part played by the first aid apparatus is similar to that of the chemical engine, in that as soon as the vehicle reaches a fire the pump begins playing upon the blaze, utilizing the water in the reservoir until such time as the suction tube can be connected. It is estimated that this will be sufficient in at least one-third of the fires, while in a majority of others the first aid will be able to hold the blaze in check until the arrival of the larger pumping engines.

THREE DAYS A WEEK.

Automobiles Will Be Permitted to Enter Prince Edward Island This Year.

It was freely predicted in New Brunswick last summer that automobiles would be permitted to enter Prince Edward Island this year. It appears that the prediction was well founded, the legislature of that province having decided that motor cars may be operated three days a week—Monday, Wednesday and Thursday. Tuesday and Friday are market days, and it has not been thought best to permit motor vehicles to mingle with the horse drawn wagons on those days, and it does not appear that any special reason is assigned for eliminating Saturday and Sunday.

Several years ago a number of tourists visited Prince Edward Island, it being a matter of record that there were nine cars in all. Horses were so badly frightened that at its next session the legislature passed a bill excluding automobiles from the province. Last year a bill was introduced incorporating a company to manufacture cars at Charlottetown, and later permission was given to demonstrate machines on this company's private grounds. This year's law requires registration of

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the cars, examination and licensing of the chauffeurs, and very stringent regulations to safeguard pedestrians and other users of the highways. The revenue will be devoted to maintenance of roads.

ONTARIO MOTOR LEAGUE.

Recent Affiliations Make It an Important Factor in Canadian Automobile Circles.

Eighteen automobile clubs in as many leading centres of population throughout Ontario, Canada, are now affiliated with the Ontario Motor League, and promise to do important work in furthering the activities of that organization in their respective districts. So extensive is the membership of the league that there is no city and practically no town in Ontario where several members are not to be found.

Motorists everywhere in Ontario are coming to a full realization of the importance of organized effort. The influence of a score of automobile clubs, comprising in their membership the leading citizens of as many towns and cities, is bound to prove considerable when all work together in such causes as that of good roads or sound motor vehicle legislation.

IMPORTANT BRITISH CONFERENCE.

Government Officials and Commercial Interests to Discuss Motor Transportation Problems.

During July an imperial conference will be held at London, England, to deal with the question of motor transport, including all the industrial uses of motor vehicles. Invitations have been sent to all parts of the Empire and it is hoped that the government departments of all the colonies interested in the development of road transport will be represented at the conference. Representatives of chambers of commerce, boards of trade, agricultural and planters' societies, municipal and road authorities and important concerns in the engineering and motor trades, will be present.

It is expected that H. R. H., Prince Arthur of Connaught, who is president of the conference, will receive the delegates July 18. The following day they will visit the industrial motor vehicle exhibition organized by the Society of Manufacturers & Traders, at Olympia. During the course of the conference the delegates will visit garages, depots, etc., where industrial motors are operated in considerable numbers. The following subjects will be discussed at the conference:

The question of fuel supply; present needs and future prospects; the possibility of creating adequate supplies within the Empire.

The consideration of the problems of imperial military motor transport with special reference to the production of types of vehicles, useful both for military work and for industrial work in the dominions and colonies.

The organization of motor transport systems for the carriage of goods, and their value to the mercantile life of the community. The adaptation of existing methods of delivery required to enable traders to take full advantage of the capabilities of mechanically propelled vehicles.

The relations between the British manufacturers and buyers overseas. Desirable arrangements for satisfactory supply, agencies, etc.

Road transport in cities. The carriage of passengers and the municipal uses of motor vehicles. Fire fighting and ambulance services. Postal services.

Rural transport and the uses of the motor to the agriculturist.

NOTES FROM FOREIGN LANDS.

Ninety per cent. of the automobiles used in Aguascalientes, Mex., and in that vicinity, are of American manufacture. Owing to the amount of quartz rock the life of tires is short.

The French government recently laid before the Chamber of Deputies a proposal to increase the automobile tax materially in order to raise more money for the upkeep of the roads. The plan calls for an extra annual duty of from $10 to $50, according to the horsepower. The industry is organizing a strong protest against the tax. It is estimated that about $1,600,000 yearly would be obtained by such means.

According to Auto, the organ of the German Society of Automobile Engineers, the German automobile industry during the last few years has experienced serious setbacks in its export business and its representatives in the foreign countries have ascribed the rapid and untoward change to American competition. An automobile show in Berlin at the earliest possible moment, preferably during the coming summer, is suggested as a suitable remedy and a means of averting a crisis.

An interesting reliability trial was held recently by the Canterbury Automobile Association, New Zealand, the route being from Kaikoura to Christchurch. There were 18 cars in the contest. In the open class the winner was W. B. Scott, who drove a Vauxhall car, made by an English firm. He was awarded the gold medal and certificate for reliability and also the first prize for the lowest gasoline consumption. Mr. Scott made a nonstop run and his gasoline consumption was 44 ton-miles and 29 car-miles a gallon.

The German Imperial Automobile Club, in conjunction with the German Society of Motor Manufacturers, recently held a series of comparative road tests of gasoline, heavier spirit and benzol. The trials lasted nine days and the cars were divided into three groups, so that on each day the three different classes of fuel could be in use. Thus the group using gasoline on the first day used heavy spirit on the second and benzol on the third. Those entering cars were allowed to provide three separate carburetors for use with the different classes of fuel, or, in the alternative, they might use and adjust a single carburetor. The trials were conducted not so much as a competition between rival systems as for the purpose of procuring data of the relative consumption and cost of the different fuels.

According to United States Consul Edward J. Norton at Bombay, India, it is quite practicable to cover a large part of that country by automobile. He reports that a party recently left Calcutta in a 30 horsepower, four-cylinder Studebaker car, made by the Studebaker Corporation, Detroit, Mich., on a journey of 1472 miles, which included the following points on the most practicable, direct route: Mhow, Jhansi, Cawnpore, Allahabad, Benares, Delhi and Calcutta. In laying out a northern tour it is believed that the most desirable route could be found by leaving the Bombay-Calcutta road at Cawnpore, going thence to Lucknow and Agra. Side trips can be made to Gwalior, Delhi and other places and the journey continued with many detours as far north as Peshawar. The best touring season is from October to March.

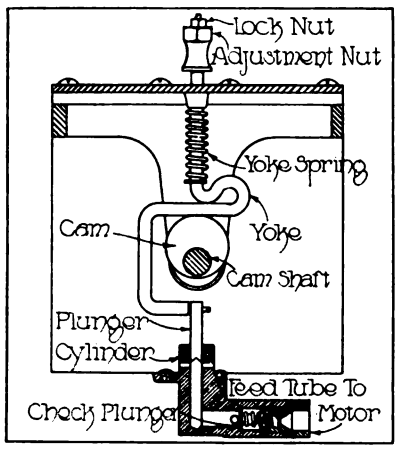
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MECHANICAL NOTES FOR OWNERS.

Timing the Valves of Model T Ford Motor---Adjusting Mechanical Lubricators---Treatment of Slipping Cones---Handy Wire Stripper---Starting Small Screws.

TIMING the valves of an internal combustion motor is not a difficult task and as the efficiency of the engine depends largely upon the correct opening and closing of these members it is important that they be given proper consideration. Valves are timed correctly at the factory, but after considerable service the stems and pushrods will wear, causing the valve to open late and to close early, thereby decreasing the power of the motor. When this condition exists the remedy is to retime the valves.

There are two methods, one by utilizing the marks on the flywheel, and the other the piston travel. The latter plan is employed in resetting the valves of the model T Ford car and in an accompanying illustration is presented a timing diagram, the opening and closing points for the intake and exhaust members being shown.



Adjusting Mechanism of Lubricator on Overland.

As the work involves the removal of the cylinder head it will be an excellent plan to examine the valves and grind these before checking up the timing. Assuming that this has been done, the first step is to check the timing of the intake valve of the first cylinder—that nearest the radiator.

As will be noted by the diagram at A, the intake valve opens .125-inch past top dead centre on the completion of the exhaust stroke of that cylinder. It should be borne in mind that there are four strokes to each cylinder, these being intake, compression, firing and exhaust, in that order. Consequently, in timing the intake valve of the first cylinder it should open when the piston has completed one-eighth of the downward stroke or piston travel. As the stroke of the piston is four inches this is a simple case of mathematics.

The intake closes one-quarter past lower centre, or in other words, the piston has completed the intake stroke and has begun the compression stroke as shown at B. With the piston in this position the valve should be on its seat with a suitable space between the valve stem and pushrod or tappet as illustrated in the drawing.

The timing of the exhaust valves is accomplished in a similar manner. The exhaust opens one-quarter before the piston reaches lower dead centre as shown at C and closes on top dead centre as illustrated at D. The valves of each cylinder should be timed separately.

The clearance between the valve stem and the pushrod should never be greater than .03125 inch nor less than .015625 inch. If the space is too small the valve is likely to remain partially open, causing faulty operation of the motor. It should be remembered that there is more or less expansion of the metal when hot and this should be taken into consideration in making fine adjustments, and when lengthening the stems or fitting new pushrods.

As the valve mechanism is not adjustable the valve stems will have to be lengthened when too short. This involves drawing them out just above the hole into which is fitted the pin retaining the spring collar. Care should be exercised in the work as it is an easy matter to bend the stem. A simpler method is to fit the Apco valve stem adjusters, made by the Providence Auto Parts Company, Providence, R. I. These devices are constructed especially for the work and are attached easily, being slipped over the stem.

The sketch at E will be of service in replacing the camshaft if this member has been removed in the overhaul or in case of trouble. As the crankshaft and camshaft gears are marked, it is a simple matter to remesh them. If either is broken so that the mark has been destroyed the gear should be replaced so that the cam and piston occupy the positions shown in the drawing. The first cylinder is utilized for this timing. As the direction of rotation of the crankshaft, cams, etc., is shown in the drawings and the stroke of the piston defined by arrows, one should not experience any difficulty in retiming the valves.

Oily waste should not be allowed to remain in the garage unless stored in a suitable container, owing to danger of spontaneous combustion.

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REMEDYING SLIPPING CONES.

Some of the older types of cars are fitted with ball bearings which are adjusted by moving the outside cone on the spindle toward the hub. When the small cone has been replaced a number of times the spindle becomes worn and the cone does not fit snugly, resulting in its rotating with the wheel. This condition not only produces friction, but wear of the spindle and adjusting nut follows. When it is found that the cone is slipping it may be cured by taking a small cold chisel and nicking the spindle so that a drive fit of the cone is secured.

STARTING SMALL SCREWS.

Small screws are difficult to start, especially when located in places not accessible with the fingers. A small wire, bent double at one end and slipped under the head of the screw will hold the latter steady while the threads are being caught. Another method is to cut a V slot in a small strip of tin. This plan is recommended because the device will take several sizes of screws. Another suggestion is to take a piece of stiff paper and push the screw through it.

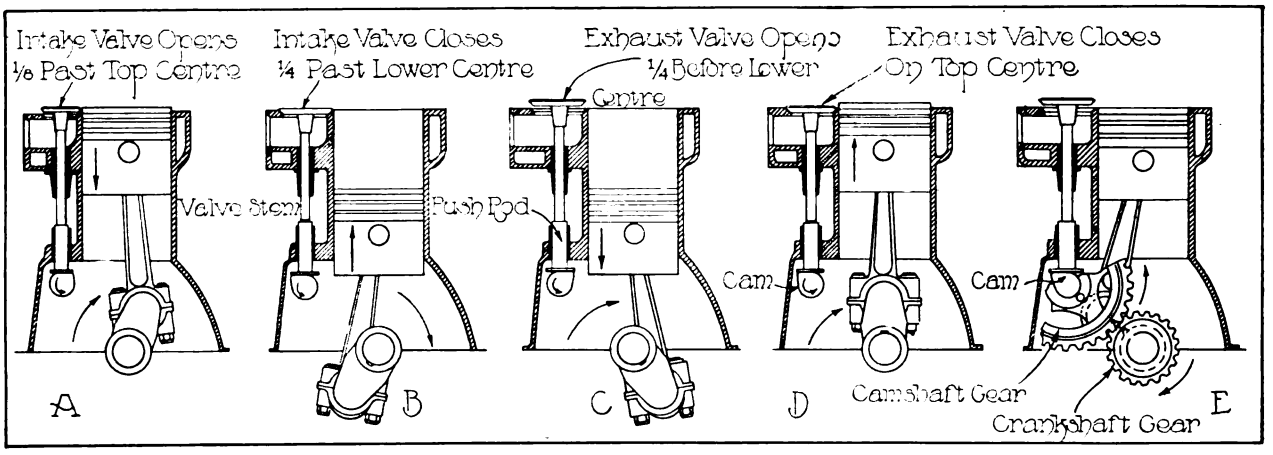
ADJUSTING MECHANICAL OILERS.

The practise of increasing the amount of oil fed to the working parts of the motor after an overhaul or adjustment of bearings is to be recommended. With the type of lubricator shown in an accompanying illustration, and used on the model 69 Overland car, means are provided for augmenting the supply or reducing it as desired.

When the bearings have been taken up it is a good plan to increase the amount of lubricant until they are worked in, after which the setting may be returned to its original position. The operation of the oiler is mechanical, a cam raising and lowering a plunger, which forces the lubricant past a check valve to the working parts. As the amount of oil forced depends upon the stroke of the plunger, this member is made adjustable.

The variation of the stroke is accomplished by restricting or increasing the movement of the yoke member, and an adjusting nut secured by a lock nut is provided for this purpose. To decrease the amount of oil the adjusting nut is screwed down, diminishing the quantity of lubricant, while raising or lengthening the stroke increases the amount.

The oiler is very efficient and the only trouble likely to be experienced is through clogging of the feed pipes. This can be avoided, however, if one be careful to utilize a clean oil, one free from foreign elements. A clogged pipe is indicated by the plunger remaining up or stationary. The obstructions can sometimes be removed by operating the plunger by hand. When the oiler is set temporarily to increase the amount of lubricant, in cutting down the quantity, care should be taken to make the adjustment so that the proper level will be maintained in the crankcase. This can be determined with a little experience.



Illustrating Timing of Valves of Model T Ford by Position of the Piston and Its Travel, Also Showing Method of Replacing Camshaft and Meshing the Gears.

WIRE STRIPPER.

In stripping wire of its insulation one is apt to cut into the strands. An excellent tool for this work is a clip, such as utilized for cutting the finger nails. One that has seen considerable service is best adapted to the work.

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THE GUESTS OF THE INDUSTRY.

During the next 20 days it will be the privilege of the American automobile industry to assist the Society of Automobile Engineers in entertaining members of the Institute of Automobile Engineers and the Society of Motor Manufacturers & Traders of Great Britain. The event is one of decided importance, as indicating the friendly relations existing between the representative bodies of the two countries.

The entertainment programme has been arranged to afford a wide diversity, including not only the official midsummer meeting of the American society, at which papers will be presented by the British engineers, but abundant opportunity to inspect many of the largest plants in the industry and in lines closely allied therewith. It is proper to assume that the visitors have elected to come to America for the purpose of studying American methods at first hand, and the industry of this country greets them with a cordial welcome.

The splendid development of the automobile industry in America is a matter for pardonable pride on the part of Americans, but it hardly will be contended that it has yet reached the point where there is nothing further to be learned. The British engineers and manufacturers can bestow as much information as they can absorb, and it would prove extremely unfortunate if full advantage were not taken of this opportunity for an exchange of opinions and methods.

CONCERNING RECKLESS DRIVING.

The legislative season now drawing to a close has devoted considerable attention to the reckless driver, many states having enacted more stringent laws covering this point. The menace is one which affects all users of the highways—other motorists as well as pedestrians and occupants of horse drawn vehicles—and is one in which the majority of automobilists are as deeply interested as the others.

But, as is quite often the case in other fields, it is an open question whether there is need for additional legislation. The conviction of a reckless chauffeur by a Chicago jury, four members of which were motorists, and the subsequent sentence of 14 years, is sufficient indication in itself, not only of the position held by motorists, but of the possibilities under existing laws.

The trouble has been in the past that many of those upon whom has devolved the duty of seeing that laws were enforced have been more intent upon maintaining speed traps, which have resulted in the apprehension of those who were but slightly exceeding the law's provision rather than in the arrest of those guilty of recklessness. It need not be contended that the former should be entirely overlooked, but it would seem that there might be greater activity in reaching the real offenders. And it may be added that the courts have a certain responsibility as well.

Public opinion is a valuable asset in any field of endeavor, and the motorist must appreciate its effect in solving the good roads problem. Successful agitation by automobile owners and users has done much, but as yet little more has been accomplished than to demonstrate the need. There is still the subject of ways and means.

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OVERHAULING THE MOTOR CAR CHASSIS.

Describing the Construction of Components Subject to Wear and Method of Inspection and Restoration---Suggestions for Facilitating the Work.

(By C. P. Shattuck.)

COMPONENTS of the motor car other than the power plant need attention and much of the work may be performed successfully by

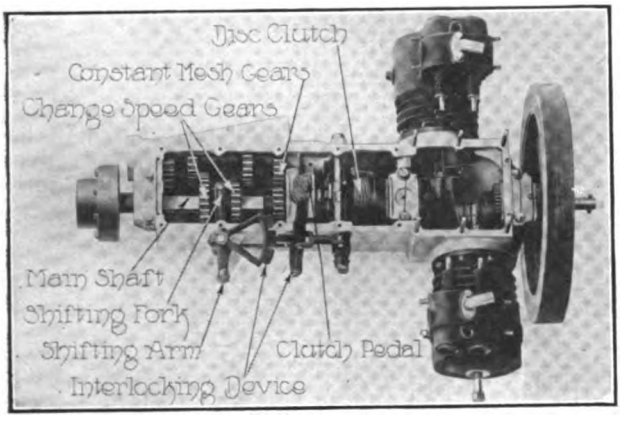


Fig. 1—Conventional Type of Multiple Disc Clutch and Transmission and Parts Requiring Attention.

the owner. There are a number of small jobs which require time rather than experience, and some involve tasks entering into the regular routine, such as adjusting the clutch and brakes, replenishing the supply of lubricant, etc. While the mechanism may appear complicated to the novice, it is simple, and by studying the principles involved not only will considerable beneficial knowledge be obtained, but much economy will be effected.

Although there are a number of repairs which should not be attempted by the inexperienced, there is no reason why the greater part of the work cannot be undertaken, this depending of course upon the condition of the car, etc. While the suggestions contained herein may be familiar to some they will be of value in that they will serve to facilitate the overhaul. Several of the groups of components are shown disassembled and with the steps illustrated in sequence.

It is assumed that the motor has been placed in first class condition and is in the chassis. The next step is to inspect the clutch, which may require only cleaning and adjusting. If it be of the multiple disc type with the plates operating in lubricant, similar to that shown at Fig. 1 for example, it should not be disassembled unless one is familiar with the work or under the supervision of a competent workman. Even if the parts are in good condition the old oil ought to be removed and the plates and housing flushed with kerosene. Remove the plug under the casing and drain off the old lubricant, after which use plenty of kerosene. With the clutch out spin the starting handle to flush the plates, also let the clutch in and throw it out several times. After draining off the kerosene inspect the clutch, collar, yoke, etc.; adjust the spring if necessary and refill with the lubricant recommended by the maker. If the clutch has been giving trouble and cleaning and adjusting fail to secure results, it may be necessary to call in the expert and have the discs examined for burrs, etc.

The design of clutch shown at Fig. 5 differs from the one previously mentioned in that the plates are alternately of bronze and steel, the former carrying 64 cork inserts, which come in contact with the steel members. The cork is filed smooth with the metal, but upon being subjected to the oil bath in which the clutch operates, the material distends beyond the surface of the bronze. As with the plain disc type it is necessary that the plates be cleaned and new lubricant

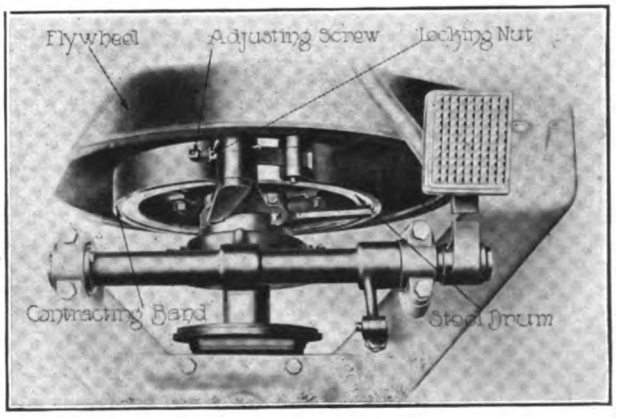


Fig. 2—Showing Contracting Type of Clutch and Method of Adjustment.

utilized. The method of assembly, as well as adjustment, is outlined in the illustration.

There are various forms of clutches and at

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Fig. 3 is shown one in which the flywheel carries 16 coil springs, which exert a powerful pressure against a driving plate and the energy is transmitted by a driven plate, which carries a number of cork inserts. This is a three-plate clutch, which does not operate in oil.

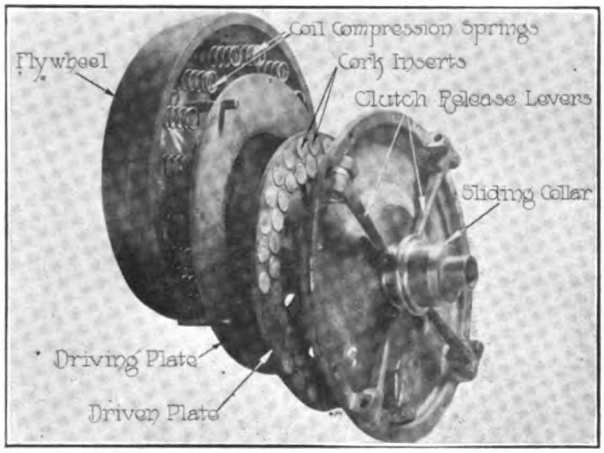


Fig. 3—Three-Plate Dry Disc Clutch Having Cork Inserts and Coil Springs.

The clutch shown at Fig. 2 is of the contracting band type and consists of a heavy steel band which encircles a large steel drum. When engaged the band grips the drum throughout its entire circumference, and when disengaged, the drum rotates free. The contraction and expansion are accomplished by a wedge shaped shipper head. This type is easily adjusted, by loosening the locking nut and setting an adjusting screw.

The design at Fig. 4 is of the leather faced cone type. The male member is forced into contact with the flywheel by three clutch springs carried on studs and the tension of the springs is regulated by an adjusting nut. Screwing the latter up increases the tension. While there are a number of other types of clutches the principle on which they operate is similar to those outlined, and by studying the arrangement of those illustrated one should not experience trouble in making any needed adjustments.

Dealing first with the plain type of leather faced cone clutch: Two points are subject to wear, the facing and the bearing surface of the male member where it revolves on the shaft. It is possible that the clutch has been slipping and that treating the face with oil has not cured the trouble. If the operator has made it a practise to slip the clutch it may be found that the facing is worn to the heads of the rivets. It may be that the leather is in such poor condition that a new facing is necessary. While a piece of leather may be prepared, treated and fitted, it is best to procure a new facing from the maker. In fitting it the heads of the rivets must be well countersunk.

When the clutch slips and the leather has been treated too freely with oil, thereby reducing the co-efficient of friction to a low point, and the pressure of the spring is not sufficient to maintain the parts in frictional engagement, the surplus lubricant must be absorbed. Fuller's earth, well rubbed into the surface is recommended, but if the clutch is not to be removed, the material may be inserted by using a small bellows or a blow gun.

A harsh or gripping clutch should be remedied as its failure to yield exerts undesirable stresses upon the driving components of the chassis. Treating the facing with neatsfoot oil to render it soft and pliable will usually remedy the trouble. In some types of leather faced cone clutches springs are fitted under the facing to make for easy and gradual engagement. When the clutch bites and the leather is in good shape it is possible that the springs are not adjusted properly; that is, they do not lift the facing.

In the examination of the clutch the bearings should not be overlooked. If worn the male member will have a tendency to drag and if this condition exists it will explain the reason for the difficulty experienced in changing speeds. If a clutch stop is fitted, it may require resetting. The thrust bearings are equally important in the proper operation of the clutch and these members should be cleaned and fresh lubricant utilized.

Faulty clutch action may be due to a number of conditions existing outside of the clutch,

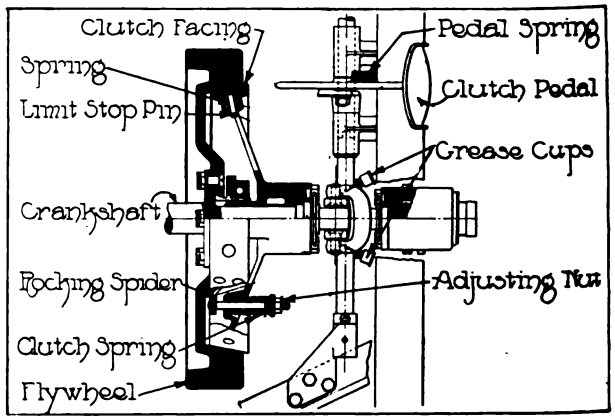


Fig. 4—Illustrating the Leather Faced Cone Clutch and Components Needing Inspection.

such as wear of the various operating parts. Worn or improper adjustment of the linkage, including levers, rods, shifting collars, pins, etc.,

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often hinders disengagement, and sometimes the wear is so pronounced that a complete depression of the pedal does not wholly disengage the

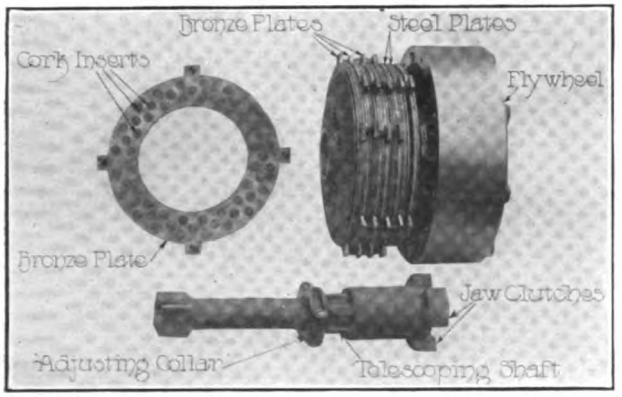


Fig. 5—Multiple Disc Clutch with Plates Having Cork Inserts and Operating in Oil.

clutch. As the type of control varies it is not possible to give other than suggestions for inspection. By carefully studying the design and following the instructions of the maker as to adjustments, faulty operation may be corrected.

Aside from a very thorough cleaning and inspection the writer does not advocate that the novice attempt repairs to the transmission, either the sliding gearset or the planetary. The parts of the former may be examined by removing the old lubricant and washing the components until all foreign elements are removed. It will then be a simple matter to note if the gears are worn badly, the bearings snug and the shifting mechanism in order. The change speed lever can be utilized and the meshing of the gears watched to note if they slide by each other freely and easily. If not the expert should be called in. If the transmission is in good condition all that will be necessary will be to renew the supply of lubricant.

Although a large majority of cars are equipped with the sliding gearset, there are a number of machines fitted with the planetary or epicylic type of transmission. These are easily cleaned and adjusted, the friction being secured for the low and reverse speeds by means of contracting bands. These should be examined for undue wear and if needed, new bands fitted. In inspecting the transmission the high speed plate should be cleaned as sometimes slipping of the clutch is due to the plate being cracked. In adjusting the low and reverse speed bands care must be taken not to have these members bind. This can be determined by cranking the motor with the spark off and brakes released. If the machine "crawls" it may be assumed that the bands are too snug. This means lost power as well as worn facings. As with the other forms of transmission the housing containing the gears should be cleaned and refilled with fresh lubricant. The linkage of the planetary type is subject to wear and means are usually provided for taking up lost motion.

The overhaul of the rear system will depend upon the age of the car and its condition. Owing to the different designs it is not possible to give complete instructions and the owner will have to be guided by the construction. When the rear axle is of the full floating type it is an easy matter to disassemble the driving and driven components and without jacking up the rear of the chassis. On the other hand, with other designs, it may be necessary to disconnect the rear springs and jack up the frame before attempting to disconnect the universal joints, etc.

The front wheel should be blocked to prevent rolling of the chassis. If the garage be equipped with a falls and tackle the work will be simplified. If not, jacks will have to be employed. Disconnect the spring clips at the top or bottom half of the springs, depending upon the design, also the brake rod connections. If possible place a piece of joist under the frame, utilizing a jack at each end of the wooden member. The chassis should be lifted gradually and care must be taken that the jacks are balanced. After the universal joints and radius rods are disconnected, the rear system may be rolled out and the jacks reinforced by placing heavy boxes under the rear cross frame member. This will prevent damage in the event the jacks slip and will also safeguard the

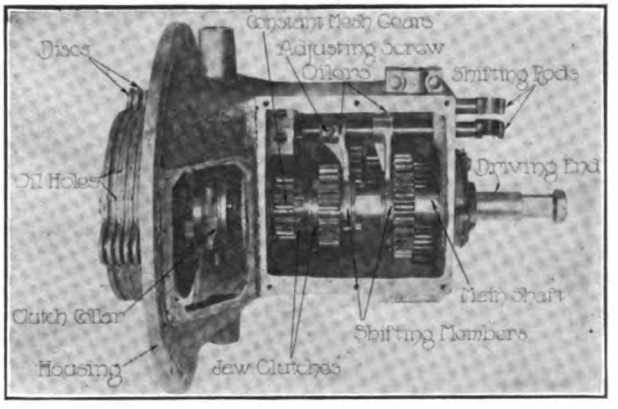


Fig. 6—Components of Sliding Gearset, Multiple Disc Clutch and Operating Mechanism of the Latter.

workman when obliged to get under the car.

Before disassembling the rear construction remove the drain plug under the differential cas-

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ing and allow the lubricant to run out, for if it be in a fluid state the separation of the casing will flood the floor with dirty lubricant. Before un-

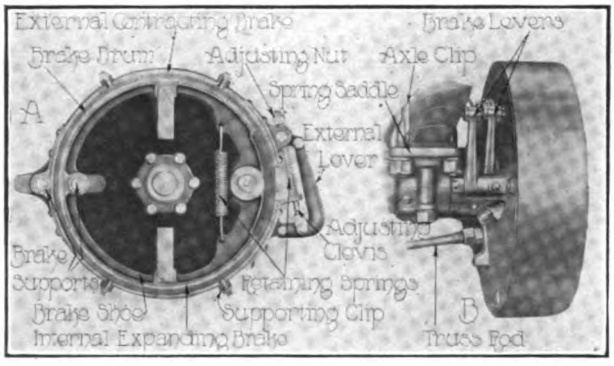


Fig. 7—Conventional Types of Brakes: A, Illustrating External Contracting and Internal Expanding Designs and Parts Requiring Inspection; B, Enclosed Type and Brake Levers, Etc.

bolting the halves of the housing place it on supports so that it will be relieved of undue strains. It will also be found that the work of removing the bolts will be simplified by this arrangement.

At Fig. 10 will be noted full floating constructions with the driving groups clearly outlined. That at A is a conventional design and is shown with the hub cap displaced and the axle shaft partially withdrawn to illustrate the operation of removal. It will be seen that the drive is imparted from the jaw clutch of the axle to that on the hub of the wheel. That at B is similar in design and the parts are entirely disassembled to show their construction. The type illustrated at C is on the same principle, differing only in the method of retaining the axle. It will be seen that the driving member is secured to the flange and that the latter is bolted to the wheel proper. An advantage claimed in this construction is that opportunity for lost motion or wear of jaw clutch is eliminated. The axle is removed easily by displacing a few nuts, after which the axles are withdrawn without jacking up the car.

A feature of the full floating design is that the differential may be taken out easily and Fig. 8 illustrates the steps in alphabetical order, which if followed will simplify the work. If the car has been in service for some time it is an excellent plan to disassemble the differential, clean and inspect it. The reassembly can be accomplished by reversing the order of the letters. As previously pointed out, the method of overhauling the axle will depend upon the design. The drive shaft should not be overlooked, or the universal joints. The latter should be cleaned and the bearings examined and if too much play exists the elimination of the lost motion will require the services of a machinist or expert. The end thrust bearings of the drive shafts will also require attention and the shaft should be tested for longitudinal as well as side movement. The majority of machines are fitted with means for adjusting these parts and in the reassembly care must be taken in meshing the driving gear with the driven or crown gear. This is a delicate task and it may be necessary to make several alterations before the gears run quietly. They should not bottom nor be too far out of mesh, or the humming noise will be in evidence.

Torque tubes and radius rods are important factors and when the latter are employed they should be given a careful inspection to make sure that undue play does not exist. Their adjustment requires care and one should not be subject to more stresses than the other. As with the clutch there are varying types which will require different treatment.

Too much emphasis cannot be laid upon the attention to be given the brakes and their actuating mechanism, especially with the sliding

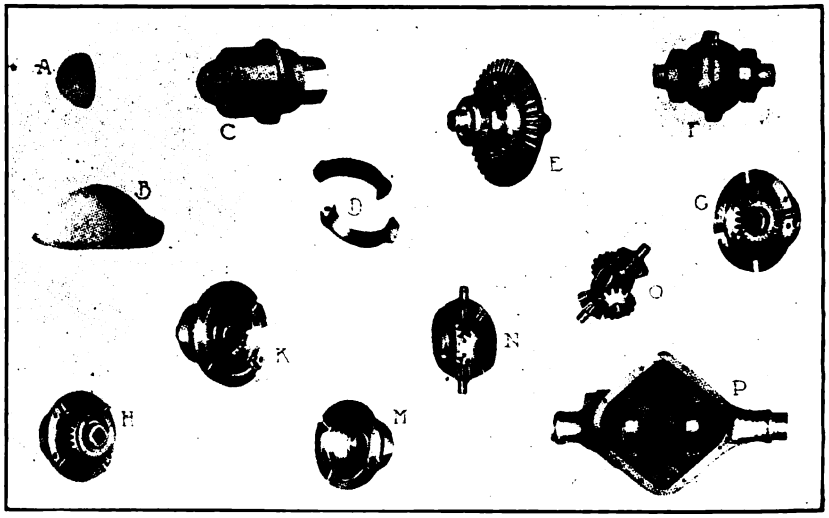


Fig. 8—Showing Steps in Disassembling the Differential—To Reassemble Reverse the Alphabetical Order.

type of gearset. As the operator must rely wholly upon them and, unlike with the planetary type of transmission, cannot resort to the use

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of the reverse in an emergency, it will be seen that the overhaul of the braking system must be carefully and thoroughly supervised.

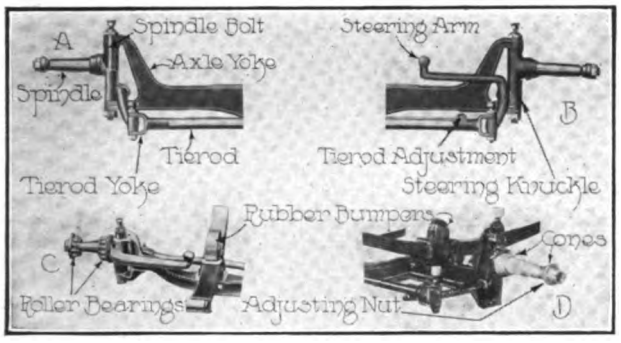


Fig. 9—Front Axle Assembly and Parts Subject to Wear: A, Steering Knuckle Cut Away to Show Bolt; B, Adjusting Devices for Aligning Wheels; C, Conventional Type of Roller Bearings; D, Cones Employed with Ball Bearing Wheels.

Brakes are divided into two classes, contracting and expanding, and in the majority of cases are fitted to the rear wheels, although the drive shaft is utilized by some makers for the service brake. The external contracting type, such as shown at Fig. 7 A, is favored by many makers for the service member and an internal expanding member is utilized for the emergency. With the first named design the components and actuating linkage are readily accessible and may be disassembled easily. The various parts, including the adjusting mechanism, are outlined in the illustration and the operation should be understood easily with a little study.

To examine the internal brakes the wheels will have to be removed and the old lubricant cleaned out before the cams, springs, etc., can be inspected. The cams may be worn and require new members; the springs may have lost their tension, permitting the brakes to drag, or the linings be worn so that the heads of the rivets are exposed. The method of repairing and relining brakes was discussed and illustrated in the Feb. 25 issue. Before leaving the brakes their levers should be examined and if the pins are badly worn new ones fitted. If the design is similar to that presented at B the grease cup will need cleaning and refilling with fresh lubricant. Truss rods are important, reinforcing as they do the rear axle, and these members should be snug, not too tight, else they are likely to break. In connection with the rear axle should be mentioned the advisability of replacing old felt washers with new, especially if there has been a tendency toward leakage of lubricant around the axles into the brake drums. In replacing the hub caps pack with grease, but do not use so much that the cap cannot be screwed home, otherwise a loss of the cap may follow.

The spring saddles, clips, etc., should be gone over and if the threads of the nuts or retaining members are damaged through lost motion or careless handling, fit new. Clean and lubricate the springs. There is an inexpensive tool marketed for separating the leaves, which should be thoroughly cleaned and their faces treated with a lubricant. The writer prefers graphite, as it fills the pores of the metal and reduces friction to a minimum.

The overhaul of the steering gear and its linkage should be very thorough. While a slight amount of wheel play is permissible it should not be excessive, neither should there be any longitudinal movement. The mechanism is tested easily by rotating the wheel and noting the amount of lost motion. A conventional type of steering gear is shown at Fig. 11, and the components are illustrated individually. With this design it is possible to reduce any lost motion by changing the position of the worm gear in its relation to that of the worm. The worm gear shaft is squared at one end and has a groove cut in each corner to take the ball steering arm. The

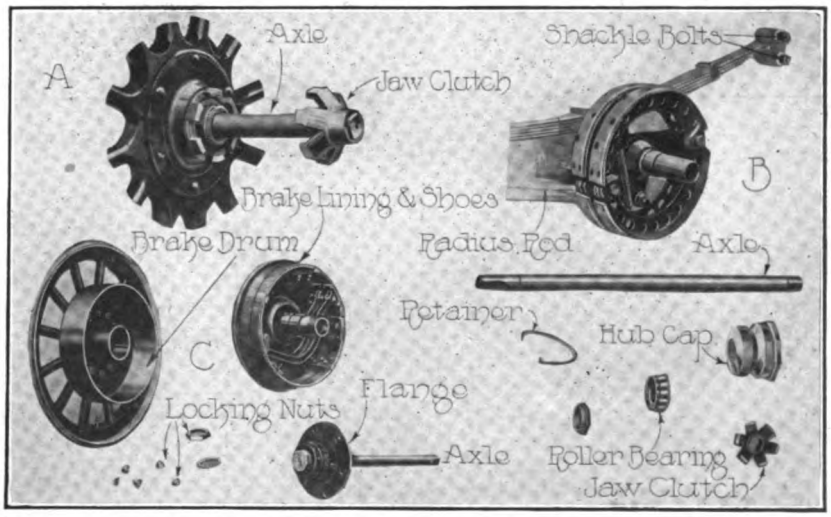


Fig. 10—Rear Axle Construction: A, Full Floating Type with Jaw Clutch; B, Similar Design with Axle, Etc., Removed; C, Illustrating Method of Retaining Axle by Flange Bolted to Wheel.

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parts are secured by a clamping screw, which permits the turning of the worm gear a quarter of a turn, thus bringing a new section of the gear into mesh. Longitudinal movement is restricted by the adjustment of the thrust bearings. In reassembling the components be sure that each nut and bolt is set up snugly and that the usual lock washer is in place. Repack with grease in accordance with the instructions of the maker.

Next examine the drag link. This may be the source of some of the lost motion and as these members are usually adjustable, remove the cotter pin and adjusting plug, clean out the lubricant and repack with new before replacing the adjusting member. Another cause of play in the steering linkage is due to the tierod connections, the bolt and bushing being subject to wear. The fitting of new bushings and bolts will eliminate the trouble, after which the wheels should be aligned. This is accomplished by loosening the clamp device shown at Fig. 9 B and lengthening or shortening the tierod as is necessary.

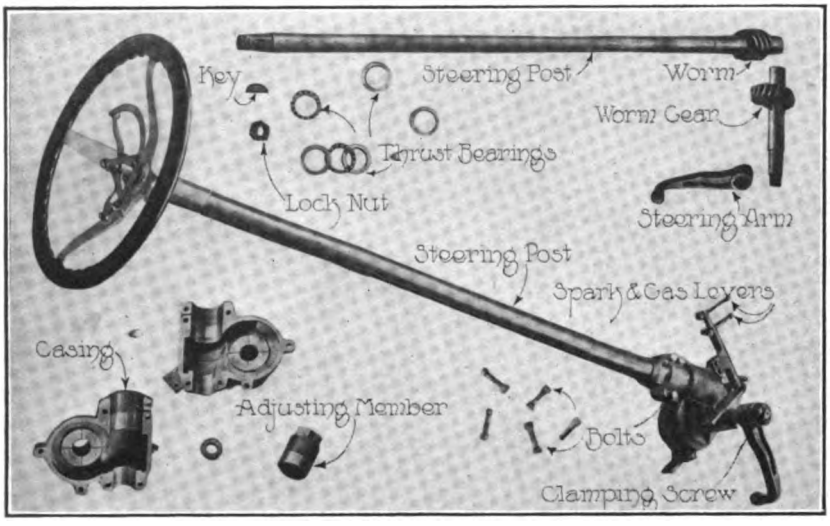


Fig. 11—A Typical Steering Gear and Its Parts—Lost Motion Is Eliminated by Meshing Unworn Part of Worm Gear with Worm.

Remove the spindle bolts and clean out the oiling grooves and holes, and if the bushings, are worn replace with new. Also use a new pin if the latter shows signs of wear. By moving the bolt around slightly some lost motion will be eliminated.

If the front wheels are fitted with ball bearings, remove the wheels, and clean the races, cones and balls. Examine these parts carefully for wear and if one or more of the balls are worn replace with a complete new set. Observe the same treatment with the cones, and in replacing the bearings, repack with a high grade grease, one free from acid. In adjusting the bearings tighten up until they appear to bind, then slack off about half a turn and lock. Try the wheel to see if it revolves freely, as it may bind at one section. If it cannot be adjusted examine the spindle. It may be possible that the latter is bent. Roller bearings are adjusted in a similar manner. Clean and refill all grease cups and replace worn boots with new, repacking same with grease.

Before testing out go over the chassis and try all nuts and bolts to make sure they are snug. If the tires have been removed, as they should have been, clean the rims and either paint or graphite them. There is a graphite paint on the market made especially for this work. The chassis should be tested out before replacing the body, as it permits of the changing of any adjustment or tightening of parts not easily accessible with the body in place. Before fitting the body go over the nuts and bolts a second time as some will be found that will permit of tightening.

Before going out on the road with the chassis make sure that the crankcase is supplied with plenty of lubricant and that the oiler is full. If the bearings have been taken up it is a good plan to adjust the oiler to feed more than the usual amount until the bearings are run in. The road trial is recommended as it affords opportunity to readjust the carburetor, test the brakes and to make a number of minor adjustments which are usually needed. Before going out it is advisable to note if the license plates are attached as in some states the law covering these members is strictly enforced. In the replacement of the accessories, such as lamps, speedometer, horn, etc., these members should be cleaned and inspected if the work was not previously performed.

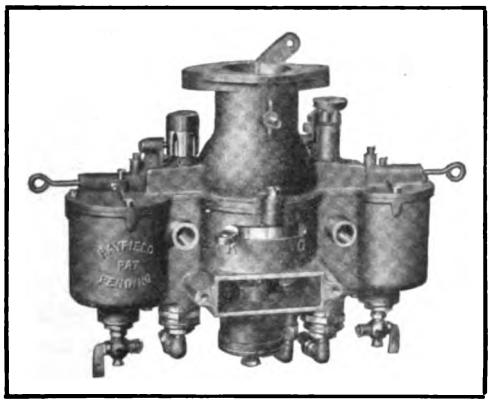
As a reward for her services in obtaining the conviction of leaders of a band which for two years has defrauded dealers in automobiles and tires, Miss Margaret M. Burnet, an attorney of 2 Rector street, New York City, has been made secretary of the Automobile & Accessories Dealers' Protective Association.

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NEW RAYFIELD CARBURETOR.

Combination Vaporizer Utilizing Gasoline or Kerosene Independently.

Announcement is made by the Findeisen & Kropf Manufacturing Company, Chicago, of a new combination Rayfield carburetor. It is the invention of Chas. Rayfield, who also designed the conventional Rayfield carburetor, and is for use on traction, stationary and marine engines, although it is understood that the inventor is conducting a series of experiments with a similar instrument applicable to automobile motors.



Rayfield Combination Kerosene and Gasoline Carburetor.

The operation of the new carburetor is automatic, and it is held that a perfect mixture is supplied to the cylinders at all speeds and under varying loads when using kerosene, distillate or other low grade fuels. Water is automatically fed with the kerosene.

As will be noted by the accompanying illustration, two float chambers are employed. The shifting of a small lever by the operator shuts off the supply of gasoline and opens the kerosene port, instantly changing the mixture from one fuel to the other. Two separate adjustments are provided. The required heat for vaporization is obtained from the exhaust manifold, a pipe connecting the latter to the air intake of the kerosene member.

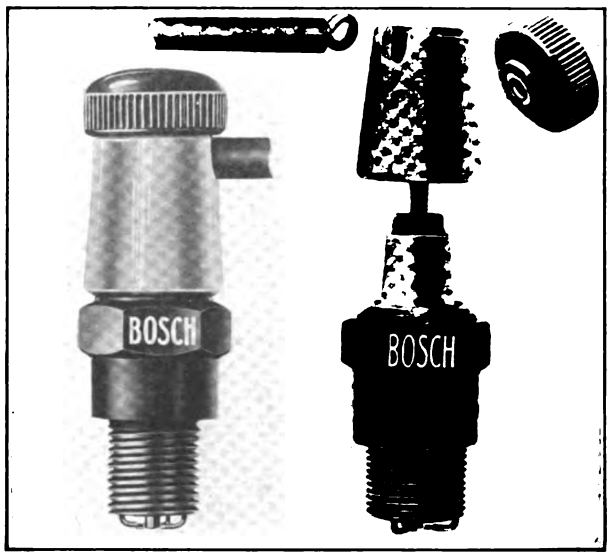
BOSCH SPARK PLUG HOOD.

Simple and Easily Attached Device for Preventing Short Circuits, Due to Moisture, Etc.

The tendency of a high-tension current to stray from its intended path is augmented when terminals, such as those of the spark plug for example, are exposed to dampness or moisture. Water is a well known conductor of electricity and during heavy rain storms the spark plugs are subjected to moisture unless the hood of the motor is water tight. To prevent short circuits and to protect the plug as well, the Bosch Magneto Company, New York City, has perfected and is marketing a hood which is easily and quickly attached or removed, and without interfering with the usual plug.

The spark plug hood is shown in an accompanying illustration and comprises but three parts, the hood, asbestos washer and an insulated terminal thumb cap. To apply it the usual plug terminal is removed and the asbestos ring pressed into the groove at the base of the hood, after which the latter is slipped over the regular plug. The cable is then set in the recess of the hood with its terminal over that of the electrode or central pin of the plug. The insulated thumb cap is next screwed in place, it not only serving to retain the parts, but its large inside diameter bearing against the insulation of the cable, expanding it sufficiently to seal the opening. The hood is of steatite.

The construction of the hood is such that the parts carrying the high-tension current to the gap of the plug or ground side of the shell, are insulated, and it would be possible to obtain perfect ignition even if the hood were subjected to a stream of water. A feature of the device is that the cable may be detached with the motor operating, and without danger of shocks, by removing the thumb cap. The hood may be displaced and reassembled by the fingers and locking as it does the connections, makes for convenience. It is made in all sizes for Bosch plugs, including those for motorcycles.



Bosch Spark Plug Hood, a Practical and Simple Construction for Completely Insulating High-Tension Current Carrying Parts of Spark Plug.

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MOTORING LAWS AND THEIR ENFORCEMENT.

Provisions of Amended Law in New York State---What Maine Is Doing for Good Roads---Special Registration Fees for Trucks---Legislative Briefs.

AFTER Jan. 1, 1914, under the provisions of the new motoring law passed by the New York legislature, all automobile operators, whether chauffeurs or not, must be licensed. Only chauffeurs will be required to pass an examination, however. The license fee is made $1 a year instead of $5, as at present.

Although several automobile bills were introduced early in the session, the new statute amends the so-called Callan law in only a very few particulars. The most important of these, aside from the provision for licensing all operators, is found in the new section 291, which reads as follows:

Suspension and revocation of a certificate of registration and license of operator—The secretary of state may suspend any certificate of registration, or any license, issued to any person under the provisions of this article for any one of the following causes: a, for a third violation of the speed provision of this article within one calendar year; b, upon the conviction of the holder of a license of a felony under this act; c, because of some physical or mental disability of the holder arising since the original issuance of the license or its renewal, or the disability of the holder by reasons of intoxication or the use of drugs; d, because of the gross negligence of the operator whereby person or property has been injured; e, for going away without stopping and giving his name and address after causing injury to any person or property. Before revoking such certificate of registration or license, the holder thereof shall be entitled to a hearing before the secretary of state or his deputy, upon 10 days' notice in writing; on the revocation of a certificate of registration or license to operate, neither the license nor the certificate shall be reissued unless upon investigation the secretary of state shall determine that the operator may again be legally permitted to operate. Upon the conviction of a person for an offense involving a third violation of section 287 (speed) of this article, within one calendar year, or of operating a motor vehicle while under the influence of intoxicating liquors or drugs, or for injuring a person or property by reasons of gross negligence in operating, or of going away without stopping or giving his name and address after causing injury to any person or property, the secretary of state may immediately revoke the license of the person so convicted and if any person convicted of any such offense shall appeal from the decision of such trial court, the secretary of state may suspend forthwith the license of the person so convicted and appealing and may order the license delivered to him and shall not reissue the same unless such person is acquitted upon such appeal, or unless the secretary of state shall decide that such license shall be reissued. Whenever any license or certificate shall have been revoked under the provisions of this article no new license or certificate shall be issued unless by the secretary of state to such person until after 30 days from the date of such revocation, nor thereafter, except in the discretion of the secretary of state. Notice of the revocation and suspension of any license or certificate of registration shall be transmitted forthwith by the secretary of state to the chief of police of the city or prosecuting officer in the locality in which the person whose license or certificate of registration so revoked or suspended, resides.

It would appear that those interested in the use of motor trucks were successful in defeating the measures introduced to limit the weight of vehicles used on the highways, since this subject is not covered in the new law as passed. And there is no change in the registration fees.

THE MAINE LEGISLATURE.

Creates Highway Commission, Adopts State Road System and Limits Truck Weight.

The Maine legislature has adjourned. The Maine Automobile Association is particularly pleased with the creation of a state highway commission and the adoption of a state road system, but it is not at all enthusiastic respecting the new law limiting the weight of motor trucks. The last named action appears to have been patterned somewhat after those which met with decided opposition in Massachusetts, New York, New Jersey and Pennsylvania. It provides that no vehicle of nine tons, including its own weight, shall be allowed on a highway without a special permit from the highway department or the municipal officers of the town. Motor trucks of between four and five tons are limited to 15 miles an hour, and those between six and nine tons are limited to six miles an hour. The size of tires also is regulated according to the weight of the vehicles.

The state highway commission will have jurisdiction over the expenditure of the $2,000,000 bond issue authorized by the voters last fall. None of this money can be used in the thickly settled portions of towns of 2500 population or more, and another provision is that it must be expended on through roads, in continuous sections of at least seven miles, provided there is that distance that can be constructed in the county before it reaches the county line or another piece of improved road. These state roads are to be built wholly at the expense of the state, the municipalities to pay the state $60 a mile annually for their maintenance. Another class of highways, designated state aid roads, is contemplated, in the construction of which the state is to render assistance in exactly the same proportion as the towns, the maintenance to be under the supervision of the state highway commission, the towns being required to pay $30 a mile annually for this purpose.

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PROTEST TARIFF SCHEDULE.

Committee Representing Automobile Manufacturers Prepare Brief for Congress.

Protesting against the automobile schedule in the proposed Underwood tariff, by which the duty on chassis is reduced from 45 to 30 per cent. and that on parts from 45 to 20 per cent., while the duty on complete automobiles is retained at 45 per cent., a committee of automobile manufacturers representing 27 of the leading plants in the country is preparing to present its case to the ways and means committee of Congress.

The brief prepared purports to show that the reductions would throw much of the American automobile trade into the hands of the foreign manufacturers, as the only things they desire to import are chassis and parts, which can be assembled in this country at small cost. The manufacturers represented by the committee which makes the protest are as follows:

John S. Clark, vice president, Autocar Company, Ardmore, Penn.; C. Arthur Benjamin, general sales manager, American Locomotive Company, New York City; V. A. Longaker, general manager, American Motor Company, Indianapolis, Ind.; J. J. Cole, president, Cole Motor Car Company, Indianapolis, Ind.; G. W. Bennett, vice president, Garford Company, Elyria, O.; Elwood Haynes, president, Haynes Automobile Company, Kokomo, Ind.; Charles D. Hastings, secretary, Hupp Motor Car Company, Detroit; S. T. Davis, Jr., president, Locomotive Company of America, Bridgeport, Conn.; G. A. Kissel, president, Kissel Motor Car Company, Hartford, Wis.; H. M. Jewett, former president, Lozier Motor Car Company, Detroit; Leo A. Fief, general sales manager, Mitchell-Lewis Company, Racine, Wis.; George M. Dickson, secretary, National Motor Vehicle Company, Indianapolis, Ind.; George O. Daniels, vice president, Oakland Motor Car Company, Pontiac, Mich.; O. O. Hutchinson, vice president, Olds Motor Works, Lansing, Mich.; L. H. Kittredge, president, Peerless Motor Car Company, Cleveland, O.; George Pope, treasurer, Pope Manufacturing Company, Hartford, Conn.; H. M. Snyder, secretary, Reo Motor Car Company, Lansing, Mich.; H. B. Staver, Staver Carriage Company, Chicago; W. H. Whiteside, president, Stevens-Duryea Company, Chicopee Falls, Mass.; Frederick F. Fish, president, Studebaker Corporation, Detroit and South Bend, Ind.; Robert W. Allen, general manager, Warren Motor Car Company, Detroit; Windsor T. White, president, White Company, Cleveland, O.

TAXING MOTOR TRUCKS.

Special Registration Fees Already Required in Several of the States.

In view of the activity on the part of certain states, as represented by their legislators, in seeking to impose what is regarded as heavy restrictions upon the use of commercial motor vehicles, there is interest in learning what action already has been taken. In many commonwealths motor truck owners and users have been busy during the past few months protesting against bills that have been introduced. They were successful in Rhode Island and New York, and it remains to be seen what the outcome will be in Massachusetts, Pennsylvania and California. New Hampshire, New Jersey and Michigan enacted provisions which hardly can be conceded as representing progress in this respect.

A majority of the states make no specific mention of motor vehicles utilized for commercial purposes, the inference being that they are subject to the same fees as the so-called pleasure cars. An investigation of the laws now in force, or soon to go into effect, reveals the following special provisions for business motors:

Alabama, act of 1911—Motor vehicles used for public hire in transporting passengers or freight, $25.

Connecticut, act of 1912—Cars of 1000 pounds capacity, $5; above that, $2 for each 1000 pounds or fraction thereof.

Indiana, act of 1913—Flat rate of $5.

Maine, act of 1911—Flat rate of $10.

Maryland, act of 1912—Flat rate of $3.

Massachusetts, act of 1909—Flat rate of $5.

Michigan, act of 1913—Fifty cents a horsepower.

New Hampshire, act of 1913—One ton capacity, $10; one to two tons, $12.50; two to five tons, $15; over five tons, $20.

New Jersey, act of 1913—Over 4000 pounds capacity, $10 in addition to regular fees according to horsepower.

New York, act of 1913—Flat rate of $5.

Rhode Island, act of 1909—Flat rate of $2.

LEGISLATIVE BRIEFS.

It appears that Chief Edward Bromage of the police force in West Springfield, Mass., has revived the speed trap, with the result that during April 54 arrests were made in the Riverside section of that town, netting $340 in fines.

Mayor Gaynor of New York City has signed the new speed ordinance passed by the board of aldermen creating a speed limit of 20 miles an hour, but with a provision that in case of accident 15 miles an hour shall be deemed presumptive evidence of negligence. The ordinance goes into effect June 2.

The motor vehicle department in New York State has decided that no special license can be demanded for the use of a side car attachment on motorcycles. Until the matter was taken up recently by the Federation of American Motorcyclists it had been the plan of the department to class motorcycles with side cars as automobiles and to demand a fee accordingly.

Secretary of the Interior Lane has decided to permit automobiles in the Yosemite national park in California. This is looked upon as the entering wedge which will break up the transportation monopolies heretofore existing in the various national parks, and it is expected that cars will be admitted to other public lands of like character. The plan includes the imposition of an entrance fee, the fund to be expended in improving the roads.

The town of Eden, Me., in which Bar Harbor is located, has passed a new traffic ordinance, in which provision is made for automobiles. The speed limit is fixed at 10 miles an hour, and operators are cautioned to sound their warning signals in approaching curves. All vehicles, both motor driven and horse drawn, are required to carry lights from one hour after sunset to one hour before sunrise. It would appear that Bar Harbor was to receive motor tourists this year.

A Chicago jury, of which four members were automobile owners, recently found a defendant guilty of murder as the result of an automobile accident in which the victim was struck by the machine and rolled along the ground for some distance. The evidence tended to show that the chauffeur neglected to stop or make any attempt to see what injury had been inflicted. The court sentenced him to prison for 14 years. The case has served to indicate that automobile owners have little desire to condone reckless driving.

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IN THE COMMERCIAL VEHICLE FIELD.

Constructional Details of the New Kelly Line, Now Equipped with Water-Cooled Motors---Two Interesting Additions to the Light Delivery Wagon List.

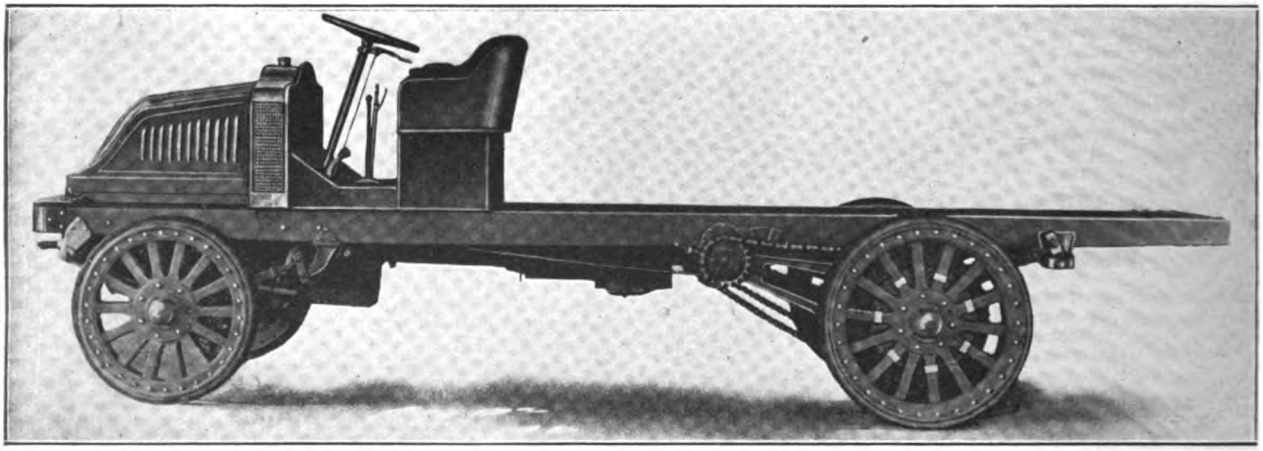
CONSIDERABLE interest attaches to the 1913 Kelly truck line, produced by the Kelly-Springfield Motor Truck Company, Springfield, O., largely because of the substitution of a water-cooled motor for the original blower system of cooling by air utilized in these machines when they were known as the Frayer-Miller. It also will be noted that the general design has been changed materially, this including a more elastic chassis frame, a radiator in front of the dash and behind the motor, and a so-called foreign type hood. The accompanying illustration is that of the three-ton model, and the company is producing a one-ton vehicle differing only in the type of motor and the jackshaft construction.

The larger motor is a four-cylinder, four-cycle, water-cooled T head type with the cylinders cast in pairs, the bore being 4.5 inches and the stroke 6.5, while the smaller is of the L head type with cylinders cast en bloc, the bore being 3.75 inches and stroke 5.25. The former is rated at 38.75 horsepower at 900 revolutions, to which maximum speed it is regulated by a governor, and the latter is rated at 30 horsepower. With both machines the motor is installed in the frame with a three point suspension, two at the forward end and the third at the rear.

The engine is lubricated by a dry base self-contained force feed system, the oil being stored in a reservoir in the base of the crankcase which has a capacity of 2.75 gallons. A centrifugal pump creating high pressure forces the lubricant through a system of tubing to all the bearings through a hollow crankshaft and to all the timing gears, the normal flowage being about 2.5 gallons a minute. The oil drains back to the reservoir and is filtered and used over and over. Cooling is by a circulation of water forced by a centrifugal pump driven by the cross shaft at the forward end of the motor through the water jackets, and the tubular radiator is incorporated with the dash. Ignition is by an Eisemann high-tension magneto fitted with a governor that automatically advances and retards the spark. The fuel also is controlled by a governor of the vertical loose ball type.

The cone clutch is coupled to the driving shaft by a double universal joint, and the main driving shaft is enclosed in a torque tube that is supported at its forward end in the centre cross frame member by a double swivel joint. The transmission gearset, incorporated with the jackshaft, is of the selective sliding gear type with three forward speeds and reverse. With the smaller vehicle the jackshaft is of the semi-floating type, and by removing either the top or the bottom of the jackshaft housing the differential gear may be taken out.

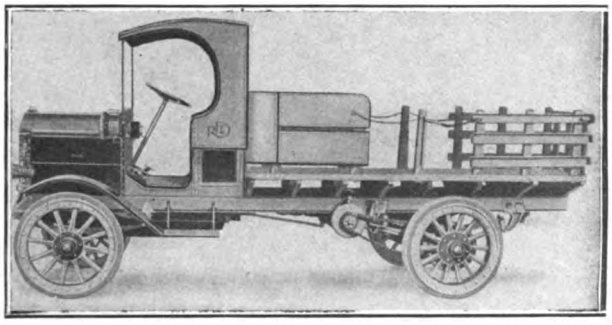
Springs are semi-elliptic. Two sets of brakes are fitted, these being internal expanding on rear wheel drums. Wheels are of the conventional artillery type, the larger machine being shod with 38 by five-inch single solid tires in front and 42 by five-inch dual tires at the rear. The smaller has



Side View of Three-Ton Kelly Truck Chassis, Utilizing Water-Cooled Engine, Foreign Type Hood and Radiator Behind the Motor.

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36 by 3.5-inch solid tires in front and 36 by four-inch in the rear, with an option of 38 by 5.5-inch pneumatics at slight additional cost. The stand-



Reo Delivery Wagon of 3000-4000 Pounds Capacity.

ard wheelbase of the three-ton machine is 150 inches, although options of 130 and 172 are permitted. The standard loading space is 12 feet three inches, and the options, nine, 15 and 17 feet. The standard wheelbase of the one-ton is 120 inches, with loading space of nine feet, which may be increased to 12 feet upon option. The driver is located at the left with levers in the centre.

REO DELIVERY WAGON.

Use of Sectional Radiator Insures Against Failure of the Cooling System.

The new Reo delivery wagon of 3000-4000 pounds capacity, made by the Reo Motor Car Company, Lansing, Mich., has a number of interesting features, among which may be mentioned the sectional radiator, this being of the tubular design, constructed in 24 sections, so arranged that one or more may be removed and the machine used wih efficient radiation. The motor is a four-cylinder, water-cooled unit, with valves in the side and head, and the cylinders are cast in pairs. The crankcase is a single casting of aluminum, carrying three main bearings that are adjustable from the outside. The crankshaft is large and of manganese steel.

The motor is cooled by a circulation of water by a gear driven pump, aided by a belt driven fan and a fan spoked flywheel. The lubrication is a combination splash and force feed, the bearings being flooded by a plunger pump, and splash supplying the other moving parts. The excess from the constant level of oil is drained to the reservoir, filtered and used over again. The carburetor is an automatic float feed type with hot air intake, adjustable from the dash. Ignition is by a low-tension magneto and auxiliary battery.

The clutch is a dry multiple disc design, the discs being faced with anti-friction material, contained in a dust tight housing. The transmission is of the selective type, giving three forward speeds and reverse. The drive is through a shaft having two universal joints and side chains. The differential is of the four-pinion construction.

Springs are semi-elliptic. The brakes are external contracting with bands two inches wide, acting on 12-inch drums on the jackshaft and 17-inch drums on the rear wheels. The frame is a steel channel section. The front axle is a round steel section and the rear axle a hammered forging, both being fitted with Timken bearings. The wheels are 36 inches diameter with four-inch single tires forward and three-inch dual tires rear. The wheelbase is 130 inches. The driver is located at the left and the control levers in the centre.

BROWN USES INTERNAL GEAR.

Constructional Details of Light Delivery Wagon Produced in Peru, Ind.

Beginning the production of a 1500-pound delivery wagon late last year, the product of the Brown Commercial Car Company, Peru, Ind., may be regarded as among the newer additions to the industry. It is designed for fast, light delivery, and its principal feature is the use of the internal or concentric gear drive.

The motor is a vertical, four-cylinder, four-cycle, water-cooled L head unit with cylinders cast en bloc. The bore is 3.75 inches and the



Brown Commercial Car for Fast, Light Delivery.

stroke 5.25, giving a rating under the S. A. E. formula of 22.5 horsepower. Lubricant is circulated by two plunger pumps driven by eccentrics

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on the camshaft, through a system of tubing to the main bearings and timing gears, and drains into the crankcase, where a constant level is maintained for splash lubrication of camshaft bearings, cams, valve tappets, connecting rods, pistons and cylinders. Water is forced through a vertical radiator by a centrifugal pump, and cooling is further aided by a fan driven by a flat belt. The radiator is suspended on coiled springs and is insured against stresses of any kind due to chassis distortion. The carburetor is of the automatic float feed type, and ignition is by a Remy magneto.

The clutch is a dry plate design with 27 plates, 14 of which are faced on either side with an anti-friction material. The transmission is selective, giving three forward speeds and reverse. Drive is through a 1.75-inch tubular shaft fitted at either end with dust proof universal joints, and the torque and driving strains are taken by two large tubes extending from the brake spiders to a cross member in the centre of the chassis frame. The forward ends of the tubes are mounted with a globe that is carried in a bracket on the cross frame member. The shaft extends through an opening in the heavy drop forged rear axle web to a countershaft bolted at the rear of the axle, and a pinion meshes with the bevel gear of the differential. Pinions at the outer ends of the shafts mesh with the internal gears bolted to the rear wheels.

Springs are semi-elliptic. Two sets of brakes are fitted, internal expanding and external contracting. The wheelbase is 122 inches. The wheels are of the artillery type, fitted either with 34 by 4.5-inch pneumatic tires on demountable rims, or Motz cushion tires, 34 by 3.5 inches forward and 34 by four inches rear.

WELL PLEASED WITH KNOX.

California Owner Reports Splendid Record for Machine During Past 2.5 Years.

C. W. Ayers, mining engineer of Jamestown, Cal., has driven his four-cylinder Knox car, made by the Knox Automobile Company, Springfield, Mass., over the most unfrequented roads of the Sierra Nevada mountains and across the hot, sandy desert and oil fields of the South, during the last 2.5 years, covering over 20,000 miles. During that time he states that the machine has never been taken down or overhauled.

He gives a further brief history of his car as follows: Had valves reground twice; engine compression apparently as good today as on the first day's run; has the same spark plugs, valves and springs furnished with the car; carburetor, magneto and sparking system never disturbed; oiling system as perfect as when put in; can speed up to 60 miles an hour and take all grades on the Altamont hills on high gear.

PANAMA-PACIFIC EXPOSITION.

Director Feels Proposition Was Not Placed Before Industry in Proper Light.

Robert Alexander Crothers of San Francisco, Cal., editor of the San Francisco Bulletin and director of the Panama-Pacific Exposition, is disappointed because plans for a great automobile building at the exposition did not meet with the approval of the industry, and recently interviewed several prominent motor car manufacturers on the subject. He believes that there was a wrong impression relative to the project and says:

> I find that at other expositions selling of automobiles has not been allowed, and that the manufacturers have not been allowed to change their exhibits during the exposition. We intended to make this great exhibition hall a place for business. I am going to try to bring about the exhibition just the same, believing that under the plan we had in mind, and which apparently was not placed before the makers in the right light, the show will be a pronounced success.

WANTS LICENSE NO. 1.

Haynes Automobile Company Makes This Request of Secretary of State.

The Haynes Automobile Company, Kokomo, Ind., maker of Haynes cars, has made a request of L. G. Ellingham, secretary of state of Indiana, for license No. 1 under the new Indiana motor vehicle registration law, which goes into effect July 1. The request is based upon the claim that the first automobile in the United States, which was a Haynes, made by Elwood Haynes, who was born at Portland, Ind., is due this recognition in the State of Indiana.

The secretary of state's attention is called to the fact that the "Pioneer," the machine which inaugurated the American gasoline automobile industry, and brought fame to Indiana, is now in the custody of the Smithsonian Institute at Washington, D. C.

The Merchants' Association of New York City has removed from 54-60 Lafayette street to new headquarters in the Woolworth building, 233 Broadway, where much needed room will be at the disposal of the various bureaus.

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AVAILABLE LIQUID MOTOR FUELS.

THE automobile owner naturally is deeply interested in the subject of fuel. The increased cost of gasoline has brought the matter directly to his attention, and has served in no slight measure to urge greater activity among engineers in an effort to secure a satisfactory substitute. Devices for carbureting kerosene and mixtures of kerosene and gasoline are making their appearance both in this country and abroad. The problem has assumed definite form and the effort to find the proper solution may be described as universal.

As is more or less well known the American Society of Automobile Engineers has undertaken a systematic investigation of the subject, and without doubt much important work will be done by this body during the coming year. The experiments hardly will be limited to the engineers connected with the production of cars and carburetors. The owner has played an important part in the development of the industry, and it may be expected with reason that some very valuable suggestions will be received from that source in the present instance, particularly during the summer, when the matter of vaporization is unattended by the difficulties met in colder months. With this fact in mind, it is of interest to consider from time to time some of the discussions presented by members of the S. A. E. at the meetings of its various sections.

In a paper read by N. B. Pope before the Metropolitan section early in the year, the importance of this subject was brought out very forcibly. After citing the increased demand for hydrocarbon fuels, Mr. Pope said:

In this connection two circumstances stand out conspicuously. The first is that the lust of the automobile industry for producing low and medium priced cars in huge quantities continues unsatiated; and the second, that the output of commercial vehicles has begun to assume proportions of magnitude. Despite the rate of obsolescence that is comparatively high (though tending to decrease as the art becomes more familiar), and the upbuilding of substantial foreign markets, the curve of annual automobile consumption in the United States continues to sweep upward. Nor is it even remotely possible to foretell when the maximum will be reached and when, in consequence, the automobile industry itself may become truly stabilized. Automobile fuel consumption, while in large measure responsive to conditions affecting the general welfare, must, naturally, be forced upward by net production; that is, production which is not offset either by obsolescence or exportation. So long as the number of automobiles in use increases, just so long the fuel demand of the country must increase; and to foresee the limit to the growth of the one is no easier than to foresee a limit to the growth of the other. Decreased production, due to whatever cause, would, however, not mean decreased fuel consumption, save as both might be subject to the same external influences. In other words, while there is no way of foretelling just when the fuel market will cease its present rapid expansion, it is practically certain that little short of a total cessation of business activity throughout the country—a serious panic—could materially affect it, and then only temporarily.

Mr. Pope quoted estimates from official sources which tended to show a rate of increase in automobile fuel consumption of more than 40 per cent. a year, while the world's production of petroleum, as based on government statistics, showed an increase of only five per cent. from 1910 to 1911. And he further stated that this gain was due wholly to increased production in what formerly was termed "fuel oils," or the asphaltic oils of the gulf, mid-continent and California fields, which was increased by about 12.7 per cent., so that the so-called "refinery oils" actually decreased by a trifle under 2.5 per cent.

The paper made a plea for a standardized fuel and added: "Despite the immensity of the demand the automobile fuel market is without an acknowledged competitor for gasoline. * * * Had the automobile industry, or a substantial portion of it, set out to design motors to use kerosene, distillate or any other fuel than gasoline a couple of years ago, the present situation might have been averted."

A more recent discussion is that presented by A. E. Potter, in a paper read before the Indiana section of the society, entitled, "Liquid Motor Fuels." This took up in detail some of the fuels available for automobile use and was in part as follows:

Of the liquid fuels proposed for use in automobile motors but two, wood and grain alcohol, belong to the carbohydrates, while the hydrocarbons, with which we are more familiar, include besides naphtha and kerosene, the two best known, benzene, benzol, distillates, compressed natural gas, gasoline, etc.

Alcohol.

Wood alcohol cannot be considered as a possible fuel for internal combustion motors, for the reason that formic acid, resulting from the action of heat, has an extremely deleterious effect upon the metal of the cylinders, pistons and rings. Its high cost of production also renders it unavailable.

Grain alcohol possesses many disadvantages, such as its necessarily high cost of manufacture, low fuel value, necessity of an abnormally high compression to secure efficiency and difficulty in the matter of efficient lubrication.

Several years ago I made some exhaustive investigations as to the possibility of using grain alcohol as a fuel for marine internal combustion motors, and as a result made some seemingly radical statements, declaring it unsuitable for such use. At the time President Roosevelt's commission, headed by Professor Lucke, were engaged in the investigation of the alcohol question abroad. Motor boat and yacht clubs were laboring to influence federal legislation to secure free alcohol for use for industrial purposes, and farmers were contemplating the installation of stills for utilizing the waste from their crops. I was taken severely in hand, my published conclusions being in the nature of cold water doused upon a very hot get-rich-quick scheme. A few months later the report of the free alcohol commission convinced my critics, against their will, bearing me out completely in my conclusions. It was later found that instead of laboring for free alcohol for use in marine motors, they wished

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the remission of the internal revenue tax for entirely different industrial purposes.

I am just as confident today as I was seven years ago that grain alcohol will never be used to any appreciable extent for the propulsion of motor cars or motor boats, and I do not hesitate to predict that motor car owners would rather pay 50 cents a gallon for naphtha than 25 cents a gallon for grain alcohol, and that they would be able to secure greater mileage a unit of cost with the higher priced fuel. I think we should not consider any carbohydrate for motor fuel.

Hydrocarbons.

Of the hydrocarbons, benzol derived from the distillation of coal, shale oil from oily shales found in various localities, compressed natural gas and gasoline, should on account of their very much higher cost of production, be eliminated. This leaves us as available motor naphtha, benzene, kerosene and crude distillates.

It is only within a few years that refiners have ceased the production of gasoline lighter than 86 degrees Baume. The 88 and 90 gasoline formerly offered now all goes into the 86 grade to increase its gravity and add to the volume of the higher-priced product. Considerable of the so-called naphtha fraction lighter than 76 and heavier than 86 degrees, which formerly was recovered as 76 naphtha, is now marketed with the so-called 86 gasoline used largely for the purpose of illumination and the recovery of oils.

The term gasoline, it may be noted, is here used to designate the volatile distillate of 86 degrees and lighter, while naphtha was formerly the term used for distillates known as 74 and 75 degrees naphtha, and benzene was offered in gravities between 58 and 66 degrees. Kerosene is the next heavier of the light distillates. It may be news to many that there are several grades of kerosene, of different standards of fire test and color. Today the principal commercial grades in the order of their gravity, the lighter being mentioned first, are 110-fire test, standard white; 130-fire test, standard white; 150-fire test, water white, and 300-fire test.

That which was called 76 naphtha a few years ago was any grade that would show a gravity of at least 74 degrees, while the so-called 74 had to show at least 72 degrees. Today practically all the true naphtha on the market is called 74 degrees, and is approximately of that gravity. This grade is very largely exported to Great Britain, France, Italy, Germany, etc., where it is sold in competition with other imported motor spirit, petrol or essence. There is practically no 74-degree naphtha used in this country for automobile motors.

Many of us remember that a few years ago vapor and "gasoline" stoves were advertised and largely used, after certain big interests had influenced the various boards of fire underwriters to permit their use in insured buildings. These devices were designed to utilize the vast accumulations of naphtha too heavy to be utilized for 74 and 76-degree naphtha together with unmarketed benzene, and the term "stove gasoline" was given to this product. Gas engines designed for use with coal gas had become adapted to use of naphtha and air, and it quite naturally became customary to use the term gasoline engine, rather than naphtha engine, and call naphtha gasoline. Another circumstance that no doubt was a factor in misnaming the internal combustion engine using naphtha was the fact that the Gas Engine & Power Company were putting out what they called naphtha launches, practically steam engines, except that naphtha was used in the flash boilers instead of water.

Stove gasoline was the progenitor of automobile naphtha, as it is called by the trade, and gasoline by motor users. To this stove gasoline has been added practically all the benzenes and some of the kerosene, and today it is not unusual to find motor fuel of this sort offered with a gravity of but 58 degrees, and the exception to find it 62 degrees, and the end is not yet, for following the law of supply and demand motor naphtha must either grow heavier and heavier or the price will have to be advanced to check the demand.

I have before me some distillation tests of Texas motor naphtha, made during the past year, which in this connection are of interest. These samples in the order of their dates of receipt are called Nos. 1, 2, 3, 4, 5 and 6. Their gravities were respectively 59.4, 57.7, 57.2, 61.3 and 61.4 Baume. The boiling points were 142, 157, 183, 195, 134 and 130 degrees Fahrenheit, while 50 per cent. distilled at 222.5, 229.5, 235.5, 228 and 226 degrees, and it took maximum temperature of 323, 324, 314, 310, 330 and 329 degrees to distill the entire samples. It may be interesting to note that the entire ranges of temperature between boiling points and total distillation were respectively 181, 167, 131, 115, 196 and 199 degrees Fahrenheit, the No. 4 sample Texas disclosing a remarkably short range, while samples Nos. 5 and 6 showed an unusually long range, nearly 200 degrees.

A sample of Standard Oil 74 degrees naphtha on distillation test showed a boiling point of 100 degrees, 50 per cent. passed over at 162 degrees, while it took 275 to distill the entire sample. Its gravity at 60 degrees Fahrenheit was 73.3 Baume.

On the redistillation of the naphtha fraction subsequent to its usual treatment with sulphuric acid and water in an agitator, the product being later neutralized with lime or some other alkali, there will be formed a certain percentage of kerosene. The kerosene fraction will likewise furnish a percentage of the naphtha series. In the refining of naphtha this kerosene will be left in, while in refining kerosene all the naphtha has to be refined in order to have the product possess the required fire test. The very last of the product takes a relatively higher temperature to distill, while from the boiling point to the 10 per cent. distillation point a variety of ranges results, the wider the range the greater being the percentage of more volatile naphtha.

Occasionally one will find a naphtha that on distillation will show a very slow rise in temperature during the first 10 to 20 per cent.; thence rising uniformly more rapidly. In such an instance it would be proven conclusively that the naphtha was not a natural but a mixed product, a heavy grade of naphtha or even benzene fortified with high test volatile naphtha, gasoline or even compressed natural gas to secure the desired gravity. In fact, some refiners even advertise high test gasoline for mixing purposes. The line of demarkation between motor naphtha and kerosene is one largely of convenience and conditions. If the price of kerosene were higher than that of naphtha it is safe to say that no kerosene would be allowed in the motor naphtha, but as there is a growing surplus of kerosene and a scarcity of naphtha the natural tendency is to include just as much of the lighter kerosene in the motor naphtha as the trade will stand.

Kerosene.

It should be remembered that gasoline, naphtha and benzene have no fire test. In other words, a flame will ignite either one of them at any temperature. On the other hand, kerosene has a fire test; in other words, kerosene will not ignite until its temperature is raised to a certain degree, known as its fire test. The lowest fire test kerosene produced is known as 110-degree standard white. This grade cannot be used in this country for illuminating purposes, but is considered sufficiently safe for use in some foreign countries, to which it is exported, not so heavily, however, for the last year or so since much of this grade has been included in motor naphtha. The grade known as 130-degree standard white is being marketed from tank wagons to storekeepers in New York at about 8.25 cents a gallon, while the 150-degree water white brings nine cents. Jobbing prices for 150-degree water white in bulk, cargo lots, are about 5.8 cents a gallon, with quotation on 110-degree at 4.8 cents.

The boiling point of kerosene is from about 300 to 400 degrees. There is no question but that the 110-degree grade is very much more volatile than the 130 and that the 150 is not nearly so volatile as the 130.

The next heavier petroleum product, after kerosene, is a mineral oil used largely in the oiling of wool, for the purpose of adulteration, and in paints, etc. It, like kerosene, has practically no lubricating quality, and has a fire test of approximately 325 to 350 degrees Fahrenheit. From this it may be seen that 150 kerosene may contain all the heavier kerosenes up to this product, although some refiners put out a grade of 300 kerosene for use in miners' lamps or for signal purposes. Even at that the 150 kerosene, or even the 130—if it is not up to standard of color—may contain kerosene of 295 fire test. This would give a range of temperatures from a boiling point of about 300 to a maximum temperature of about 400, before the very heaviest kerosene would all distill, providing all the 300 kerosene is removed from the product.

When one comes to compare the distilling temperature of 74 Baume naphtha, motor naphtha and 150 fire test kerosene, one begins to realize something of the problem that has so far not only baffled the successful use of ordinary illuminating kerosene in motor car motors, but in adopting mixed naphtha and kerosene as an automobile motor fuel, the light products vaporizing very readily, while the heavy portion at best is liable to enter the cylinder in far from gaseous form.

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G. C. VAPORIZER UTILIZES HEAVY FUELS.

Presents Novel Features in That It Replaces Usual Muffler—Heat of the Exhaust Gases Is Employed to Vaporize Kerosene, Etc.

COINCIDENT with the exploitation of kerosene as a substitute for gasoline is the announcement of the formation of the G. C. Vaporizer Company of America, Inc., 1790 Broadway, New York City, which concern will manufacture and market the G. C. vaporizer. The latter is not a new product, as it has been in service in England for nearly two years, and is now being utilized with success on commercial vehicles, motor boats and stationary engines. Its use is not confined to mechanical transports, it having been tested out on pleasure automobiles and one of the trials included a 700-mile trip with a four-cylinder Adlake car. At the end of the test the motor was examined and found to be free from carbon or soot, usually deposited with gasoline as a fuel.

The G. C. vaporizer is a radical departure from the ordinary type of carburetor in that vaporization of the kerosene or heavy fuels is obtained through the utilization of the heat of the exhaust gases in a novel manner, rather than by atomizing the fuel mechanically as it issues from a jet. Although a certain amount of outside air is employed, this is so regulated by the construction of the mixing valve and other components of the system, that it is maintained that varying atmospheric conditions do not affect the mixture.

The company does not claim that a cold engine may be started on kerosene with its vaporizer, but does state that the latter will retain its heat for a considerable period and that it is possible to restart the engine after being inoperative for approximately two hours. The installation of the G. C. vaporizer does not in any way interfere with the design or construction of the motor, which retains the usual gasoline carburetor, this being employed for starting purposes and its use being continued until sufficient heat is obtained. It is held that the desired temperature is secured in a short time. As the heavy fuel mixture is conveyed to the intake manifold and above the carburetor the use of either the regular or heavier fuel is possible, the one independently of the other.

Diagrams of the G. C. are shown at Fig. 1 with the components lettered, while the general arrangement is illustrated at Fig. 2. It will be noted that the vaporizer replaces the conventional muffler and that the exhaust gases are led by the usual piping from the exhaust manifold of the motor. Thus the vaporizer is a muffler and serves a useful feature in that the heat usually wasted is utilized for distilling the fuel.

The exhaust gases pass through the central tube of the vaporizer and follow the path indicated by the arrows to the exhaust outlet. During the passage of the hot gases they heat up a triple layer of small fragments of cast iron through which extends a horizontal pipe containing the fuel. The tube has a large number of perforations about .145 inch in diameter and the liquid is distributed by gravity onto the heat accumulating bodies, resulting in its being instantly

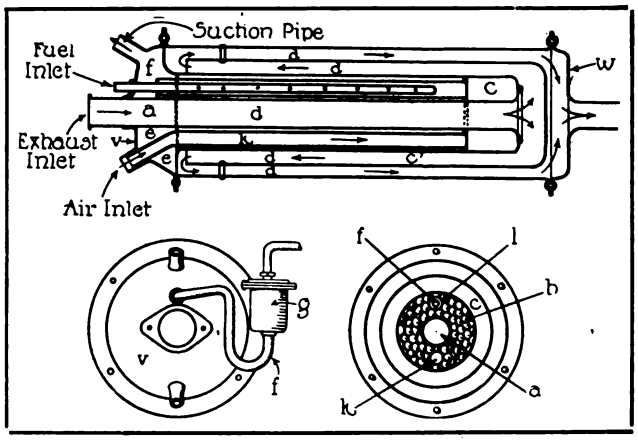


Fig. 1—Sectional Diagrams of G. C. Vaporizer, a Combined Muffler and Vaporizer Having Novel Features: a and c, Heat Retaining Jackets; b, Heat Absorbing Metal Blocks; d, Exhaust Expanding Room; e, Gas Space; f, Perforated Fuel Tube; g, Fuel Pipe; k, Air Pipe; l, Kerosene Pipe Protector; v, Front Cover; w, Back Cover.

vaporized. At the same time atmospheric air is drawn through the lower opening and mixing with the vapor, a very homogeneous mixture is obtained. This is supplied to the cylinders, compressed and burnt in the usual manner.

The amount of kerosene entering the perforated pipe of the vaporizer is automatically regulated by the suction of the motor and the supply is augmented in proportion to its speed because the vacuum produced is in proportion to the throttle opening. When the engine is operating at high speed the metal fragments in the vaporizing chamber absorb the excess heat, holding it in reserve until the speed of the motor

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falls, or for starting purposes. It is held to be possible to vary the speed of the motor from its minimum to its maximum with the same degree of flexibility as with the gasoline carburetor.

Regulation of the fuel is by a float chamber supplying a small stand pipe having a normal level slightly below the top of the pipe. The volume of heavy fuel mixture passing to the cylinders is controlled by a throttle incorporated with the air mixing valve shown at Fig. 2, and the control of the bi-fuel system may be simplified by the steering wheel control of the gasoline carburetor and that of the heavy fuel by the accelerator.

The adjustments are simple and once the vaporizer is installed it is stated that it requires no other attention than filtering the fuel. If the motor shows signs of smoking on a full charge

The consumption of lubricating oil is stated also to be reduced as much as 20 per cent., because the explosive mixture is saturated with lubricant, and automatically lubricates the cylinder walls. One motor, after 4000 miles of operation with the G. C. vaporizer, was disassembled and no deposits of carbon or soot were found. Another advantage held in the use of kerosene is its relative non-inflammability compared with gasoline. It is pointed out that there is an improvement in the operation of the motor with light loads and that the cylinders are cooler as well as acceleration is much quicker. Although the exhaust gases are utilized for vaporizing the fuel there is no more back pressure in the vaporizer than with any well designed conventional muffler.

It is understood that the G. C. vaporizer is to be tested at the laboratory of the Automobile

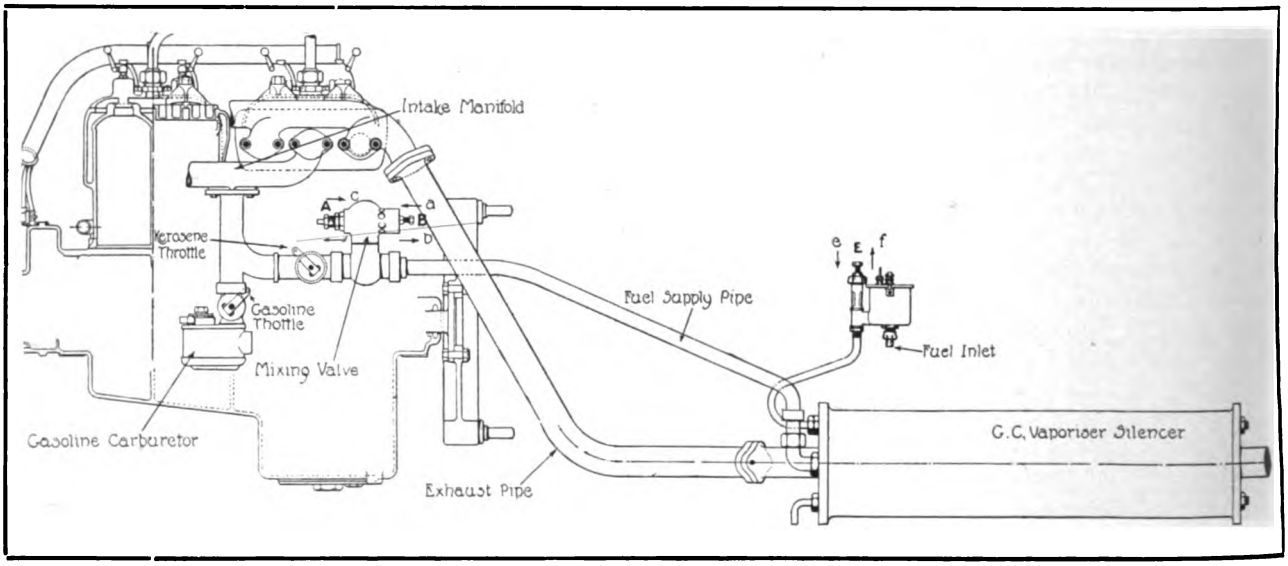


Fig. 2—General Arrangement of G. C. Vaporizer Showing Air Mixing Valve, Fuel Supply Pipe and Device for Regulating Flow of Kerosene.

the screw A of the air mixing valve is moved in the direction of d. If it backfires the screw is rotated in the direction of c. Adjustment for low speed is secured by the screw B, this being moved in the direction of a for smoking and towards b for backfiring. Further adjustment is provided by moving the screw E of the float member in the directions e and f, for smoking and backfiring respectively.

The use of fuel other than kerosene is possible, as alcohol, low grade kerosene, heavy petroleum and even ordinary methylated spirit has been successfully employed. It is claimed that the consumption of kerosene is about 20 per cent. less than that of gasoline and this economy is attributed to the utilization of the waste heat of the exhaust gases.

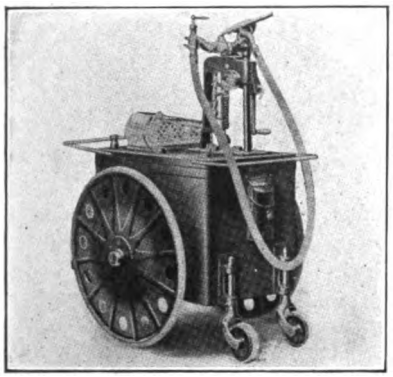
Club of America. According to a representative of the company a two-day truck economy test is being contemplated. Two five-ton trucks are to be utilized, one employing gasoline and the other kerosene and a G. C. vaporizer.

The Manhattan Automobile Club, the new organization of owners and sellers of motor cars, has formally opened its quarters in the Gainsborough studios on Fifty-ninth street, New York City. The club has been organized with the intention of doing rather more for the motorists than the ordinary automobile associations, both on the social side and also from the point of view of legislation that deserves to be encouraged or opposed. A. B. Cordner is president of the club and the directors are well known in the industry.

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GARAGE AND REPAIR SHOP EQUIPMENT.

THE profit attendant upon handling gasoline depends largely upon the equipment. Not only should the system prevent waste, but also the loss of time. As the majority of garages supply fuel to transient trade it is not always convenient to have the machine driven into the building. The American Oil Pump & Tank Company, Dayton, O., is marketing the American wheel tank, which is designed to be moved about the garage and to the sidewalk, and it includes those features making for convenience and economy.



American Wheel Tank.

The tank proper has a capacity of 50 gallons and is constructed of .1875 inch metal, being seamless and welded with internal reinforcements. The handles and brackets which support the small wheels are welded to the body of the tank. The latter is carried in a steel basket frame having heavy uprights of cast steel and to which are secured the spindles for the large pressed steel wheels. The steel frame passes underneath the tank, supporting it and eliminating strains. The large wheels rotate on ball bearings and are shod with Goodyear 1.25-inch solid tires. The small wheels are also rubber tired.

The tank is equipped with a wheel brake, magnetic contents indicator, properly screened filler pipe fitted with a brass cap, an automatic gas and air vents. When specified the equipment also includes a triplicate autographic register and charge slip box, as shown in the accompanying illustration.

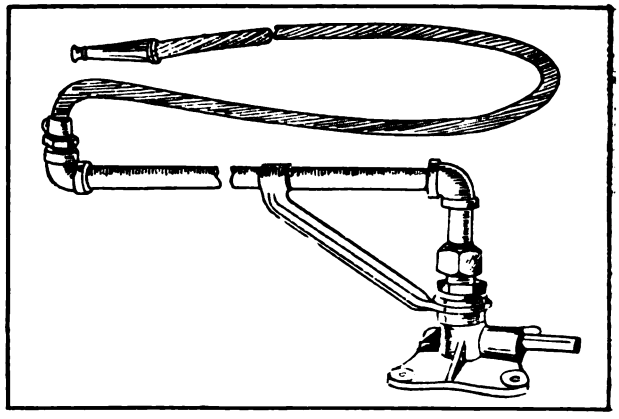
The pump is a continuous flow member, equipped with a recording gallon meter, gasoline filter, two-way discharge, discharge register and spring lock. It is adjusted to measure a pint, quart, half-gallon and gallon, and it discharges on both the up and down stroke of the piston. Four and one-quarter turns of the crank discharge a gallon and leave the pump ready for the next operation. It is operated in the same manner as a single acting pump and it is claimed that 50 per cent. time, labor and wear is saved. All measurement stops are sealed into position and all valves are accessible. Complete data and price list will be forwarded upon request by the maker.

WALWORTH WASHER.

The Walworth Manufacturing Company, Boston, is manufacturing the Walworth auto and carriage washer which is of the swivelling type and moderately priced. It is secured to the ceiling by lag screws, and the arm swivels horizontally in a complete circle, eight feet, eight inches in diameter. The working parts are of brass, with other components of cast and wrought iron, heavily galvanized.

The washer not only enables the operator to reach easily any part of the machine being washed, but the hose is kept off the floor, adding to its life. The complete equipment comprises in addition to the washer and lag screws, 15 feet of .75-inch three-ply hose with couplings, and a Boston spray nozzle. The maker has an interesting proposition for dealers, particulars of which will be forwarded upon application.

Illustrating the world wide extent of automobiling and the increasing co-operation among the various organizations, reciprocal relations are being established between the Nippon Automobile Club of Japan and the American Automobile Association, as a result of the action at the recent meeting of the executive board of the latter association. The Japanese association particularly urges Americans to visit unexplored Japan, and the Nippon club will supply all necessary routes and information as to the best roads.

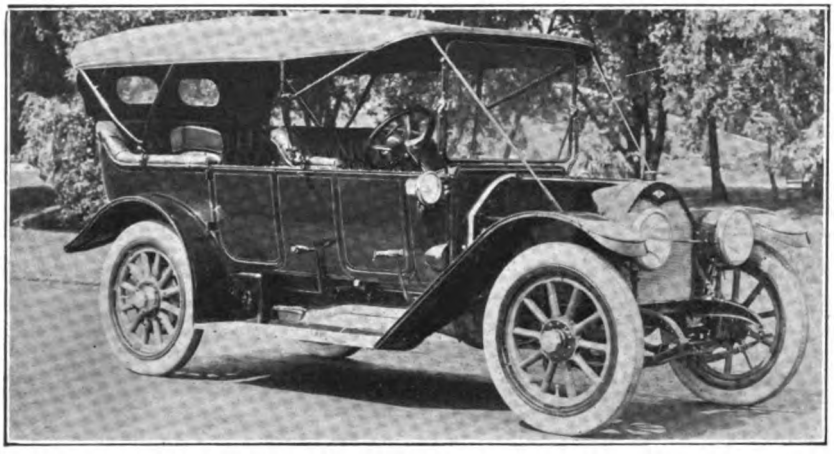


Walworth Swivelling Type Auto Washer, Designed for Attachment to the Ceiling.

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ABBOTT-DETROIT MADE IN SEVEN MODELS.

FOUR models known as the 44-50 and three as the 34-40, comprise the Abbott-Detroit line produced by the Abbott Motor Company, Detroit. The two chassis are defined by the horsepower developed in brake tests, and the mechanical construction is similar with the exception of the horsepower, wheelbase and size of tires. The 44-50 models include three open and one enclosed body, a seven-passenger touring, demi-tonneau, battleship roadster and a cab-side limousine. The 34-40 chassis carries a five-passenger touring, three-passenger roadster and a three-passenger Colonial coupe. All open bodies are of the fore door type, having attractive lines, luxurious upholstery and high grade finish. The equipment is very complete, including electric lighting and electric motor starting, these being separate units.



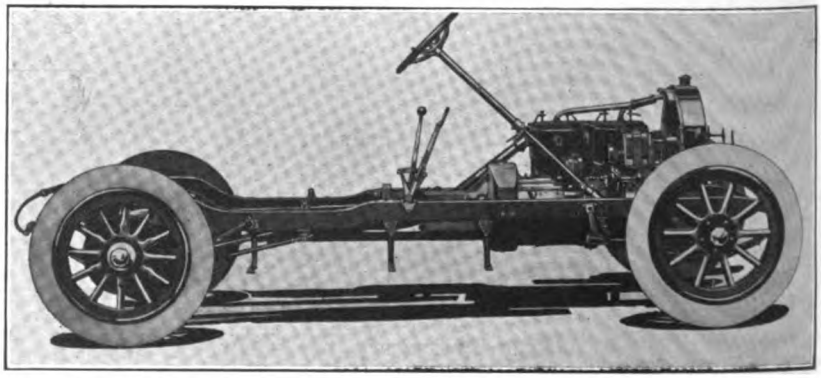
Abbott-Detroit 44-50 Seven-Passenger Touring Car, the Equipment of Which Includes Electric Lighting and Electric Motor Starting Systems.

The motor of the 44-50 models is a Continental of the L head type with the cylinders cast in pairs and having a bore of 4.5 inches and stroke of five. Although rated at 32.4 horsepower by the S. A. E. formula, the four cylinders develop from 45 to 53. The power plant of the 34-40 models is a Continental with a bore of 4.125 inches and stroke of 5.25. The crankshaft and camshaft are a high grade carbon steel, and the bearings of the former are three in number. The valves are 2.25 inches in diameter with nickel steel heads and machined steel stems. The pistons, exhaust manifold and cylinders are gray cast iron and the divided crankcase is a high grade aluminum alloy.

Carburetion is by a double jet Mayer with dash adjustment, and with all models the fuel supply is liberal. Each tank is provided with a reserve capacity, varying according to the model, and each is fitted with a self-measuring gauge. Ignition is by the Splitdorf dual system with the magneto located on the right of the power plant and driven through an extension of the pump shaft. Lubrication is by a constant level splash system, a double plunger pump driven off the camshaft maintaining the proper level at all times. Cooling is by a gear driven centrifugal pump, aided by a belt driven fan. The radiator is of the cellular type.

The clutch is a 17-plate multiple dry disc type, each alternate steel disc being faced with Raybestos. A three-speed selective transmission, having chrome nickel steel gears and nickel steel shafts, is a part of the unit power plant, and Timken roller bearings are employed throughout. The drive is through two Spicer universal joints and a nickel steel shaft to a full floating type of rear axle having chrome nickel steel gears and shafts.

Timken roller bearings are used in the axle and Shafer annular bearings in the wheels. The torque arm is a two-piece tubular member and radius rods take the drive from rear axle, per-

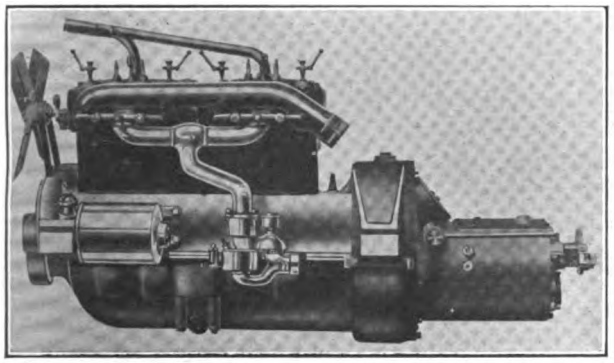


Chassis of the 44-50 Abbott-Detroit, Noticeable for Its Low Centre of Gravity, Compactness and Accessibility of Components.

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mitting rear springs to be shackled at both ends.

The brake drums are liberal in size, 16 inches, and are fitted with external contracting and internal expanding brakes, both of which have equalizers and a simple method of adjustment. Raybestos is utilized as a lining and the drums and hubs are of pressed steel with drop forged steel driving flanges. The emergency brake lever is a drop forging and drop forgings are employed throughout the brake assembly.



Unit Power Plant of Abbott-Detroit 44-50 Model, Showing Location of Electric Motor Starter.

Both the front and rear springs are of the underslung type, lowering the centre of gravity without decreasing the road clearance. The front members are semi-elliptic, 38 inches long and two wide, while the rear are three-quarter elliptic, 48 inches long and two wide. The leaves are carefully oil tempered, ground and polished, and all eyes are bushed. All parts of the chassis subject to friction are lubricated by grease cups. The frame is of pressed steel, of ample dimensions, and is provided with a double drop under the tonneau doors.

The wheels are of the heavy artillery type, of carefully selected hickory, and are fitted with Booth demountable rims and Goodyear No-Rim-Cut tires. Thirty-six by 4.5-inch shoes are standard on all 44-50 models with the exception of the roadster, which is shod with 35 by 4.5-inch casings. The 34-40 chassis is fitted with 34 by four-inch tires. Oversize shoes are listed as extra.

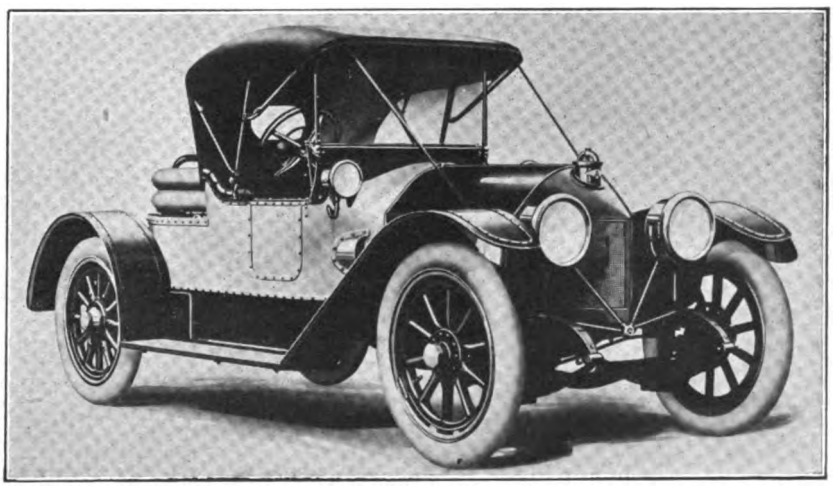
The front axle is a one-piece drop forging of the I beam section type and Timken roller bearings are employed. The tread is standard, 56 inches, for both chassis. The wheelbase of the larger chassis is 121 inches, that of the 34-40, 116.

The steering gear is of the irreversible worm gear type and the column is set at a comfortable angle, being surmounted by an 18-inch ebonized wheel of special design. The spark and throttle control is mounted on the wheel and the levers throughout are drop forged, .25-inch cold rolled rods being utilized.

The fenders, dust shields and running boards are of pressed steel, the boards being covered with linoleum having nickel plated binding on the edge. The driver is located at the right with inside control levers, and quiet and easy engagement of the gears is emphasized.

The body designs have a striking rotund flare from top to bottom, and the interior dimensions from dash to front seat and from back of front seat to rear seats, are such as to provide maximum room and comfort. The upholstery is 12 inches deep and has the latest Turkish roll cushions. The leather is hand buffed, fitted over oil tempered springs on a steel frame. A high grade hair is employed. The toeboard is of aluminum inlaid with linoleum and the tonneau floor is covered with carpet. Ample bellows pockets are provided, and the foot and robe rails are of the adjustable type. All trimmings are black and nickel, and the equipment includes a rain vision and ventilating windshield, tire brackets, jack, tools, etc. A top with Jiffy curtains and a speedometer with clockset combination are listed as extra.

The motor starting system is independent from the lighting generator and energy is supplied to the crankshaft through a train of enclosed gears operating in oil. The system was fully de-



Abbott-Detroit Battleship Roadster, a Radical Departure from Conventional Body Designing.

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scribed in the March 10 issue. It is operated by a push button located on the toeboard. The lighting generator is driven by silent chain and maintains a 180 ampere-hour storage battery in a properly charged condition.

The standard colors of the Abbott-Detroit models are medium blue, deep Derby red and Brewster green. The chassis is plain black. The company points out that the finish is not only high grade and durable, but 24 operations are required.

The Abbott-Detroit battleship roadster is a departure from conventional body designs as the construction is substantial sheet steel with rows of rivet heads showing. A tire trunk and two extra casings with tubes mounted on spare rims are carried on the deck, these being standard equipment. The radiator of this model differs from the others in that it is V shaped. The product of the Abbott Motor Company carries with it a very liberal guarantee.

VULCAN WINS TRUCK RUN.

Hard Test for Commercial Vehicles Under Auspices of Washington Post.

In the motor truck run conducted from Washington, D. C., by the Washington Post the four-ton Vulcan truck, made by the Driggs-Seabury Ordnance Corporation, Sharon, Penn., was declared the winner of the sweepstakes, on the ton-mile basis used in determining the results. The truck carried one ton at a rate of 1.22 cents for one mile. It was the only one in its division. In the other divisions the winners were as follows:

Division 1 K, 1000 pounds and under, International, ton-mile cost, 3.47 cents; 2 K, 1001-1500, White, 2.38 cents; 3 K, 1501-2000, Wilcox, 2.6 cents; 4 K, 2001-3000, White, 1.4 cents; 5 K, 3001-4000, Atterbury, 1.72 cents; 6 K, 4001-5000 pounds, Rowe, 2.62 cents; non-contesting division, United States ambulances, White, 2.76 cents.

The run was a hard one for all the trucks, which carried their rated load throughout the trip. Bad roads were encountered in many places and numerous penalties were assessed. Six machines were able to complete the road circuit with perfect scores, these being Mais, Wilcox, McIntyre and three Whites. Following the road work the machines were given out-door tests of brakes, clutches, gearboxes and a final examination, and all of these six underwent the tests and passed the examination with clean scores. Then the final result depended upon the amount of gasoline and the number of gallons of oil used. Gasoline was charged at 20 cents a gallon and oil at 45 cents. These costs, together with the loads carried, were used as a basis of computing the ton-mile cost.

NAZARRO TAKES TARGA FLORIO.

Creates New Record for Sicilian Course, Overland Entrant Finishes Seventh.

According to news received from Paris, France, Felix Nazarro, in a Nazarro car, won the Targa Florio two-day race around the Island of Sicily, May 11-12, covering the 620-mile course in 19:28:40. This is over four hours faster than the time made last year by Snipe in a S. C. A. T.

There were 35 starters, among them being an Overland car, two Fords and a Studebaker machine. The Overland, with Lopez driving, finished seventh, being the only American car to complete the required mileage within the 24-hour limit. The cars and drivers, in the order in which they finished, follow:

Car	Driver	Time
Nazarro	Nazarro	19:28:40
Aquilla	Marsaglia	20:43:49
Devecchi	Gloria	21:48:04
De Dion	Berra	22:22:55
Fiat	Giordano	22:26:04
Devecchi	Sivocci	22:47:00
Overland	Lopez	23:12:47
Lancia	Bordino	23:43:45
Isotta	Diana	23:46:00
Minerva	Stabile	23:59:04
Renault	Turner	24:30:00

NATIONAL, SWEEPSTAKES WINNER.

Mercer Takes the Hill Climb and Paige the Fuel Economy Awards.

Twenty cars took part in the West Hudson-Catskill tour, May 14-15, two features of which were a hill climb at Haines Falls, N. Y., and a fuel economy test. The final award shows a National car an all-around winner; a Mercer, the hill climb victor, and a Paige leading in fuel economy. The three elements entering into the sweepstakes award were divided as to points as follows: Reliability, 600; hill climbing, 200; fuel economy, 200. The published results follow:

Car and Driver	Reliability	Climbing	Fuel	Total
National, Poertner	600	139	199	938
Paige, Christopher	600	136	200	936
Alco, Reilly	600	155	173	928
American, Woodhull	600	142	165	907
Ford, Young	600	121	157	878
Oakland, Cooper	600	104	159	863
Ford, Parrott	600	100	152	852
Mercer, Ferguson	525	200	125	850
Mercer, Burdett	600	...	160	760
Pathfinder, Spiegel	85	100	180	365
Briggs-Detroiter, Ross	140	...	186	326

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TESTING CONTINENTAL MOTORS.

Various Steps of the Process Require Special Equipment and Safety Appliances.

The testing of a motor is one of the most important and thorough phases of its manufacture by the Continental Motor Manufacturing Company, which concern built a new plant at Detroit recently. In designing this structure the company was determined to have the best, safest and most efficient testing department that modern ideas and skill could provide. No motor is ready for delivery until it has been run in for many hours, both with and without a load, and the severe tests are not only practical and thorough, but calculated to eliminate opportunity for imperfections.

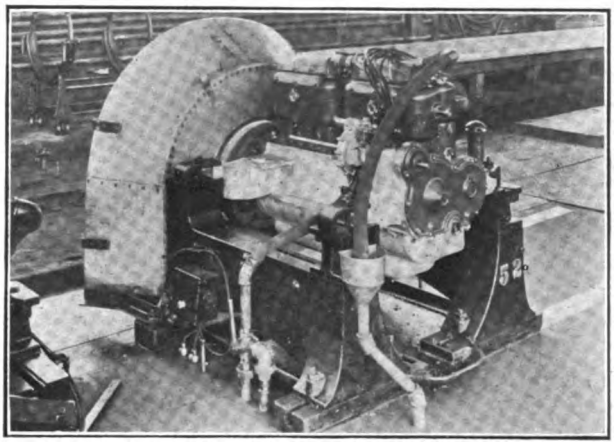
A motor is first run in by belts for four hours before going to the test blocks. In the testing room it is placed on an individual block and operated under its own power for four or five hours. After the oil pan has been removed and the bearings, etc., inspected, the engine is run three hours more and again inspected. The night testers then run the motor throughout the night and under a load. After this test the motor is disassembled, thoroughly examined and adjusted and replaced on the block for the final running and tuning up process.

The block test room is one of the most important departments and presents certain problems that under former methods of manufacture frequently led to dangerous difficulties, in that in testing on the block explosions and fires were likely to occur unless preventative measures were adopted. It readily will be seen that the closing of the department because of a fire would seriously impair the output of the plant.

When a cylinder misses fire, which happens frequently when a new motor is being operated, an explosive mixture enters the exhaust line. The engine on the next block may happen at that time to be taking in a rich mixture, which causes it to send a stream of flame into the exhaust line. This flame, striking the mixture of gas from the cylinder that has missed fire in the other motor, will ignite it and an explosion will occur, frequently setting fire to the lubricating oil discharged from the engine and found at the bottom of the exhaust line. The burning lubricant is extremely dangerous because of the presence of more or less gasoline.

The Continental Motor Manufacturing Company has solved the problem in its construction of its testing room which is one story in height, with monitor roof and so designed as to secure the maximum of light and to be absolutely fireproof. In an accompanying illustration is shown a motor on its block and this is so arranged that it exhausts into a trench which has loose covered plates so that it can be cleaned. These trenches are connected to a large exhaust fan located in another room separated from the testing department by a fire wall. To avoid explosions an opening is left near each engine exhaust, which pulls in fresh air and dilutes the exhaust so that it is too weak to explode.

Metal doors are suspended in each branch of the tunnel, and in case of fire they drop automatically, confining the fire to one section. Refuse oil is drained away from the fan and there is a sprinkler system in the trench. The fuel supply piping is of brass and is located below the



Testing Block in New Motor Department of Continental Motor Manufacturing Company, Detroit—Precautions Are Taken to Prevent Fires by Use of Special Equipment.

floor line. The cooling fluid is circulated by a Union centrifugal pump and the system is elaborate and efficient. It is so designed as to maintain the water at between 160 and 200 degrees, and a thermostatic valve in the storage tank opens automatically at 200 degrees and discharges water. The test stands are built to accommodate different models. Drain pans and pipes collect the spilled lubricant, returning it to the storage tank, where it is filtered. In order to facilitate the handling of the motors an electric crane is arranged to run the entire length of the building. It picks up the engines and places them on the blocks and also delivers them to the shipping department.

The Grand Trunk railroad is considering the installation of motor car service between Buffalo and Bridgeport, Ont., for Sunday travel.

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IN THE REALM OF THE MOTORCYCLIST.

Planning for Big Gathering of F. A. M. Members in Middle West---Denver Convention Date Moved One Week Ahead---News Notes of the Industry.

The directors of the Ohio State F. A. M. held an enthusiastic meeting recently and launched plans for an annual convention which it is expected will attract much attention. Because of the great distance to Denver, Col., where the national convention will be held, many motorcyclists will be unable to attend. Therefore a convention in the middle west is believed to meet the requirement of those who cannot go to the national meeting and the Ohio convention will be preceded by four tours, which will draw a great deal of attention to motorcycling throughout the state.

The tours will start simultaneously from the four corners of the state on June 19. The starting points will be at Cincinnati, Marietta, Toledo and Ashtabula. Two days will be allowed for reaching Cleveland and bronze medals of special design will be awarded to those participating in the run. The annual business meeting will be held on the morning of June 21 at Cleveland. A big parade will be held the following morning and it is anticipated that more than 1000 motorcycles will be in line.

The meeting which made arrangements for this event was presided over by State Commissioner J. A. Campbell of Toledo and the other directors in attendance were Edward Hensley of Dayton, secretary; M. E. Remelin of Cincinnati, chairman of the highway committee; Carl Cappel, chairman of the legal action committee; Walker Brown, commissioner for Hamilton county, and F. L. Valiant, chairman of the publicity committee. Others in attendance were George Squiers of Dayton and M. E. Horn, president of the Cincinnati club.

Attleboro Riders on Outing.

An accompanying illustration shows the members of the Attleboro Motorcycle Club, Attleboro, Mass., on one of their recent outings to Lake Pearl, Wrentham, Mass. Those in the picture are, from left to right: Willett, Indian; Whitaker, M-M; Weeman, M-M; Smith, Indian; Gaffney, Harley-Davidson; Park brothers, Indian; Mondor, Indian; McCambridge, Excelsior; Wallenthiem, Harley-Davidson; Fields, Indian; James, Harley-Davidson; Rogers, Harley-Davidson; Woodard, Merkel; Auclair, Harley-Davidson; Spencer, Indian; Swenson, Indian; Kemp, M-M; Fuller, M-M; Stevens, Pope; Cook, special; La Durantey, Indian; Wright, Indian; Broadbent, Indian.



Members of the Attleboro Motorcycle Club, Attleboro, Mass., on Recent Outing at Lake Pearl, Wrentham.

Old Sol Lamp Winners.

Chairman E. M. Estabrook of the F. A. M. membership committee has announced the winners of the monthly contests for Old Sol lamps, donated by the Hawthorne Manufacturing Company, Bridgeport, Conn. The report covers March and April and refers to new clubs which have affiliated with the F. A. M. during that time. The contest will continue during May and June with several fine lamps to be distributed at the end of each month, and is open to all clubs not already affiliated with the F. A. M. The clubs

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affiliating the largest number of new members receive the prizes. Following are the winners for March and April: Norfolk, Va., two lamps; Hyde Park, Mass., one; Newburg, N. Y., one; West Philadelphia, Penn., one Chicago Indian Club, Chicago, Ill., two; Coldwater, Mich., one; Bayonne, N. J., one; Hornell, N. Y., one.

Yale as Business Producer.

Frank E. Miller of Steinle & Miller, Sidney, O., dealer in stoves and tinware, has been using a Yale motorcycle, made by the Consolidated Manufacturing Company, Toledo, O., in his business. He purchased the machine for pleasure and to ride to and from his home, two miles from the store. But he found that calls were frequently received from the country to repair a gasoline stove or set up a new one. He usually covers the distance on his motorcycle in a short time and in case a new stove is to be sent to a house the driver is sent with the team a reasonable time in advance. Mr. Miller follows later on his motorcycle, reaching the house as soon, if not sooner, than the team. This saves the time of an extra man that would otherwise be on the wagon while making the trip. Incidentally, Steinle & Miller get many rush orders which they might not receive if it was not for the Yale machine.

Coming Sanctioned Events.

Sanctions have been requested of the competition committee of the F. A. M. and granted by that body for a series of motorcycle races to be held the week beginning May 25 by the following concerns at the places stated: Stadium Motordrome Company, Riverview Park, Chicago; Luna Park Amusement Company, Luna Park, Cleveland, O.; St. Louis Motordrome & Amusement Company, St. Louis, Mo. Sanctions also have been granted to the same concerns to conduct races at their respective tracks on Memorial Day, May 30. Other sanctions have been given to the Tri-State Racing Company, Canton, and John C. Thompson, Lancaster, Penn., to conduct a race meet in their respective cities May 30, while James Mayo has been granted permission to conduct a meet at Reading, Penn., on June 7.

Racing Riders in Canada.

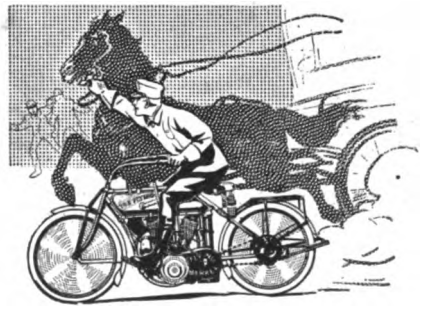
Chairman J. P. Thornley of the competition committee of the F. A. M., has issued a warning to motorcycle racing riders relative to the situation in Canada which may cause some confusion. He has received information from Toronto, Can., that the Toronto Motorcycle Club has incorporated under the name of the Canada Motorcyclists' Association. This gives the club the same initials which represent the Canadian Motorcyclists' Association. The latter organization is the governing body of Canada recognized by the F. A. M. All riders are warned against riding under the sanction of the Toronto club, which has not asked or obtained recognition from the United States body. It is the duty of every rider to assure himself that he is riding under the sanction of the recognized body and not the Toronto club.

Police Ride Harley-Davidsons.

The police department of Detroit, Mich., has purchased from Harry Svensgaard Sales Corporation, 471 Woodward avenue, 10 Harley-Davidson motorcycles for use by the "Minute Men" of the department. These machines are manufactured by the Harley-Davidson Motor Company, Milwaukee, Wis., and last year the Detroit police purchased 10 machines. The reorder came because of the excellent service rendered by those already in use. They are worked 24 hours each day, three men using each machine in eight-hour shifts.

New Members Last Month.

The number of new members taken into the F. A. M. throughout the United States during the month of April was 836, divided among the various states as follows: Ohio, 149; New York, 101; Illinois, 88; Indiana, 75; Pennsylvania, 58; South Dakota, 56; New Jersey, 50; Michigan, 40; California, 32; Kansas, 20; Missouri, 19; Georgia, 16; Massachusetts, 15; Oregon, 15; Kentucky, 15;



ALWAYS READY FOR ANY EMERGENCY!

With its ability to pick up speed quickly—(60 miles an hour from a standing start within a city block)—the 1913 Flying Merkel Motorcycle is always ready for instantaneous use. These features and the fact that the Flying Merkel Motorcycle is the most economical in the world to operate has led to its universal adoption by Police Departments, Park Boards, Gas Companies, Telephone and Electric Light Companies and all other business concerns and individuals whose requirements demand a sturdy, reliable motorcycle at the minimum cost of upkeep. Remember, the Flying Merkel

"Made its Name on Merkel Mileage."

Free Art Catalog on Request.

The Miami Cycle & Mfg. Co.

320 Hanover St. Middletown, Ohio, U. S. A.

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Montana, 13; Maryland, 12; Wisconsin, 12; Florida, 11; Washington, nine; Colorado, seven; Virginia, four; Oklahoma, four; Connecticut, three;



W. A. Burnett, Davenport, Ia., and His Flying Merkel at the Old Davenport Home at the Rock Island Arsenal.

Texas, three; Iowa, three; Arizona, three; Rhode Island, two; Minnesota, two; District of Columbia, one; North Carolina, one; Nebraska, one; New Mexico, one.

Touring on Flying Merkel.

The accompanying illustration shows W. A. Burnett of Davenport, Ia., who is employed at the Rock Island Arsenal, Rock Island, Ill., directly opposite Davenport. Mr. Burnett last season made many trips on his Flying Merkel motorcycle, made by the Miami Cycle and Manufacturing Company, Middletown, O., and he has earned a reputation in Davenport as a long distance tourist of considerable ability.

With his wife Mr. Burnett made several tours to Chicago and Minneapolis, Minn., as well as a number of other cities. Both Mr. and Mrs. Burnett found much pleasure in visiting little frequented places while on their tours and the out-of-door air did much to improve their health.

Oscar Hedstrom Retires.

Although Oscar Hedstrom is not connected with the Hendee Manufacturing Company, Springfield, Mass., he will not connect himself with any other motorcycle industry for a period of two years at least, as he has announced that his contract with the Hendee company still has that period of time to run. He has received numerous offers for his expert services, but states that he is not considering any of them. He is resting at his home at Portland, Conn.

Change Convention Date.

It has been officially announced that the date of the annual convention of the Federation of American Motorcyclists will be held at Denver, Col., during the week of July 23-26, inclusive, instead of the week of July 27, as was originally planned. The races will be held the day following the meet, July 27. The directors of the F. A. M. have made the change to one week earlier in order to accommodate those who desire to attend both this convention and that of the Cycle Parts and Accessories Manufacturers' Association in Atlantic City, N. J., Aug. 5.

New Affiliations and Repair Shops.

New clubs which have affiliated with the Federation of American Motorcyclists, follow: Astoria, 18 members; secretary, E. R. Sutton, 585 Duane street, Astoria, Ore. Bucyrus, 26 members; secretary, Robert Carroll, 403 Rensselaer street, Bucyrus, O.

Repair shops registering with the F. A. M. recently include the Allen Arms & Cycle Company, 404 North Oregon street, El Paso, Tex.; George L. Snider, 958 Baker street, Bakersfield, Cal.; Burr & Turner, Dodge City, Kan.

Results in Newark Contest.

The 200-mile reliability run of the Newark Motorcycle Club to Allentown, Penn., and return, resulted in 16 finishing at the home control, among them being Mr. and Mrs. E. B. Holton, with the only tandem which participated. Four teams of three riders each entered the team division. These included the Harley-Davidson, Jefferson, Yale and Indian mounts. The prizes of accessories and manufacturers' trophies will be decided by the scores obtained at the secret checking stations along the route. The two former teams are out of the running in that division because of penalties and the contest is between the Yale and Indian teams. The former is composed of Wilmer Stevens, Ortie Stevens



Herbert Hope, Providence, R. I., and Harley-Davidson with Which He Makes Weekly Trips to Old Home in Lowell, Mass.

and George Riechey, and has won every team contest in which it has participated during the past three years. Eberhardt, Sincox and Haster

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are the riders who make up the Indian team.

Those who finished were: Herbert Weakliem, Thor; William Sincox, Indian; J. V. Haster, Indian; Mr. and Mrs. E. B. Holton, Excelsior; Watson J. Kliczek, Jefferson; William Allen, Excelsior; P. W. Stevens, Yale; George H. Riechey, Yale; O. W. Stevens, Yale; C. T. Bush, Harley-Davidson; W. Edward McDougall, Harley-Davidson; W. C. Gertimeier, Harley-Davidson; Seth Eberhardt, Indian; Andrew Bohsen, Excelsior; Peter Bohsen, Excelsior.

Pittsburg Opens Season.

The racing season at Pittsburg, Penn., was opened May 10 with a meet at Schenley Oval and despite the raw, cold weather, a large crowd was present and witnessed some spirited contests. Following are the results:

Five-mile novice, stripped stock machines—First, Glenn Wheaton, T. Y. P.; second, Samuel J. Martin, Indian; third, Ade Weixel, Pope; time, 6:28.

Ten-mile open, racing machines—First, A. G. Schmidt, Indian; second, Charles Seitz, Thor; third, Richard Beacon, Harley-Davidson; time, 12:32.4.

Five-mile open, stripped stock machines, no ports—First, Carl C. Kaiser, T. Y. P.; second, John Ponti, Indian; third, George A. Black, R-S; time, not stated.

Five-mile open, racing machines—First, A. G. Schmidt, Indian; second, Carl C. Kaiser, T. Y. P.; third, Charles Seitz, Thor; time, 6:15.2.

Twenty-five-mile open, racing machines—First, Charles Seitz, Thor; second, Carl C. Kaiser, T. Y. P.; third, John Ponti, Indian; time, 32:31.

Good Racing at Denver.

The professional races at Denver, Col., on the Tuileries board track, May 11, brought out a large gathering of spectators and they were not disappointed with the excellent races furnished. All the matches were decided by close margins and resulted as follows:

Five-mile open—First, Fredericks, Excelsior; second, Bruggerman, Indian; third, Fleckstein, Indian; time, 3:29.2.

Five-mile stock—First, Cox, Indian; second, Fleckstein, Indian; third, Stokes, Excelsior; time, 4:07.

Five-mile open—First, Fleckstein, Indian; second, Bruggerman, Indian; third, Stokes, Excelsior; time, 3:49.4.

Club Notes, Here and There.

A 200-mile reliability run was made recently by the Newark Motorcycle Club of Newark, N. J., about 50 riders participating.

Twenty-two members of the Springfield Motorcycle Club, Springfield, Mass., recently made a century run to Albany, N. Y., and return. The return trip was made in 1:10:00.

Members of the New Orleans Motorcycle Club have dedicated a fine club house at New Orleans, La.

The Schenectady Motorcycle Club held its first run of the season from Schenectady, N. Y., to Pittsfield, Mass. A secret time run will be held Memorial Day.

The members of the Amherst Motorcycle Club, Amherst, O., recently held a run to Cleveland, O., a distance of 150 miles. The club was affiliated with the F. A. M.

The Buffalo Motorcycle Club, Buffalo, N. Y., held its first run this season to Springville. Arrangements are being made for a joint run with the Rochester and Lockport clubs.

The Motorcycle Club of Duluth, Minn., will feature hill climbs the coming summer, which will probably be held at Lincoln Park, as it offers a desirable course for such contests.

Initiating actively its new season, the Indian Motorcycle Club, Cincinnati, O., W. E. Horne, president, held its first run to Miamitown, where entertainment was furnished by the Bumiller-Remellin supply house in the form of a chicken dinner at the home of Mrs. A. Bevis.

The St. Louis Motorcycle Club, St. Louis, Mo., has inaugurated a campaign for new members. A successful effort to increase the membership was conducted during the winter by offering prizes to the members bringing in the largest number.

The Missoula Motorcycle Club, Missoula, Mont., was recently formed and it is endeavoring to include in its membership every motorcycle rider in the western part of the state. The charter members are: W. G. Reid, Chris Anderson, George A. Schattenberg, Willard Anderson, Claud Bean, R. S. Walker, George Reeves, C. A. Graybeal and H. A. Bisbee.

Three riders finished with perfect scores out of a total entry list of 21 in the 300-mile durability run of the Savannah Motorcycle Club, Savannah, Ga., held recently. These were J. W. Gregorie on a Thor twin, Martin Schroeder, Thor twin, and W. A. Everett, Harley-Davidson single. In the 200-mile event W. A. McIntyre on an Excelsior twin finished first with 995 and O. A. Meyer on a similar machine was second with 990. Third place went to W. C. Carraway, Indian twin, and fourth to Dennis Downing on a Pope.

O. P. Warlick of the Invincible Motorcycle Club, Brooklyn, N. Y., won the special medal posted for the rider who made the best record in the famous spring run around Long Island, over a course of 200 miles. Warlick rode an Indian machine. John U. Constant of the same club, with a similar mount, achieved practically the same record, subject to a double check. L. N. Vine, Excelsior, was third, and W. C. Hetherington, Jr., Indian, was fourth.

Several hundred motorcyclists attended the annual picture run of the Providence Motorcycle Club, Providence, R. I., held recently, the destination being Roger Williams Park in that city. The day was rather raw and cold, but nevertheless the club members and their guests enjoyed the outing immensely. The previous Sunday between 25 and 30 of the members of the club, headed by Capt. Edward Luther, went to Westerly, R. I., and enjoyed a pleasant run. A stop was made at Wakefield. The majority of the riders were mounted on Indian machines and included in the party were Charles W. Rayhill, first lieutenant; G. W. Lane, second lieutenant; John G. Edwards, secretary of the club, and B. A. Swenson, the state agent for the Indian motorcycle.

1913 F. N. SHAFT-DRIVE MOTORCYCLES.

Lightweight Single, with Two-Speed Gear $275
Only Machine Built With Handle Bar Control of Clutch.
Four-Cylinder $300
With Handle Bar Control of Clutch $350
Two-Speed Gear, Extra $50
Equipment includes two brakes, footrests if desired, compound spring fork, combined luggage carrier and stand.

American F. N. Company, Boston, Mass.

Branch—415 Trumbull St., Hartford, Ct.

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which is the National Organization fostering the interests of motorcyclists along legislative and other lines. Cut this out, mail it, and you will get the reasons.

E. M. ESTABROOK
Chairman Membership Committee Federation
American Motorcyclists,
BANGOR, MAINE.

Please send me the F. A. M. Booklet and all information interesting to prospective members.

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NEWS OF THE MANUFACTURER AND DEALER.

The following concerns have been incorporated recently to manufacture or deal in motor cars, accessories, etc.:

Hydraulic Transmission Company, Stevens Point, Wis.; $45,000; J. P. Atwell, Benjamin Beijer, Arthur Beijer.

Bierman-Everett Foundry Company, Irvington, N. J.; $125,000; welding supplies; G. Bierman, J. E. Berlanbach, W. H. Mantz.

Miles B. Mank Motor Car Company, Portland, Me.; $10,000; Miles B. Mank, Annie E. Mank, Cecile F. Mank.

Beeler Slide Valve Motor Company, Chicago; $20,000; E. Burleigh Beeler, S. D. Hirschl, M. A. Hirschl.

Michigan Motor Car Company, Memphis, Tenn.; $5000; I. Bennett, C. V. York, J. J. Carrigan.

Prince Street Garage Company, Elizabeth, N. J.; $25,000; Edward S. Fabian, George C. Otto, Alice Byrne.

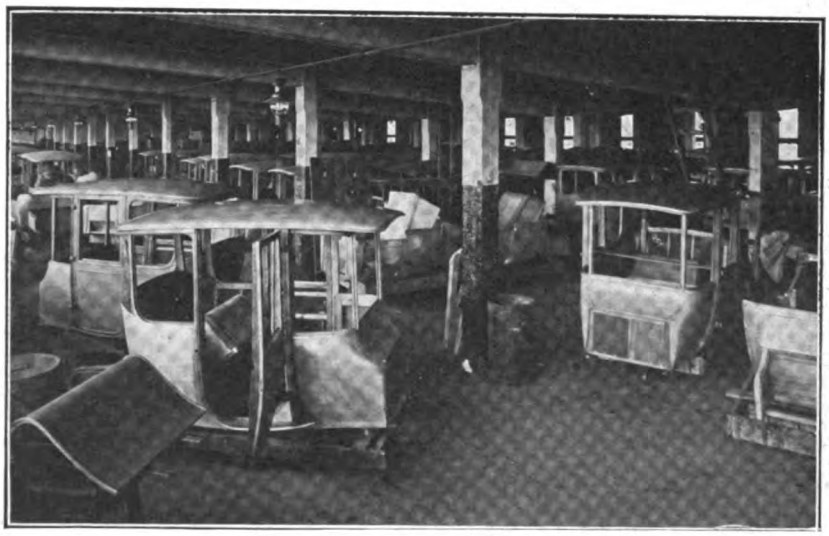
Cuno Engineering Company, Meriden, Conn.; $50,000; to make safety starters; Charles H. Cuno and others.

Auto Sales Company of Illinois, Chicago; $2000; T. J. Peden, R. C. Merrick, J. W. Yaeger.

Mendham Garage Company, Mendham, N. J.; $50,000; L. K. Hill, E. L. Garabrant, J. M. Hoffman.

Whittemore Cab Company, Brooklyn, N. Y.; $1000; Albert Wald, C. F. Fuerst, W. I. Wiedeman.

Hartford Storage Battery & Supply Company, Hartford, Conn.; $10,000; G. W. Gammack, C. C. Krolin.



Interior of the Aluminum Plant of the Anderson Electric Car Company, Detroit.

Alpha Lamp Company, Newark, N. J.; $25,000; G. A. Furnell and others.

Variable Clutch & Variable Transmission Company, Seattle, Wash.; $100,000; C. E. Lawson, H. A. Emery and others.

Kelsey Wheel Company, Toronto, Can.; $150,000; Malcolm C. Campbell, Oscar E. Fleming, Benjamin J. Cox.

Harris Carburetor Company, Cleveland, O.; $15,000; H. C. Cummings, Fred B. Fishman, John W. Camp, Louis A. Black, Harry Pott.

WITH THE MANUFACTURERS.

The Studebaker Corporation, Detroit, maker of Studebaker cars, has completed plans for a new two-story $60,000 building on the southwest corner of Forest Park boulevard and Boyle avenue, St. Louis, Mo., to be occupied by the company, which has a 15-year lease on the property. Electric elevator and spacious office quarters will be features. The building is expected to be ready for occupancy by July 15.

The Olds Motor Works, Lansing, Mich., maker of Oldsmobile machines, has opened new branches at Pittsburg, Penn., and Atlanta, Ga., as a result of a recent trip by J. V. Hall, sales manager of the company, and it is stated that others in several large centres will soon be opened.

The American Motors Company, Indianapolis, Ind., has made a number of important changes in its sales organization. D. B. Williams, who for the last two years has occupied the position of advertising and publicity manager, has resigned to assume a place in the sales organization as district sales manager with headquarters at Louisville, Ky. G. L. Moskovics, formerly assistant advertising manager under Mr. Williams, takes the place made vacant by the latter's change. E. H. Sherwood, formerly connected with the Mercer Automobile Company, Trenton, N. J., is now connected with the general sales department as assistant sales manager.

The Pittsburg Taximeter Company, Pittsburg, Penn., one of the largest makers of taxicab meters in the country, recently closed contracts to equip all the machines owned by the Detroit Taxicab & Transfer Company and the cars of the Cleveland Taxicab Company. The company also has a large order for its product to be shipped to Rio de Janeiro, Brazil.

The Studebaker Corporation, Detroit, maker of Studebaker cars, has secured the home of the Detroit Curling Club and it is now known as Plant 14 in the Studebaker system.

The Anderson Electric Car Company, Detroit, maker of Detroit electric pleasure cars and trucks, is justly proud of its aluminum plant, in which special presses and automatic hammers have been designed by the company's engineers to handle and form the large aluminum plates to fit the special contours of the Detroit electric bodies. The panels, roofs, window sash, and even the hub caps are now made of this metal. The Detroit plant covers 12 acres of floor space, two large additions having been added recently, while the motors and electrical equipment are produced at the old factory of the Elwell-Parker Electric Company of America in Cleveland.

The Hupp Motor Car Company, Detroit, maker of Hupmobile cars, has announced the resignation of Harry Fosdick as director of sales, that position having been abolished by the company, according to Frederick A. Harris, assistant general manager, who has active supervision over the field policies of the concern. He states that the abandonment of the position of director of sales will entail no further changes or additions to the sales department. R. G. Neighbors, the present sales manager, will continue in charge with his present force.

The Willard Storage Battery Company, Cleveland, O., maker of Elba storage batteries, recently placed its sixth repeat order for Bruce-Macbeth gas engines to be used in furnishing power for operating its plant. Since the installation of the first engine six years ago the company's increasing business has made necessary a new power unit every year.

The Esterline Company, formerly of Lafayette, Ind., has moved its entire plant to Indianapolis, Ind., the new address in that city being 227 East South street.

William Sternberg, engineer of the Sternberg Manufacturing Company, West Allis, Milwaukee, Wis., maker of Sternberg trucks, recently sailed from New York City for a tour of Europe to last several months. He expects to make the trip one of business and pleasure, visiting the more important points in the manufacture of motor trucks abroad, and investigating closely the features and conditions of the industry in general.

E. L. Baker has been appointed resident engineer for the Pacific Coast territory with headquarters at San Francisco, Cal., for the H. H. Franklin Manufacturing Company, Syracuse, N. Y. He was formerly in charge of the mechanical laboratory at the home factory. A. C. Raaflaub, who has been handling the coast territory for the past six months, will return East.

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Charles B. Shanks, general sales manager of the Kelly-Springfield Motor Truck Company, Springfield, O., has left the factory for a long trip throughout the western part of the country. He will visit all the principal Kelly truck branches and agents west of Chicago.

P. J. Dasey, long connected with the Motsinger Devices Manufacturing Company, Lafayette, Ind., has been made manager of the Detroit branch of the Hartford Suspension Company, where he will handle Hartford electric starters and Truffault-Hartford shock absorbers in the Michigan territory. His headquarters will be at 803 Woodward avenue.

B. M. Sparks, who has been closely identified with the automobile industry for many years, has been engaged as travelling salesman in Nebraska with headquarters at Omaha, for the Haynes Automobile Company, Kokomo, Ind., maker of Haynes machines.

The Hupp Motor Car Company, Detroit, maker of Hupmobiles, finds that even with the addition of the old Grabowsky motor truck plant, which was taken over in February, it still has insufficient room to keep abreast of its orders. Recently a large tent was added for the use of the assembling and testing departments. An accompanying illustration indicates the present activity at the plant, which is now producing 100 cars a day. The business done in April showed an increase of nearly 100 per cent. over any other month in the history of the company.

Frank B. Willis, numbered among the veterans in the automobile industry, having first commenced the sale of cars in 1900, has been appointed general factory representative in all territory east of Denver, Col., for the Lozier Motor Company, Detroit, maker of Lozier cars.

Herbert P. Choate has become sales manager of the Star Motor Car Company, Ann Arbor, Mich., maker of Star trucks. He was formerly connected with the Empire Tire Company, Trenton, N. J. He has made arrangements with George C. Hupp and J. E. Hannon, the latter formerly secretary of the Michigan state fair, to act as Michigan distributor for the Star trucks. They have formed the Star-Tribune Motor Sales Company with headquarters at 815 Woodward avenue, Detroit, where Mr. Choate will be located. Mr. Hupp announces that he is still connected with the R-C-H Corporation, having resigned as an officer to become connected with the manufacture of the Tribune car, a new machine on the market.

F. A. Wade, formerly purchasing agent of the Flanders Motor Company, Detroit, maker of Flanders cars, has been made general purchasing agent of the Maxwell Motor Company, with headquarters at the executive offices in Detroit. Mr. Wade has been associated with Walter E. Flanders for many years, having been with him originally in the Ford Motor Company, and later purchasing agent of the E-M-F company and the Studebaker Corporation in succession.

B. F. Schmidt and L. R. Ingabrand have been advanced from foremen's positions to those of superintendent and assistant superintendent, respectively, in the factory of the Speedwell Motor Car Company, Dayton, O., maker of Speedwell motor cars and trucks. Both men have been with the company since its inception. The former was foreman of the chassis assembling department, and the latter of the final assembling department. Jacob Neibert succeeded Mr. Schmidt as foreman of chassis assembly. The changes came as the result of the resignation of Superintendent Dunston.

GARAGE AND DEALER.

The De Dion-Bouton Selling Branch, New York City, has moved its show rooms to 1612 Broadway, on the northeast corner of Fifty-second street. The garage and repair department is located at 110 West Fifty-fourth street.

The Detroit Automobile Exchange, Inc., a new organization formed to deal exclusively in used cars of high grade, has opened for business at 294 Jefferson avenue, Detroit, where large and well equipped quarters, commodious enough to handle 200 cars, have been obtained in the Sievers & Erdman building. It is a close corporation and the incorporators are: Grover C. Farnsworth, general manager; Everett W. Pingree, secretary and treasurer, and Robert M. Drysdale. Mr. Farnsworth, who will devote all his time to the business, is widely known in the automobile industry, his experience covering several departments.

The Pittsburg Chalmers Company, Pittsburg, Penn., has moved from its former home at 5932 Baum street to 220 North Negley avenue. The Pittsburg Michigan Motor Car Company has moved to 5864-5866 Baum street. A new building has been erected at this address and will be known as the Automobile Palace.

R. D. Maxwell has been appointed manager of the Studebaker branch retail store at Los Angeles, Cal.

George A. Crittenden, for a number of years connected with the Boston branch of the Lozier Motor Company, Detroit, maker of Lozier cars, has been appointed manager of sales of a Boston office established by the new Chandler Motor Car Company, Cleveland, O., maker of Chandler cars. Mr. Crittenden attained great success with the Lozier company, having on Jan. 1 been declared the winner of the annual prize among all Lozier salesmen. The officials of the Chandler company were all until recently executives of the Lozier company and were familiar with Mr. Crittenden's fine work.

William Ziegler, Darien, Conn., is having a large garage erected which will cost $150,000. It will be equipped with all modern appliances, including electric elevator, etc.



Indicating the Every Day Activity at the Factory of the Hupp Motor Car Company, Detroit.

George A. Kershner, owner of the Berkley garage at Martinsburg, W. Va., is to erect a large garage on West King street. It will be modern throughout and will cost $32,000.

The Kolb Sales Company, with offices in the United States Rubber building, Fifty-eighth street and Broadway, New York City, was recently organized to represent the interests of different automobile accessory and specialty manufacturers in the eastern territory. Milton B. Kolb, who has been identified with various branches of the industry the past 10 years, is at the head of the new organization.

W. A. Buckley, postmaster at Sprague, Wash., has purchased the Sprague garage, and will operate the same.

The Wright-Callender-Andrews Company, Los Angeles, Cal., has leased its garage building at 23 East Fifth street to L. H. Larson, who will operate a garage.

The Stewart Motor Corporation, Buffalo, N. Y., recently appointed the following dealers to handle Stewart light delivery cars: Fred H. Van Dorn, Red Bank, N. J.; Draper Garage, Northampton, Mass.; G. E. Clark, Herkimer, N. Y.; H. B. Gray Company, Fort Plain, N. Y.; Johnstown Motor Car Company, Johnstown, N. Y.; William Petry Garage, Hudson, N. Y.

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RECENT PATENTS.

Illuminating Appliance, Otis A. Mygatt, New York City, No. 1,061,100. An illuminating appliance comprising a glass inclosure having below its upper edge an interior support and a reflector with the same held by said support.

Worm Gearing, Charles H. Myers, Buffalo, N. Y., No. 1,060,933. A worm gearing comprising a worm and a worm gear wheel, the latter being provided with teeth composed of spheres bored diametrically with a counterbore at each end of the diametric bore, a screw traversing the bore of each sphere and carried by the gear wheel, and anti-friction balls lodged in the counterbores at the ends of the main bores of the spheres.

Tire Tool, Charles S. Edwards, Prineville, Ore., No. 1,059,128. A tire tool having a spoke gripping member, a lever co-operatively connected to said member, a prying element longitudinally slidable upon the lever and including a member for engaging and shifting the detachable flange in advance of engaging and prying off the tire, and means for advancing the said prying element as the tire is shifted.

Tire Chain, Douglas J. Martin, New York City, No. 1,059,182. In an anti-skid device, a series of spaced apart open endless chains disposed about the tire of a wheel, means for retaining each chain in open position, said means comprising closed elliptical springs passing through links of the chain of each side of the tire, and means passing through said links of the chain and connecting the chain with the next adjacent chain.

Turntable Attachment, Ferdinand Helder, New York City, No. 1,061,073. An improved turntable attachment for automobiles, comprising a foot piece, a supporting post rotable in said foot piece, means for lowering the foot piece to the ground and simultaneously raising the automobile in respect to the foot piece, means for locking the supporting post to the foot piece, and a planetary gear for rotating the automobile around the supporting post after the same is interlocked with the foot piece.

Muffler, Ernest M. Kluck, Buffalo, N. Y., assignor of one-half to Nicholas C. Newerf of the same city, No. 1,060,768. It is in combination with an exhaust pipe, of a pipe substantially the same size as the exhaust pipe detachably fastened to the rear end of the exhaust pipe and forming a removable continuation of said exhaust pipe, and a cylindrical muffler of larger circumference than the detachable pipe connected throughout its length to one side of and having slotted communication with said exhaust pipe.

Bolt for International Combustion Engines, Douglas V. Ashley, Binghamton, N. Y., No. 1,059,103. A bolt for securing together the head and the cylinder of an internal combustion engine, said bolt having a head to engage the outer surface of the cylinder head, a cylindrical shank of length sufficient to pass through the cylinder head and enter a tapped hole in the cylinder, screw threads upon that portion of the shank which is to enter said tapped hole, a passage extending lengthwise of said bolt head and shank, and a hole entering said passage from one side of said shank.

Valve Structure, Marshall E. Morel, Sheridan, Ill., No. 1,058,996. The combination with a gas engine of a valve chamber having an upstanding flange on the bottom, a plug closing said chamber and having a downwardly extending flange, a rotary cylindrical valve in said chamber bearing upon said bottom and said plug and maintained in position by said flanges, a plurality of piston rings on said valve, a plurality of webs arranged transversely in said valve and bracing said valve against distortion, cone surfaces formed on the outer and lower upper edges of said valve, bearing rings confined in the spaces between said cone surfaces and said plug and valve bottom respectively, and balls confined between and bearing on said rings and cone surfaces.

COMING EVENTS.

May.

May 26-June 13—American visit, British engineers.
May 27-28—Hill climb, Atlanta, Ga.
May 27-28—Reliability run, Chambersburg, Penn.
May 29-30—Inter-Club run, Chicago, Ill.
May 30—Track meet, White Plains, N. Y.
May 30—500-mile race, Indianapolis, Ind.

June.

June 7—Inter-Club run, Philadelphia, Penn.
June 10—Reliability run, Columbus, O.
June 14-15—Track meet, San Francisco, Cal.
June 16-18—Reliability run, Columbus, O.
June 19—Algonquin hill climb, Chicago, Ill.
June 21—Stanley avenue hill climb, Cincinnati, O.
June 21-22—Track meet, Portland, Ore.
June 23—Reliability run, Des Moines, Ia.
June 25-28—Non-stop day and night run, Chicago-Boston.

July.

July 1—Manufacturers' tour, Indianapolis-San Francisco.
July 4—200-mile race, Columbus, O.
July 4—Track meet, Taylor, Tex.
July 4—Panama-Pacific road race, Los Angeles, Cal.
July 4—Track meet, Washington, D. C.
July 4-5—Track meet, Sioux City, Ia.
July 4-6—Road race, Tacoma, Wash.
July 11-19—A. A. A. tour, Minneapolis-Glacier Park.
July 20—Track races, Seattle, Wash.
July 21-25—Tour, Seattle, Wash.
July 27—Tour, Grand Rapids, Mich.
July 27-28—Road races, Tacoma, Wash.
July 28-30—Beach races, Galveston, Tex.

August.

Aug. 12—Reliability run, Kansas State Automobile Association.
Aug. 29—Chicago Trophy race, Elgin, Ill.
Aug. 30—Elgin Trophy race, Elgin, Ill.
Aug. 30-Sept. 6—Reliability tour, Chicago, Ill.

September.

Sept. 1—Fire chiefs' convention, Madison Square Garden, New York.
Sept. 1—Track races, Columbus, O.
Sept. 12—Track races, Youngstown, O.

October.

Oct. 4-11—Around Lake Michigan tour, Chicago Motor Club.

November.

Nov. 24—Vanderbilt Cup race, Savannah, Ga.
Nov. 26—Grand Prize race, Savannah, Ga.

FOREIGN.

June.

June 4- 6—Tourist Trophy race, Isle of Man, England.
June 10-16—Alpine trials, Vienna, Austria.
June 23-28—International road congress, London, England.

July.

July 1-16—Plowing competition, Winnipeg, Manitoba.
July 12—Grand Prix race, Amiens, France.
July 19-20—Grand Prix race, Belgium.

August.

August 10—Hill climb, Mount Ventoux, France.
August 15—Hill climb, Tonale, Italy.

September.

September 28—Hill climb, Mont Verdun, France.

NEW BOOKS RECEIVED.

Dayton, a Story of the Great Flood—A brief but interesting history of the recent flood, comprising 32 pages, fully illustrated with photographic reproductions, published by the Dayton Engineering Laboratories Company, maker of Delco systems. The booklet is printed by the Franklin Press, Detroit.

Topographical Maps—The United States Geological Survey, Washington, D. C., is issuing topographical maps for motorists, these being of a size suitable for carrying in the car at all times. They not only give the location of all towns, villages and hamlets and all the roads covering each district, but by their use the motorist is able to tell at a glance whether the road will be level or rolling, steep or hilly, etc. Those desiring information concerning the maps should make application for descriptive indices, designating the states covered by the inquiry. Price, 10 cents each.

Correction—In the description of the Havers car, appearing in the May 10th issue, it was stated that ignition was by a Bosch high-tension magneto, dual system. This is an error as the Havers chassis is equipped with an Eisemann high-tension dual ignition instrument, made by the Eisemann Magneto Company, New York City.

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MOTOR EXCEEDS RECORD.

Standard Packard Engine Running 300 Hours Utilizes Bosch Ignition.

The standard "38" Packard motor, which has been undergoing a prolonged non-stop test at the laboratory of the Automobile Club of America, in New York City, exceeded all previous records of this character. Four years ago a motor was run for 132 hours in England. It was the original intention to run the Packard motor for 200 hours, but it was later decided to continue the test for 300 hours, which were completed May 16. Two spark plugs were changed, and two adjustments were made to the exhaust valve tappet on the No. 1 cylinder. A small leak in the fuel line also developed, but not enough to cause damage. The motor maintained a constant speed of 1200 revolutions a minute, held to be equivalent to pulling a fully loaded car at a speed of 37.46 miles an hour.

Of particular interest in connection with this test was the performance of the Bosch magneto, with which the motor was fitted. This was a type DU6 instrument, and it was operated throughout the 300 hours without attention. It is estimated that the magneto armature revolved 32,400,000 times, which means that 64,800,000 sparks were furnished to fire the charges, and that 129,000,000 separate movements of the interrupter arm were made. The result of the test is highly gratifying, both to the Packard Motor Car Company, Detroit, and the Bosch Magneto Company, New York City.

RECOVERS FROM DAYTON FLOOD.

Maker of Dayton Airless Tire Claims Honor of Being First to Resume Shipments.

The Dayton Rubber Manufacturing Company, Dayton, O., maker of Dayton airless tires, although submerged in 18 feet of water during the recent flood, claims the honor of being the first company in Dayton to resume shipments. During the flood J. A. MacMillan viewed the plant from his home, through strong field glasses and immediately telegraphed to New York City and other eastern points ordering several tons of rubber and other materials shipped by express. By the time the factory was cleaned up the fresh materials had arrived.

Superintendent Witsaman was sent to Akron, O., where he secured an additional force of expert tire builders and the factory is now producing more tires than before the flood. In a few weeks a night force will be put at work as the demand is rapidly increasing. Recently a shipment of Dayton airless tires was made to Copenhagen, Denmark, while others have been made to New Zealand, the Philippine Islands, Rio Janeiro and the City of Mexico.

STILL IDENTIFIED WITH CONCERN.

Sole Surviving Studebaker Brother Is Regarded as Expert on Automobile Woods.

J. M. Studebaker, the sole surviving brother of the five who developed the business of the Studebaker Corporation, Detroit, and South Bend, Ind., maker of Studebaker trucks and pleasure automobiles, and horse drawn vehicles, is now nearing his 80th birthday. Several years ago he withdrew from active responsibility of the routine order, but he still takes a keen interest in the business of the concern.

Among the brothers, J. M. was the manufacturer; Clement, father of the present vice president, was the general executive, and Peter was the sales manager. J. M. Studebaker is today recognized as one of the leading authorities on the different kinds of wood used in vehicle and automobile construction, this knowledge being of great value to the designers of Studebaker cars. One of his self-assigned tasks is the selection of the wood which forms the base of the automobile running boards, body braces and dashes, much of which comes from the yards of the corporation at South Bend, where it has been seasoned by special processes for many months. Mr. Studebaker's chief regret is that he was not born 20 years later in order that he might have identified himself with the automobile industry in a more active way.

Flaring red signs, 22 feet in length, with the word "school" painted in white letters are advocated to be placed on every road at the approach to a school building by the Automobile Legal Association as a warning to automobilists to slow down. Circular letters have been sent to the mayors and selectmen of each city and town asking that the signs be placed.

The details of the annual pilgrimage of the Bay State Automobile Association, Boston Mass., to Lake Spofford, N. H., June 16-17, are being arranged by President E. A. Gilmore and the tours committee, W. H. Stevens, Walter Williams, Chase Langmaid and M. E. Lebon.

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PRESIDENT JOY ON PRICE MAINTENANCE.

IN AN address before the Association of National Advertising Managers, May 14, Henry B. Joy, president of the Packard Motor Car Company, Detroit, again took up the subject of "Price Maintenance," which he discussed somewhat fully in recent motoring publications as affecting the purchaser. It is interesting to note in this connection that General Manager Alvan Macauley of the Packard company has addressed the following letter to all dealers representing the product of that concern:

We have had a call recently from a special agent of the Department of Justice, who was inquiring with reference to our policy of maintaining our "square deal" one-price policy. It is very possible that as our dealer you may be interviewed in this connection; and this is to say that you have nothing to conceal, and should you be visited by any official in regard to this matter, you are at liberty to state the facts as fully as you please.

In the address mentioned above, Mr. Joy said in part:

Business sadly needs some constructive advocates. The false and the stupid prejudice against success is responsible for much of our trouble. Why should this prejudice be allowed to exist? The actual dollar is simply the measure or yardstick and worthless in itself.

Created wealth, in order to remain wealth, must produce something net. The more created wealth in America the more work and the more business must be done to maintain that wealth in existence at all. The great created wealth of the country is the asset of the whole people and the basis and measure of our prosperity.

The attitude of the government toward industrial evolution of recent years has brought about conditions which require our most serious consideration. The United States has led the world in rapid stages of humanizing development in many ways. Our republican ideas of self-government have made our whole nation a forum for debate on ways and means to curb the strong and protect the weak.

Railroads, at first free to make money as private enterprises, have grown into corporations of such public interest and affecting so universally the public welfare that they are practically directed by the national government, but operated and owned privately. What was for upwards of half a century praised as successful enterprise in railroad building and management came to the point of breaking down by reason of what we now know as unfair competition.

The heads of railroad companies, after periods of vicious warfare, when their treasuries became depleted, and with failure and ruin staring them in the face, repeatedly got together and restored by agreements rates of transportation to high levels in an effort to recoup themselves for the losses of the battles which had raged.

These rate agreements could not be maintained. One railroad would soon again cut rates by private concessions to special shippers. Then others would follow as the perfidy became exposed. And another period of ruthless rate wars would recur and the destruction of the nation's wealth was incalculable.

Finally to mitigate these evils, so fatally affecting general business as well as the railroads themselves, the national government, as the result of popular will, educated by the press, provided that rates should be the same to all, that rebates, free passes, cut rates and special privileges should be things of the past. We eliminated the evils of private ownership of railroads without adopting the equally or more objectionable plan of government ownership.

Then the next stage of industrial evolution came. As railroad facilities improved, transportation quickened, towns, cities, states and nations were brought marvelously closer together. The growth of the telephone service was a revolution.

A condition was thus brought about in manufacturing industries as had been the case with the railroads where the same unfair competition brought also the stage of mutual agreements between manufacturers to maintain prices exactly as railroads had tried to do without success. Gentlemen's agreements would be broken. Unfair competition to destroy each other would again become rampant and untold countless millions of constructed wealth would melt away.

Then in utter self-preservation, companies that had fought and suffered as the bitterest trade enemies only can, were brought together by friendly mediation, and consolidations were accomplished in a small way. The advantages and possibilities became recognized. So-called trusts came on the scene.

Prices became more stable, and the business of all our people could be conducted with greater safety and certainty. Dealings in securities were however carried on on a colossal scale, and the popular mind could not differentiate between the good which the so-called trusts have yielded and the harm and discredit which was reflected on them by the manipulation of their securities. The "rules of the game" have been changed—are being changed. The benefits are rising to the surface and becoming apparent to all who will examine and study.

We have come to know that mere bigness is no crime. We have come to know that stable prices, even though made by so-called trusts, are a vast benefit compared to the feverish variations and uncertainties of the cut-throat competition days.

Now, let us look with clear, unprejudiced eyes at today's conditions. Let us keep the good. Let not prejudice blind us. Let us act wisely in modifying and mitigating existing evils that remain. These evils are not as bad as class-prejudice-fomenting publications and some politicians would have us believe. Private rebates, cut prices, special concessions, have been much mitigated. The conditions today are better to an almost infinite extent than before the consolidations of the trust era.

It is true, also I believe beyond a doubt, that there is vastly more unfair competition and price cutting practised by smaller businesses and smaller corporations today than by the so-called trusts. Personally I do not like to buy anything except from a one-price house, with the price marked on the goods. There is not an article that I personally may want to buy but that the dealer in it is expert and keen as to its real value. The average layman in the very nature of things cannot know these values. He is not an expert. It is not his special business.

Business men are more and more "putting themselves in their customers' places" and trying to treat them as they would like themselves to be treated, were conditions reversed. That is the golden rule of business.

But, you truthfully reply, that that rule cannot always in all businesses be maintained and then only by the stronger concerns, because the unscrupulous advertiser, the sharp dealer and price-cutter will get your business away from you, and you must meet unfair competitive methods with unfair competitive methods.

Let us analyze this situation. In the first place, it is true in the main. As a general proposition, unfair competition will tend to drag the idealist in business to the level of the unfairest practises in the fight for self-preservation in the last analysis. Except only for one thing: Namely, that business men be permitted to form associations for the amelioration of these "unfair" conditions. Schemes proposing unfair competition do not sound well when discussed in open meetings of business competitors.

But it is argued, in the fashionable phraseology of the day, such methods would be monopolistic and conspiracies in restraint of trade and unlawful. Such methods actually would be in promotion of honest trade and tending to the protection of the consumer, and the retailer as well.

A specific law prohibiting the sale of goods at less than cost is obviously absurd. Business exigencies occasionally require it. Such laws do no good, but only harm. An excess production of last year's bonnets would necessarily require a slaughter sale or a fire. We cannot overturn the natural laws of business without suffering and disaster. Associations, it is believed by many, can work out the wisest solutions of such problems for each line of industry and trade, in co-operation with a proper government commission.

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What do consumers and business men face today under the present attitude of the government and Department of Justice? Except that it involves protracted litigation, they do not know! I mean by that to say that they do not realize what is so insidiously being done to the businesses of all our people. They are not awake to the portending commercial and industrial revolution. The attitude of the government, as shown in pending litigation, is, concretely, that "the control of retail prices by manufacturers must cease."

When prices are cut by unfair competitive methods, who pays the bill? Absolutely the consumer is the victim ultimately and continuously.

You will fairly concede that a retail store must make a profit. They make profits of course or they could not exist. When a retail store sells an article below a proper profit, or at cost, or below cost, by reason of favoritism, or desires to accommodate the customer in order to retain his trade in other lines, or to put a competing store out of business across the street, or to run it as a leader for advertising purposes, in order to attract customers for other goods at high prices, what does it mean?

It means simply that by sharp business that retailer to make his necessary average profit must and does, first, sell to the trusting customer, or inexperienced purchaser, when he can, that same article at more than its real worth, or, second, the retailer must and does sell other articles at more than their real retail worth. Naturally he probably does both. There is no other answer; he must do so or fail!

No retailer or manufacturer desires to conduct his business along such lines. Those who do are forced to do so by the unfair competition of other retailers or by manufacturers who do not protect their retail prices. Business integrity and known fixed prices have been inseparable companions.

CAMPAIGN OF EDUCATION.

American Highway Association Inaugurates One in Interests of Good Roads.

Following the recent publication of the Good Roads Year Book, which presents the road situation in the United States to date, the American Highway Association has begun the issuance of a series of instructive papers presenting the most important phases of road improvement from the standpoint of both the layman and the engineer. Among the first to be issued is a reprint of the address by W. W. Finley, president of the Southern Railway, at the recent American road congress on "Good Roads and the Cost of Living."

Mr. Finley holds the cost of living is largely an economic question and that efforts should be turned toward increasing the area of farm land under cultivation and the yield of farm products an acre. He points to the well known fact that prospective farm settlers are largely governed by railroad and public road facilities and that when these are not adequate farm operations are discouraged. Obviously, good roads permitting the easy use of motor cars largely solve the problem.

The American Highway Association is composed of upwards of 2000 of the leading men and women of the nation and is conducting a campaign of good roads education and reform throughout the United States. Its president is Logan Waller Page, director of the United States office of public roads, and its secretary is J. E. Pennypacker, formerly chief of road management in the Department of Agriculture, and later chief statistician for the joint congressional committee on federal aid in the construction of post roads. The headquarters of the association are in the Colorado building at Washington, D. C.

"FULLY EQUIPPED—NEARLY."

Weed Chain Tire Grip Company to Inaugurate New Advertising System.

The careful attention to detail which has marked the presentation of the merits of the Weed tire chain in the advertising of its maker, the Weed Chain Tire Grip Company, New York City, has been such as to win the appreciation of motorists and those interested in raising the factor of safety in motoring. Not only have the arguments been carefully thought out, but the treatment has been with that artistic effect which serves to make a lasting impression.

Announcement is made by the company that it shortly will inaugurate a new system of advertising which will call for an even greater attempt at originality than has been manifested heretofore. The effort in this instance will be to carry conviction to both the owner and manufacturer of automobiles, and it is understood that the first appearance of the new series will be under the heading, "Fully Equipped—Nearly," in the issue of Collier's Weekly for June 7.

INCREASES CAPITAL STOCK.

Regal Motor Car Company Is Authorized to Add $2,000,000.

Stockholders of the Regal Motor Car Company, Detroit, maker of Regal cars, have approved a plan which involves increasing the capital from $1,000,000 to $3,000,000. Of the total, $2,600,000 has been subscribed for and paid in, while $400,000 of the authorized issue will be held in reserve to provide for future extensions of the company's business.

Fred W. Haines has been elected president of the company, retaining also the title of general manager, which he previously held. Directors of the company include Charles R. Lambert, Fred W. Haines and Harold H. Emmons, who assisted in the organization of the company in 1907.

The Pittsburg Automobile Dealers' Association will hold a pleasure car and truck display in October.

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HARROUN CARBURETOR.

New Vaporizer Was Used on Overland Car in Recent Tests.

In the recent test of his new carburetor, the results of which were published in these columns, Ray Harroun, the well known racing driver and winner of the 1911 500-mile race at Indianapolis, Ind., used an Overland car, made by the Willys-Overland Company, Toledo, O.

The Harroun carburetor will be used on two Henderson machines, made by the Henderson Motor Car Company, Indianapolis, entered in the tour of the manufacturers from that city to the Pacific Coast.

THE HAYNES PIONEER.

Announcement That Maker of Haynes Cars Will Issue Unique Publication.

The aggressive policy noticeable in the conduct of the Haynes Automobile Company, Kokomo, Ind., maker of Haynes cars, since the reorganization of its sales department, is further emphasized by the announcement that a house organ, devoted to the interests of Haynes owners, distributors, dealers and the automobile world in general, will be published for the first time July 1 and thereafter will be issued monthly by the company.

The initial number will contain a resume of the life and work of Elwood Haynes, the builder of America's first car, now in the Smithsonian Institute at Washington, D. C., and officially designated as the "Pioneer." A history of the car itself is also given, and reminiscent of Mr. Haynes' work, the publication will be called "The Haynes Pioneer." The early issues will contain a series of articles from the pen of Elwood Haynes, relating to the advent of the automobile in America. Already the company has had thousands of applications for copies of its new paper.

SMITH SUCCEEDS WARREN.

Changes in Personnel Among Officers of Indiana Automobile Manufacturers' Association.

The resignation of C. B. Warren, president of the Indiana Automobile Manufacturers' Association, has been accepted by the board of directors and H. O. Smith of Indianapolis, Ind., president of the Premier Motor Manufacturing Company, maker of the Premier cars, a man of national importance in the automobile world, was elected as head of the organization, which is making motor car history by its coming tour to the Pacific Coast and its plan for a national highway from the Atlantic to the Pacific.

Carl G. Fisher, Indianapolis millionaire sportsman of Speedway and Prest-O-Lite fame, and the originator of the plan for automobile manufacturers to build an all-the-year-around highway across America, was chosen a member of the board of directors. R. P. Henderson of the Henderson Motor Car Company, maker of Henderson cars, was selected as tour treasurer.

AN APPRECIATIVE ALLEGORY.

Cole Motor Car Company Publishes Work from Pen of Homer McKee.

Homer McKee, the well known director of advertising and sales for the Cole Motor Car Company, Indianapolis, Ind., maker of Cole cars, has written an appreciation relative to the motor car, having in mind the fact that man had to develop 6000 years before he evolved this mode of travel and service. Mr. McKee displays what amounts to reverence for the invention of the automobile and his short essay, in the form of an allegory, has been published in folder form by the Cole company. On the title page is inscribed, "Its Origin," and the text, printed within a border of gold, follows:

Among the various things to which the earth is heir there is a great Brain which dreams and a great Hand which DOES. And the great Brain works with the great Hand, not for you nor for me, but for MAN. The great Brain and the great Hand made space and time, and designed these to be the eternal enemies of man.

Then the great Brain and the great Hand agreed that man should never yield to his enemies, Time and Space, but should fight on and on until some mighty weapon of annihilation should be discovered.

Thus it came about that the strength of the oak, the speed of the winds, the soft, pad-footed stealth of the panther, the tirelessness of the seasons and the beauty of vines that cling were gathered together by the great Brain and the great Hand and put into a single thing which should be the all-powerful servant of man. And they called the thing—the Motor Car.

A recent internal combustion engine research proved that it takes .01 second to fill the cylinder of a racing motorcycle with gas, according to A. H. Bartsch of the Bosch Magneto Company, New York City, maker of Bosch magnetos, and less time to fire the charge. "This being so," he says, "it surely proves what a phenomenal machine the magneto is, to be able to generate current so rapidly and so efficiently as to fire a complete charge of gas in less than .01 second."

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EMPIRE AS PATHFINDER.

Five-Passenger Little Aristocrat Selected for Iowa's Little Glidden.

Announcement is made by the Iowa State Automobile Association that the pathfinding car for this year's Little Glidden tour, as the annual endurance test of that organization has come to be known, is a five-passenger Empire Little Aristocrat, made by the Empire Automobile Company, Indianapolis, Ind. This is the first important tour in which this make of car has figured so prominently.

The event is scheduled for the early part of June, and it is expected to cover some 1050 miles. J. E. Robinson, sales manager for the Iowa distributor of Empire cars, will drive the machine on the pathfinding tour, and also as pilot car in the tour itself.

HOOD GOES TO COAST.

Seeks to Learn Interest of Dealers and Others in Manufacturers' Tour.

Representing the Westcott Motor Car Company, Richmond, Ind., Wallace C. Hood, general manager of that company, is visiting the Pacific Coast in an effort to determine the amount of interest being shown by the dealers and commercial organizations in that section of the forthcoming transcontinental tour of the Indiana Automobile Manufacturers' Association. Upon his report will depend in a large measure the action taken by the Westcott company with reference to the tour.

Mr. Hood has a large acquaintance on the Coast, this having been gained through former visits, made when he was connected as sales manager with the Chalmers Motor Company and the Metzger Motor Car Company. He will stop en route at Salt Lake City, Sacramento, San Francisco, Oakland and Los Angeles, and expects to include Portland, Seattle and Spokane in his itinerary before returning to Richmond.

The Downing-Detroit Motor Company of Detroit is bringing out a racy type of cyclecar, the power plant being of a 10-12 horsepower, long stroke design. The tread is standard with wire wheels and one chassis will be produced with a choice of either tandem or single seat. Arrangements are being made to produce these cyclecars in large numbers.

STUTZ

The Stutz is Quality Built

Every STUTZ car is built with as much care and pains as the costliest watch. Every ounce of material—every detail of workmanship that goes into the STUTZ is absolutely the best.

There are so many satisfied STUTZ owners throughout the country that we are not spending a nickel for national magazine advertising—we have demands for more cars than we can produce under our careful painstaking system without it. We are putting that cost into STUTZ QUALITY.

We are building less than 1000 cars—we have demands for three times that many.

If we built more cars we could not give the attention to the many details—such as are easily slighted in a great organization burdened with quantity production.

We could not build in quantities without sacrificing the QUALITY—and we would not sacrifice the QUALITY of one STUTZ car for the greatest quantity production in the industry. We would far rather be known as QUALITY producers.

There is no watered stock—no costly branches to maintain in the STUTZ organization.

Every nickel of STUTZ purchase price is given back to the user in STUTZ QUALITY.

These are the reasons for the superior quality of STUTZ cars—the reasons why the STUTZ gives genuine service—the reasons why every STUTZ owner is proud of his car no matter in what company he associates.

Write today for advance Booklet A-5, Sturdy STUTZ Announcement, Series B

THE IDEAL MOTOR CAR COMPANY.
Manufacturers of Stutz Cars
INDIANAPOLIS INDIANA



Stutz Six-Cylinder, Six-Passenger Touring Car, $2300

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20 Miles to Gallon

Lawrence, Mass., July 13, 1912.
Gentlemen:—Enclosed find check for carburetor. I feel perfectly satisfied. It does 20 miles and over on a gallon. Can recommend it to anyone. G. A. Schmidt.

19 to Gallon on Cadillac

Planhard Co.—Edgewater, N. J., May 21, 1912.
I am very much pleased with my new Planhard Carburetor. I made a test of gasoline consumption from Edgewater to Hyde Park, N. Y., and return, and got a fraction over nineteen miles to the gallon. This is on my Cadillac.
John H. Hinners.

More Speed—Start Cold

Groton, Conn., Feb. 8, 1913.
Dear Sirs:—I put a Planhard on my single cylinder 6-8 h. p. Goshen engine. It gives 50 R. P. M. more than the ——— I took off. With the Planhard I can start cold or hot without priming, which few others can do.
Yours truly, E. A. Scriven.

3¾ More Miles

When Planhard Carburetors were put on the 6 cylinder, 4 cycle Frisbie motor of the fast boat Delphi II, she increased 230 R. P. M., and 3¾ more miles per hour.

Much More Power

Bath Marine Construction Co.—"The gasoline consumption at normal power was better than others and it would develop much more power when pushed." H. D. Bacon, President.
"Fifty miles without a miss."—Geo. E. Grosvenor, Crescent, Mich.
"To use the vernacular, 'some carburetor.' "—W. R. Fleming, 3311 Broadway, N. Y.

If you own a FORD!

Chicago, Ohio, July 1, 1912.
Gentlemen:—The Planhard Carburetor for my model S Ford Car is very satisfactory. I never bought anything for my car I paid so cheerfully for, as I have a smoother running engine with more power and get *more mileage per gallon* and my engine runs much cooler. H. W. Grandon.

Gallon Less Per Hour!

on semi-speed boat
HARTFORD III
owned by A. N. Smith, Portland, Maine, who gets better control.

Old Glory II

had a Planhard on her Loew-Victor on her famous trip to Nova Scotia.

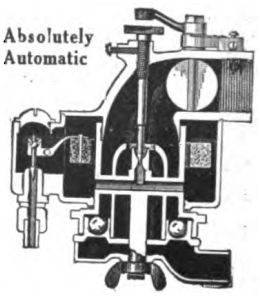
Valient II and Alfred S

took all their prizes with Planhards on their Metropolitan motors.

Emerson III

made a mile in 1 minute 8 seconds over the Washington government course with Planhards.

"Has them all beaten to a frazzle."—A. G. Linden, Cleveland, Ohio.



New England Distributors

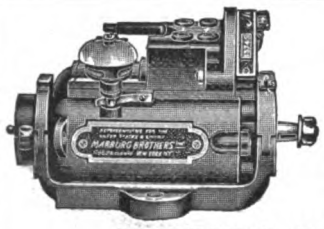
Eisner-Lenk Co.
1074 Boylston St.
Boston, Mass.
DEALERS Write
Get your profits

Note Simplicity.

Planhard Carburetor

Other Distributors
Southern N. J. & Eastern Penn., Gustave Muller, Jr., Bourse Bldg., Philadelphia.
Buffalo: Theo. P. Meinhard, 774 Main St.
Hermann Engineering Company, Equitable Building, Detroit, Mich.

Planhard Mfg. Co., 1790 Broadway, N. Y.
Gentlemen:—Send at once your chart and book concerning Planhard Carburetor.
Name .....St.....
City .....State.....
Engine .....Carburetor....Size....in.
Threaded? Flanged? Horizontal? Vertical?



Mea Magneto

S. R. O. BALL BEARING

MARBURG BROS., Inc.,
Sole Importers
Detroit. 1790 Broadway, New York. Chicago.

"Quality of a Master"

Four Cylinder $2000 Fully Equipped

LENOX

Six Cylinder $2750 Fully Equipped

Electric Lighting and Starting---Long Stroke Motor---Large Tires ---Long Wheel Base---Left Hand Drive---Centre Control.
Write for booklet describing in detail the "Boston-Made" Car.
LENOX MOTOR CAR CO. - - - - - BOSTON, MASS.
Factory: Jamaica Plain. Salesroom: Motor Mart.



GEISZLER NON-SULPHATING STORAGE BATTERIES

Guaranteed perfect satisfaction or money refunded
SIZE 66 - $20.00
GEISZLER BROS. STORAGE BATTERY COMPANY
514 West 57th Street, New York City

USE
INVADER OIL
"A Pure Food for Motors"
INVADER OIL CO., 80 Broad St., New York
Lessees of Charles F. Kellom & Co.
Philadelphia Boston Washington

DIXON'S MOTOR CHAIN COMPOUND

Minimizes Friction and Doubles or Trebles the Life of a Chain. Write for the Book "Lubricating the Motor," No. 210.
JOSEPH DIXON CRUCIBLE CO.
Jersey City (8) New Jersey

Walpole Tires

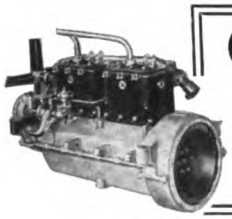
"NO STONE BRUISE"
GUARANTEED
Walpole Tire & Rubber Co., Boston, Mass.

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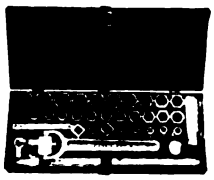
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$3.00
for Q. D. Rims



O-TAK-A
THE TIRE REMOVER
that should be in every car. It acts on the rim, the ring, the tire, and helps take them off and put them on again.
O-TAK-A FACTORY, Le Roy, N. Y.



Continental Motors
THE WORLD'S STANDARD
Carry Prestige and Sales
Continental Motor Mfg. Co.
Detroit Michigan



Bay State Autokit, No. 1, $10
Bay State Autokit, No. 2, $7.50
Bay State Stickit, $3
GEO. A. CUTTER, Sales Agent
Taunton Mass.

J-M AUTOMOBILE SUPPLIES
Brake Lining
Spark Plugs
Dry Batteries
Friction Tape
Fire Extinguishers
Radiator Shields
Packings
Cements
Fuses, Etc.
Write for Booklet



H.W. JOHNS-MANVILLE CO.
NEW YORK AND EVERY LARGE CITY

Mosler Spit Fire Plugs
ARE THE BEST
A.R. MOSLER & CO.,
P.O. BOX "M"
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1893
HAYNES
1913
America's First Car—after twenty years of continuous successful manufacturing—*Still Its Foremost.* Wide Line of Models.
HAYNES AUTOMOBILE CO., Kokomo, Ind.

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SOCONY
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Polarine

For Automobile Lubrication

Polarine Transmission Lubricants

For transmissions and differentials. Prepared in three consistencies to meet differences in wear and mechanical construction. Unexcelled in friction-reducing properties.

Polarine Fibre and Cup Greases

Polarine Fibre Grease and Polarine Cup Grease are solid lubricants of high-melting point, for use on universal joints, ball and roller bearings, and in grease cups.

For Sale Everywhere in cans of convenient sizes

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Starts — Lights — Ignites

REMY

Six Volt System—Does It All

OUR *silent, simplified starters* are especially adapted to each size and type of gasoline engine. This accurate relation of starting motor and car engine eliminates all current waste.

Compare this feature with a common size starting motor for all sizes and types of car engines.

Remy magnetos are manufactured for every known make of internal combustion engine. See that your car is Remy started—Remy ignited—Remy lighted.

The Remy starting and lighting equipment is sold only to car manufacturers.

Write us about our magneto exchange offer. Liberal allowance for any make of old equipment.

Remy Electric Company,

General Offices and Works, Anderson, Indiana

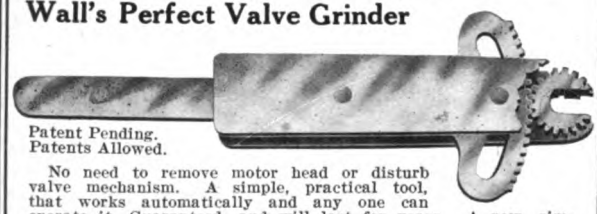
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Boston Chicago San Francisco

Service stations throughout the country.

WILL GRIND FORD VALVES

Wall's Perfect Valve Grinder



Patent Pending.
Patents Allowed.

No need to remove motor head or disturb valve mechanism. A simple, practical tool, that works automatically and any one can operate it. Guaranteed, and will last for years. A new, simple and practical guide for owner, driver and repairer. Keep your valves in perfect condition. Cost of grinder saved first time used. For circulars and price list write

J. H. WALL, 290 Hope Street, BRISTOL, R. I.

"Avon" Blow-Out Patches

BUILT LIKE A BRIDGE

12 to 14 INCHES LONG, 7-PLY, EXTRA HEAVY
3 inch, **$1.00**; 3 1-2 inch, **$1.25**; 4 inch, **$1.50**
4 1-2 inch, **$1.75**; 5 inch, **$2.00.**

Prepaid on receipt of price.

GRAY SPECIALTY CO. 148 Avon Ave., Newark, N. J.

F. SHIRLEY BOYD

903 Boylston St. Boston, Mass.

Dorian Demountable Rims.

Supplementary Spiral Springs. R. I. V. Ball Bearings.

SAGER EQUALIZERS

The Shock Absorbers Which Save Your Car and Tires.
Nothing to Wear, Adjust or Require Attention.
They Take The "Sting" Out of Rough Roads.
Try Them At Our Expense For 30 Days.

Seven Years Of Success.

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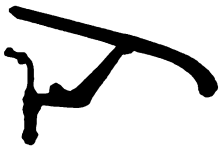


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Saved Annually by Use of Sager Bumpers.
Don't Wait for a "Smash-up" to Buy Protection.
DO IT NOW.

PRICES $6.00 to $27.50. Liberal Discounts.

Diamond



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Used Almost Exclusively On High Grade Cars.

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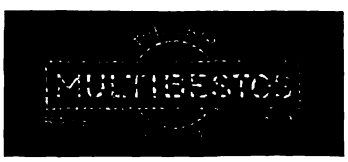
Rochester



Clamped on Bumpers of Distinction. 30 Models. Attached in 10 Minutes
FORD SPECIAL, CLAMPED ON, $10.

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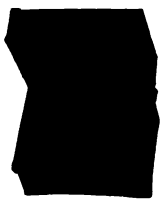
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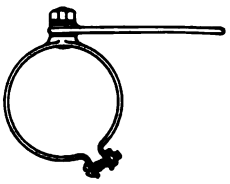
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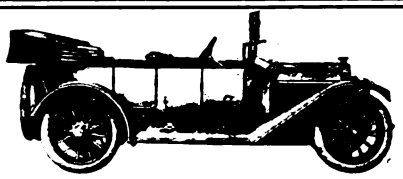


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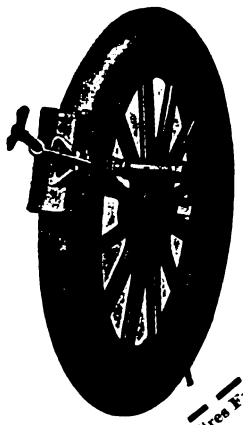
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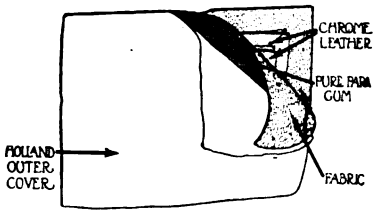
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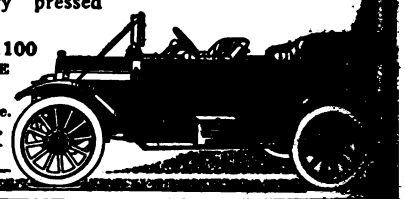
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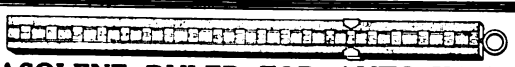
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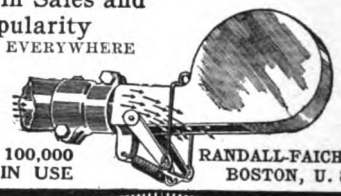
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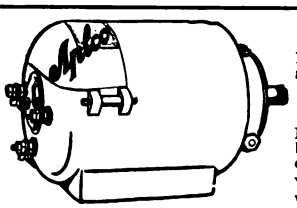
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Peerless Motor Car Co., Cleveland. (Peerless.)
Branches: See Cars—Gasoline Pleasure.

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Sullivan Motor Car Co., 611 East Ave., Rochester, N. Y. (Sullivan.)

Willys-Overland Co., Toledo, O. (Overland.)

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Atlantic Vehicle Co., Factory, Newark, N. J.; 1600 Broadway, New York City; 10 Postoffice Square, Boston. (Atlantic.)

Couple-Gear Freight-Wheel Co., 575 Buchanan St., Grand Rapids, Mich. (Couple-Gear.)
Branches: 30th floor, Singer Bldg., New York; 178 Devonshire St., Boston.

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Branches: See Cars—Gasoline Commercial.

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Cartercar Co., Pontiac, Mich. (Cartercar.)

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Branches: See Cars—Electric Commercial.

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Milwaukee Auto Specialty Co., 128 Second St., Milwaukee.

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Pyrene Co. of New England, 176 Federal St., Boston. (Pyrene.)

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Dover Stamping & Manufacturing Co., Cambridge, Mass. (Dover.)

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Goodnow Manufacturing Co., 754 Old South Bldg., Boston. (Gasoline Gallon.)

National Motor Supply Co., 1911 Euclid Ave., Cleveland. (Tire Pressure and Gasoline Tank.)
Branches: In all principal cities.

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Ross Gear & Tool Co., 794 Heath St., Lafayette, Ind. (Ross.)

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Sumner, Geo., Inc., 1926 Broadway, New York City. (Diva.)

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Randall-Faichney Co., Boston. (Jericho, Jubilee.)
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Johns-Manville Co., H. W., Madison Ave. and 41st St., New York City.

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LAMPS.

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Dixon Crucible Co., Jos., Jersey City, N. J. (Graphite.)

Eagle Oil & Supply Co., 104 Broad St., Boston. (Eagleine No-Karbon.)

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Haws, Geo. A., 77 Pine St., New York. (Panhard.)
Branch: 899 Boylston St., Boston.

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Branches: See Accessory Manufacturers and Jobbers.

New York & New Jersey Lubricant Co., 165 Broadway, New York. (MoTolRol, Non-Fluid, Kejex.)

Standard Oil Co., New York. (Polarine.)
Branches: In all cities.

Texas Company, The, 7 West St., New York.
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Vacuum Oil Co., Rochester, N. Y. (Mobiloil.)
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Valvoline Oil Co., 27 State St., Boston. (Valvoline.)

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Miami Cycle & Manufacturing Co., 320 Hanover St., Middletown, O. (Flying Merkel.)

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Federation American Motorcyclists, E. M. Estabrook, Bangor, Me.

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National Motor Supply Co., 1911 Euclid Ave., Cleveland.

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Page-Lester Co. 2644 Indiana Ave., Chicago. (Tite-Wad Rubber Putty.)

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Dayton Rubber Mfg. Co., Dayton, O. (Dayton Airless.)
Diamond Rubber Co., Akron, O. (Diamond.)
Firestone Tire & Rubber Co., Akron, O. (Firestone.)
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Branches: See Tires—Casings and Inner Tubes.
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Branches: See Tires—Cushion.
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Republic Rubber Co., Youngstown, O. (Republic.)
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Branch: 1974 Broadway, New York.

TRUCKS AND TRACTORS—See Cars, Commercial.

TRUNK RACKS.

Connecticut Steel & Wire Co., Hartford, Conn.

TUBING, GAS.

Johns-Manville Co., H. W., Madison Ave. and 41st St., New York City.

TURNTABLES.

Beach Co., T. C., 108 Ottawa St., St. Johns, Mich. (Beach.)

UNIVERSAL JOINTS.

Brets Co., J. S., 520 W. 54th St., New York. (Hartford.)
Kinsler-Bennett Co., The, P. O. Box 124, Hartford, Conn. (Kant-Break.)

VALVE GRINDERS.

Wall, J. H., 290 Hope St., Bristol, R. I. (Ford.)

VULCANIZERS.

McVey Manufacturing Co., Third and Canal Sts., Dayton, O. (McVey.)
National Motor Supply Co., 1911 Euclid Ave., Cleveland. (Garage and Individual.)
Branches: In all principal cities.
Shaler Co., C. A., Waupun, Wis.
Vanderpool Tire & Rubber Co., Springfield, O.
Williams Foundry & Machine Co., Akron, O.

WELDING OUTFITS.

Prest-O-Lite Co., 309 W. South St., Indianapolis. (Prest-O-Welder.)
Branches: See Cylinder Cleaning Compound.

WELDING, STEEL.

Standard Welding Co., Cleveland.

WHEELS.

Eberly & Orris Mfg. Co., Mechanicsburg, Penn.

WIRES AND CABLES.

Diamond Rubber Co. of N. Y., Akron, O. (Diamond.)

WIRE MECHANISM.

Brets Co., J. S., 250 W. 54th St., New York. (Bowden.)

WRENCHES AND COMBINATION OUTFITS.

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Coes Wrench Co., Worcester, Mass.
Cutter, George A., Taunton, Mass.
Walworth Manufacturing Co., Boston. (Stillson.)

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Adjustable to various angles by Ratchet and Nut at back. In general appearance it closely matches many makes of speedometers.

MODEL D



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For (Patent Applied for) Outside Stem Winding and Stem Setting Device, ADD $3.00 to above prices.

Superior to other devices. A great convenience for winding clock and setting the hands without opening the clock case.

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On Sale By Leading Jobbers and Dealers.
If Not With Your Dealer Sent on Receipt of Price.

BOSTON CLOCK CO., 16 State St., Boston, Mass.

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YOUR BRAKES ALWAYS WILL INSURE YOUR SAFETY IF YOU INSIST UPON

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"THE ORIGINAL AND BEST ASBESTOS BRAKE LINING"

RAYBESTOS grips with the slightest pressure. It transmits your message at once without slipping. When you want to stop, you do stop.

RAYBESTOS gives longer wear than any other brake lining because it is made better than others, and because it cannot burn up. The steepest hills produce no effect upon it. It is made of genuine long fibre asbestos, and the best raw material money can buy. It is treated by a secret process insuring highest efficiency. Essentially a product of QUALITY.

The name RAYBESTOS is stamped on every foot for your protection. There are inferior brake linings being "palmed off" on motorists who do not inquire into this important detail. Demand RAYBESTOS by name. It made the automobile safe.



The Royal Equipment Co.

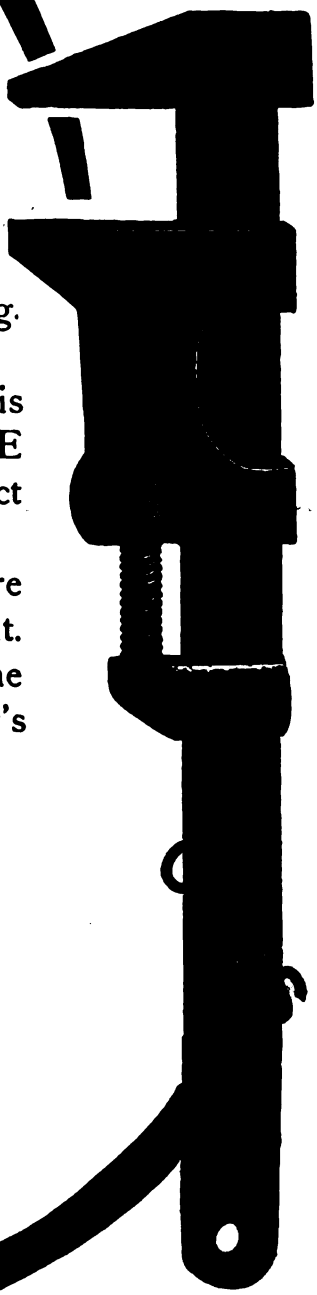
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Perfect balance and right grip

Everything the motorist desires in a wrench is to be found in the "COES" AUTOMOBILE MODEL, and you will never know perfect wrench service until you pin your faith to it.

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Polarine is the right oil for all motors. Polarine holds its body in the hottest cylinder—deposits little carbon—and puts an end to friction trouble.

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Starts — Lights — Ignites

REMY

Six Volt System-Does-It-All

Your Car—And The Blacklist

IF the company which builds the electrical equipment on your car is not in business next season, or the following, how much will your car's value be diminished? If your car is equipped with Starting, Lighting and Ignition equipment, built in three different factories, how much greater is the risk?

This is something for both manufacturer and dealer to consider; It is a great big, vital question which must not be overlooked. Do you want to take chances on your car being blacklisted because of obsolete electrical equipment?

When you equip with Remy Starting, Lighting and Ignition you are making a 14 year old firm, the largest of its kind in the world, responsible for the satisfactory and complete electrical operation of your car; when you equip with Remy apparatus you are not taking chances.

Remy Reasons:

Each REMY starting system is accurately gauged to the size of the car motor. It produces enormous turning power.

Each REMY *slow speed* Protected Generator has its output regulated inherently. The battery is charged at a non-injurious rate.

More REMY magnetos are in use this season than all other makes combined. Their service is constant; their spark is hottest.

We manufacture this Starting, Igniting and Lighting apparatus in every combination, but the Remy Starting and Lighting Equipment is sold only to car manufacturers.

Write us about our Magneto Exchange offer.
Liberal allowance for any make of old equipment.

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Completely Equipped

Self-Starter
30 Horsepower
5-Passenger Touring Car
110-inch Wheel Base
Timken Bearings
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$985

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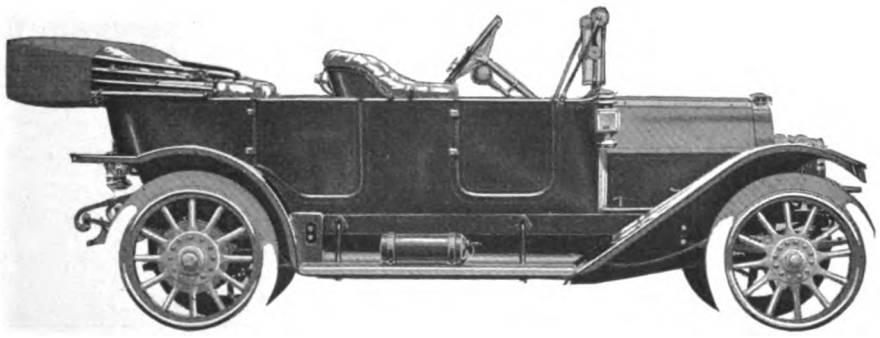
FORTY prominent German engineers, in an effort to find a weak spot, tore down an Overland that had run over 5000 miles. They could not find one single flaw on a single part.

Our exceptional value has always puzzled and astounded the world. But when you take into consideration the economy of building 40,000 cars a year you have the answer. The growing familiarity of 53 nations with the tremendous Overland construction methods has caused Overland sales to increase by leaps and bounds. The market for the best product is unlimited.

Write for Catalogue. Please address Dept. 52.

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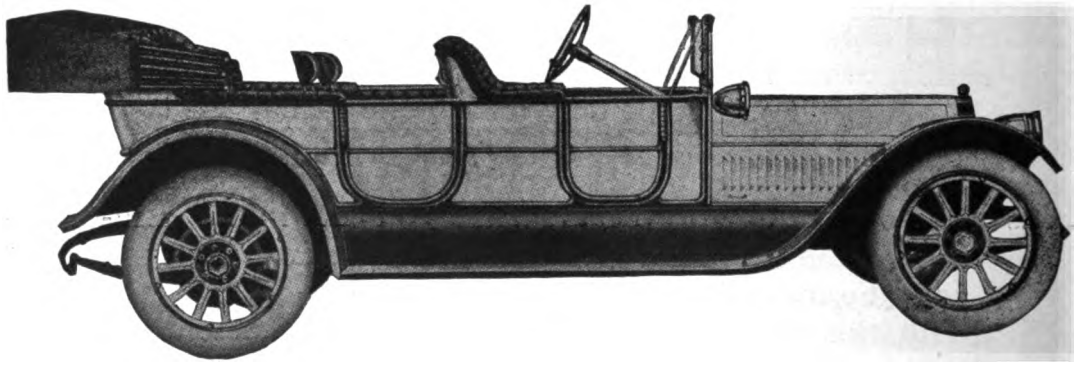
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We will (at small extra cost) furnish our Regular Models with the

AUSTIN

Two-Speed Axle

This axle provides two different gear ratios, both on direct drive, and in combination with a three-speed transmission gives six speeds forward and two reverse.



Model "77" has a Regular Direct Drive of 3 1-2 to 1, and a Special Direct Drive of 2 to 1.
Model "55" has a Regular Direct Drive of 4 1-2 to 1, and a Special Direct Drive of 3 to 1.

The Regular Direct Drive provides ample power and exceptional ease of control for hills, bad roads and crowded city traffic.

The Special Direct Drive for normal conditions, shows a gain of over 50% in mileage for the same fuel consumption and motor speed, eliminates the noise, wear and tear of running the motor at excessive speeds, adds materially to the life and durability of the car and pleasure of riding.

Model "77" Six Cylinders, 4 1-2 x 7 - - $6000.00
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MORE NEW, IMPROVED and **DISTINCTIVE FEATURES** than any other car. Two-speed rear axle, high pressure air self-starting system, complete electric lighting system, left hand steer, center control, two-spark magneto, four-speed transmission, both brakes controlled by foot pedals.

Write for complete description and any information you may desire in regard to our two-speed axle.

Austin Automobile Company

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TO THE TRADE:

Write for this valuable booklet giving the correct style of plug best suited to the engines of the cars now in use



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Write us for the correct size and style plug best suited to the engine of your car

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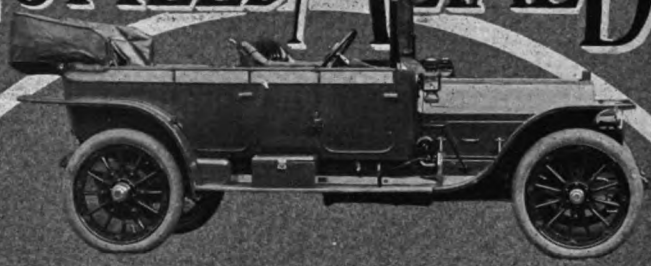
The Plug that will give mileage, speed, power and continued satisfaction

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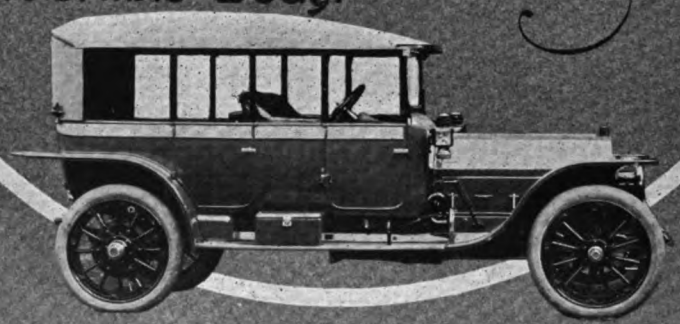
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Springfield Convertible Bodies
A Construction Giving the Qualities of a Limousine & Touring Equipment That May Be Converted as Quickly as a Folding Top Can be Raised or Lowered. When Folded the Full Space of the Touring Car is Available — When Raised It is a Regular Top or It Can Be Glass Enclosed.

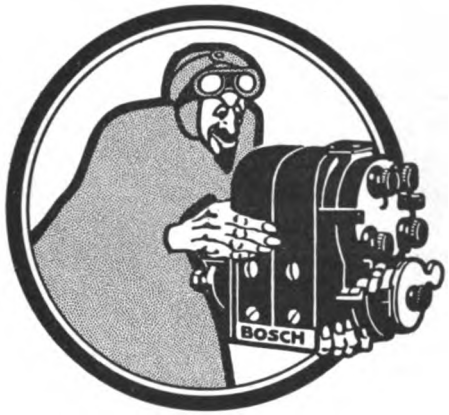
Dealers, Who Insist on Quality Equipment, Specify The Springfield Convertible Body.



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The most remarkable ignition victory ever recorded.

BOSCH

Wins of Course

The 500 Mile Race
A Clean Sweep for Bosch

1st Peugeot.....Goux

BOSCH MAGNETO

2nd Mercer.....Wishart

BOSCH MAGNETO and PLUGS

3rd Stutz.....Merz

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4th Sunbeam.....Guyot

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5th Mercedes-Knight.....Pilette

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6th Fox.....Wilcox

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7th Mercedes.....Mulford

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No argument, no claim, no proof is so thoroughly convincing as is the showing of universal selection—the greatest engineers of the industry, the most prominent drivers of the world acknowledge the superiority of Bosch by their universal selection—this sweeping victory places Bosch at the zenith of supremacy.

Be Satisfied *Write for Literature.* *Specify Bosch*

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Greatest hauling achievement on record —performed by these four KisselKar Trucks

SEVERAL makes of motor trucks were employed in hauling material for the construction of the Big Meadows dam in the California Sierras—the biggest contract of its kind ever undertaken in America. Most of the trucks made sorry work of the task and none were ever able to equal the weekly tonnage carried by the KisselKars. Over trails of decomposed lava, up and down the steepest and most dangerous grades, these three-ton KisselKars plodded continuously for forty days and nights, averaging in daily delivery 80,000 pounds of cement.

This truly marvelous feat proves anew the sturdy and sterling nature of KisselKar construction. A powerful truck, with plenty of reserve strength—able to meet exacting emergencies as well as expected stress.

KISSELKAR TRUCKS

1500 lbs., 1, 1¼, 2, 3, 4 and 5 tons

A truck to be right must be built of the best and most thoroughly tested materials, put together by skilled workmen under authoritative supervision—tested under the most rigid system. It must have four speed transmission—a lock on the differential to pull a stuck or slipping wheel out of its difficulty—a power plant of tried and unquestioned ability—general construction that will resist vibration. *In brief it must be like the KisselKar.*

***KISSELKAR SERVICE** insures prompt and careful attention to truck owners, because it offers a specific policy, ample and accessible facilities and skilled mechanics. KisselKar Service Buildings are at all principal points, while the system reaches the most remote agency.*

Send for Truck Portfolio with hundreds of illustrations of KisselKar Trucks in actual use.

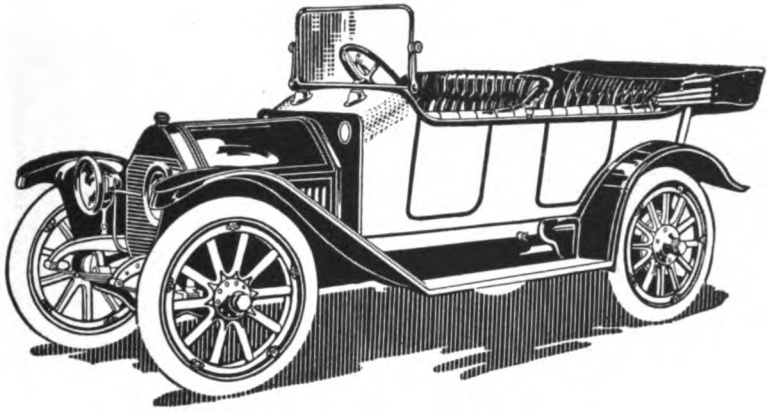


Kissel Motor Car Co.

174 Kissel Avenue, Hartford, Wis.

New York, Minneapolis, Chicago, Milwaukee, Los Angeles, Dallas, Boston, St. Paul, Kansas City, and 200 other leading points.

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Cartercars make good— So do Cartercar agents

To build up a successful business the motor car agent must have a car that will back up every statement he makes—that goes out and builds for him a reputation as a dealer in "good" cars. This is just the reason why the Cartercar has perhaps a larger percentage of unchanged agencies than any other car on the market today.

Cartercar With the Gearless Transmission

The Cartercar has the simplest possible form of transmission—only two unit parts. That would please your customers.

This transmission enables the car to climb 50% grades and run through bad sand and mud with perfect ease. Every buyer wants this service, but cannot get it in a gear car.

Then, too, the Cartercar has an unlimited number of speeds—all controlled noiselessly and easily with a single lever. Would this appeal to the buyers whose wives and daughters drive?

Another important feature, the Cartercar does not jerk or jar in starting and changing speeds. This means the utmost comfort and besides about half of the wear on tires is prevented. Would your customers object to paying only half as much for tires as the driver of the gear car?

And the Cartercar is equipped with one of the very best electric starting and lighting systems in use today. The "Jesco" starter, with both lights and cranking controlled by a single knob at the driver's left.

There are four splendid models—each one a leader in its class. These are cars that you can sell—that you can build up a permanent business with. If we are not represented in your territory write us.

Cartercar Company

PONTIAC, MICHIGAN

Branches—New York, Chicago, Detroit, Kansas City and Atlanta.

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No-Rim-Cut Tires 10% Oversize

11% Less This Year

No-Rim-Cut tires—now the favorite tires—cost 11 per cent less this year.

That's a new saving. They have always saved rim-cutting, saved overloading. Now their very popularity is saving you an extra 11 per cent.

How It Happens

We have lower rubber this year, but higher fabric and higher cost of labor.

Some makers say the net saving here warrants no reduction. Some say five per cent.

But we, in addition, have a multiplied output. A factory capacity now pretty close to 8000 motor tires daily. We have new factories with the latest equipment.

So No-Rim-Cut tires will cost, we figure, 11 per cent less than last year. And since April 1st we have given that saving to the users of these tires.

Our Profit

Our policy is to keep our profit around 8½ per cent. So long as we do that no maker in the world can sell an equal tire for less.

To assure you of this, every year we advertise our profits. We want you to know that in Goodyear tires you get the squarest sort of deal.

No Extra Price

In No-Rim-Cut tires you are getting tires which never can be rim-cut. That wipe out completely a trouble which ruins 23 per cent of old-type tires.

You are getting tires 10 per cent larger than clincher tires of the same rated size. And that adds, on the average, 25 per cent to the mileage.

And you are getting now 11 per cent reduction. So these new-type tires, with all their advantages, cost no more than standard old-type tires.

Consider those savings and judge for yourself if it pays to insist on these tires.

Hundreds of thousands think so. And they have bought, in the past 12 months, over a million Goodyear tires.

GOODYEAR
AKRON, OHIO
No-Rim-Cut Tires
With or Without Non-Skid Treads

Write for the Goodyear Tire Book—14th-year edition. It tells all known ways to economize on tires.

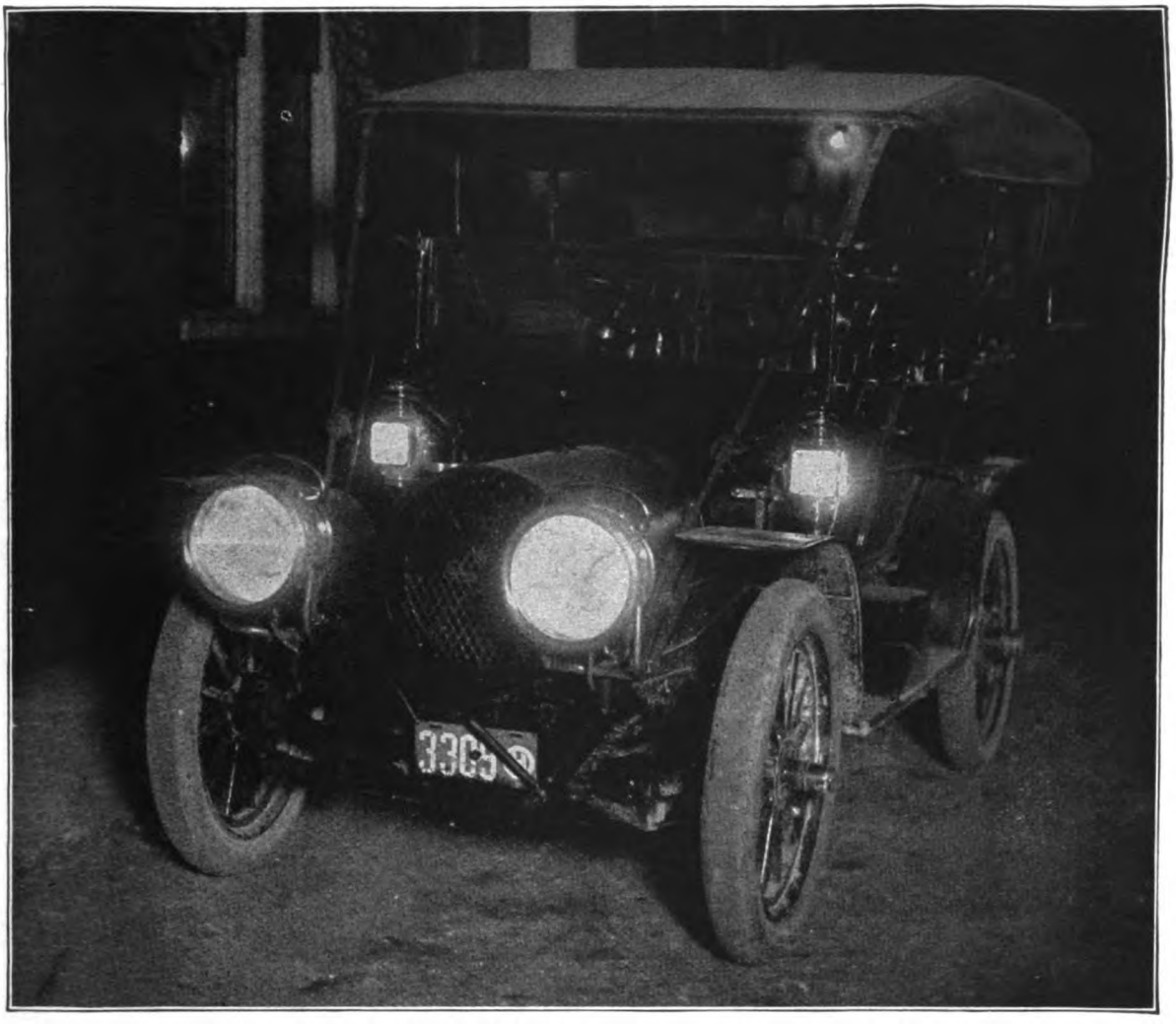
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Branches and Agencies in 103 Principal Cities—More Service Stations Than Any Other Tire
We Make All Kinds of Rubber Tires, Tire Accessories and Repair Outfits

Main Canadian Office, Toronto, Ont.—Canadian Factory, Bowmanville, Ont.

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SIX YEARS AHEAD

Electric automobile lighting in 1907!

THE APLCO SYSTEM

was the first to be installed; always the best

In 1907 Mr. Vincent G. Apple installed an electric lighting system on the Franklin car shown above. It was the first electric-lighted automobile; it is still doing service on the streets of Dayton. Apple equipped cars were exhibited at shows years ago.

WHEN you start out to equip your car with a lighting outfit you'll find that with most of the systems offered you must adapt your requirements, your convenience and the appearance of your car to the necessities of the system—or do without it.

The Aplco system is the other way; made to conform to *your* requirements. One of our dynamos will adapt itself as perfectly to the construction of your car as if built especially for it.

Within everyone's price

The Aplco System is the best for your car; its quality is of the highest required for high-priced cars; its price is in proportion to the cost of any low-priced car.

Please send to us for detailed information of how your car can be put a year ahead with the Aplco System, and learn the name of our nearest service station.

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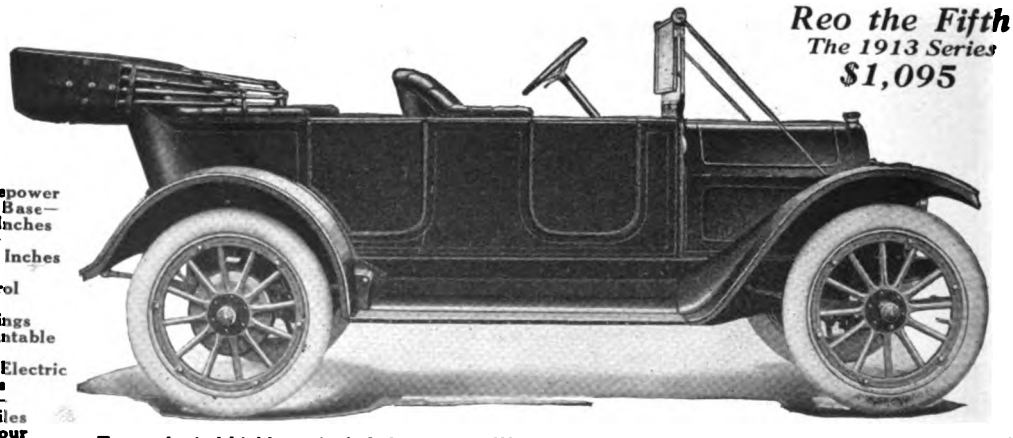
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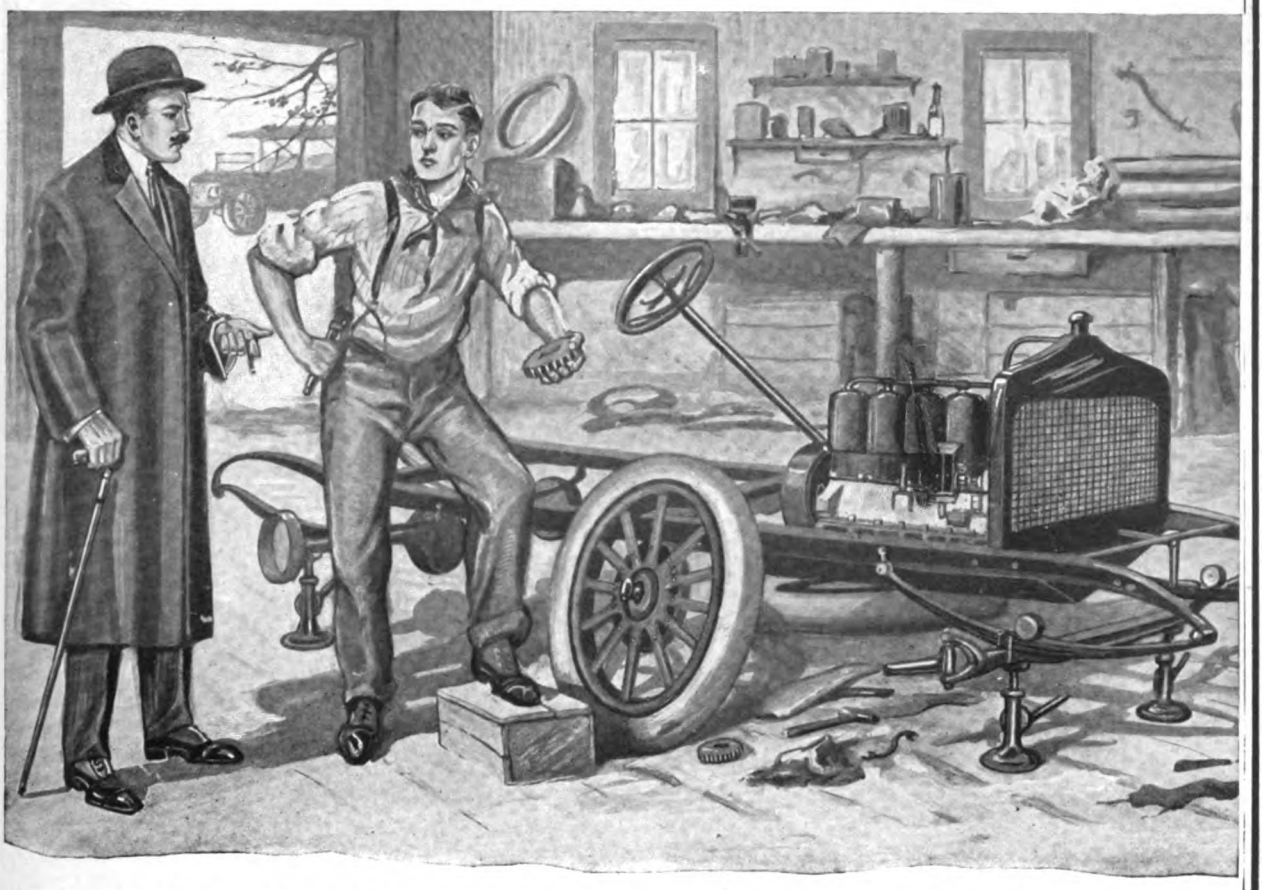


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Index To Advertisers

Abbott Motor Co.....86
American F. N. Company.....75
American Ignition Co.....88
Anti-Rust Paint Co.....91
Apple Electric Co.....15
Approved Auto Specialties Co....89
Austin Automobile Co..... 8

Barrett Manufacturing Co.....79
Beach Co., T. C.....90
Blackledge Mfg. Co., John W....91
Borne, Scrymser Company.....89
Bosch Magneto Company.....11
Boston Clock Co..... 2
Boyd, F. Shirley.....84
Braender Rubber & Tire Co.....90
Bretz Company, The J. S.....Cover
Brown Company.....92
Buckeye Manufacturing Co.....85

Cameron Mfg. Co.....88
Cartercar Company.....13
Cataract Rubber Co.....88
Coes Wrench Company..... 4
Cole Motor Car Company.....82
Continental Motor Mfg. Co.....88
Cutter, Geo. A.....86
Cutting Motor Car Co.....88

Dayton Rubber Mfg. Co.....88
Dean Electric Company.....91
Detroit and Cleveland Navigation Co. 85
Dixon Crucible Co., Jos.....84
Dover Stamp. & Mfg. Co.....85

Eagle Oil & Supply Co.....81
Edwards Mfg. Co.....82
Emery Manufacturing Co.....84
Empire Automobile Co.....90

Federation Amer. Motorcyclists..75

Gaulois Tire Corp.....87
Geiszler Bros. Storage Bat. Co....86
Goodnow Mfg. Co.....90
Goodyear Tire & Rubber Co.....14
Gray Specialty Co.....84

Harris Oil Company, A. W.....87
Haynes Automobile Co.....92
Heinze Electric Co.....87
Henderson Motor Car Co.....88
Herreshoff Motor Co.....91
Hoffecker Company, The.....85
Hopewell Bros.....80
Hotel Lenox.....92

Indian Refining Co.....90
Invader Oil Co.....16-17
Invincible Tire Co.....83

Jackson Automobile Co.....85
Johns-Manville Co., H. W.....85
Jones Speedometer Company.....85

Keeton Motor Car Co.....82
Kissel Motor Car Company.....12
Knox Automobile Company.....82
K-R-I-T Motor Car Co.....90

Lenox Motor Car Company.....87

Marburg Bros.....92
Mea Magneto.....92
Mercer Automobile Company.....21
Miami Cycle & Mfg. Co.....73
Michigan Motor Car Co.....91
Miller, Chas. E.....Cover
Milwaukee Auto Specialty Co.....92
Moller Brothers Controller & Economizer Co.....81
Mosler & Co., A. R..... 9

National Motor Vehicle Co.....86
New Departure Mfg. Co.....90
Nordyke & Marmon Co.....83
N. Y. & N. J. Lubricant Co.....19

O-Tak-A Tire Remover Co.....92
Owen & Co., R. M.....18

Paige-Detroit Motor Car Co.....84
Perfection Spring Co.....91
Pilot Car Sales Co.....90
Planhard Mfg. Co.....86
Pyrene Co. of N. E.....81

Randall-Faichney Co.....88
Remy Electric Company..... 6
Reo Motor Car Company.....18
Royal Equipment Co..... 3

Sager Company, J. H.....84
Shaler Co., C. A.....25
Speedwell Motor Car Co.....82
Splitdorf Electrical Co.....82
Springfield Metal Body Co.....10
Standard Co., The.....89
Standard Oil Co..... 5
Standard Welding Co.....83
Standard Woven Fabric Co.....84
Stewart-Warner Speedometer Corp. .....Cover
Studebaker Corporation.....88
Stutz Motor Car Co.....83
Sumner, George, Inc.....91

United States Tire Co.....86

Vacuum Oil Co.....Cover
Valvoline Oil Company.....91

Waite Auto Supply Co.....91
Wall, J. H.....92
Walpole Tire & Rubber Co.....23
Weed Chain Tire Grip Co.....86
White Automobile Co.....26
Willard Storage Battery Co..... 1
Willys-Overland Company..... 7

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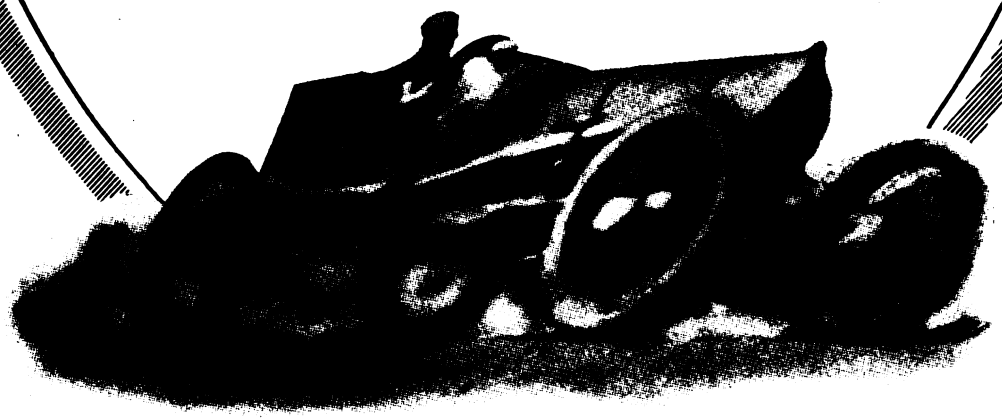
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Page

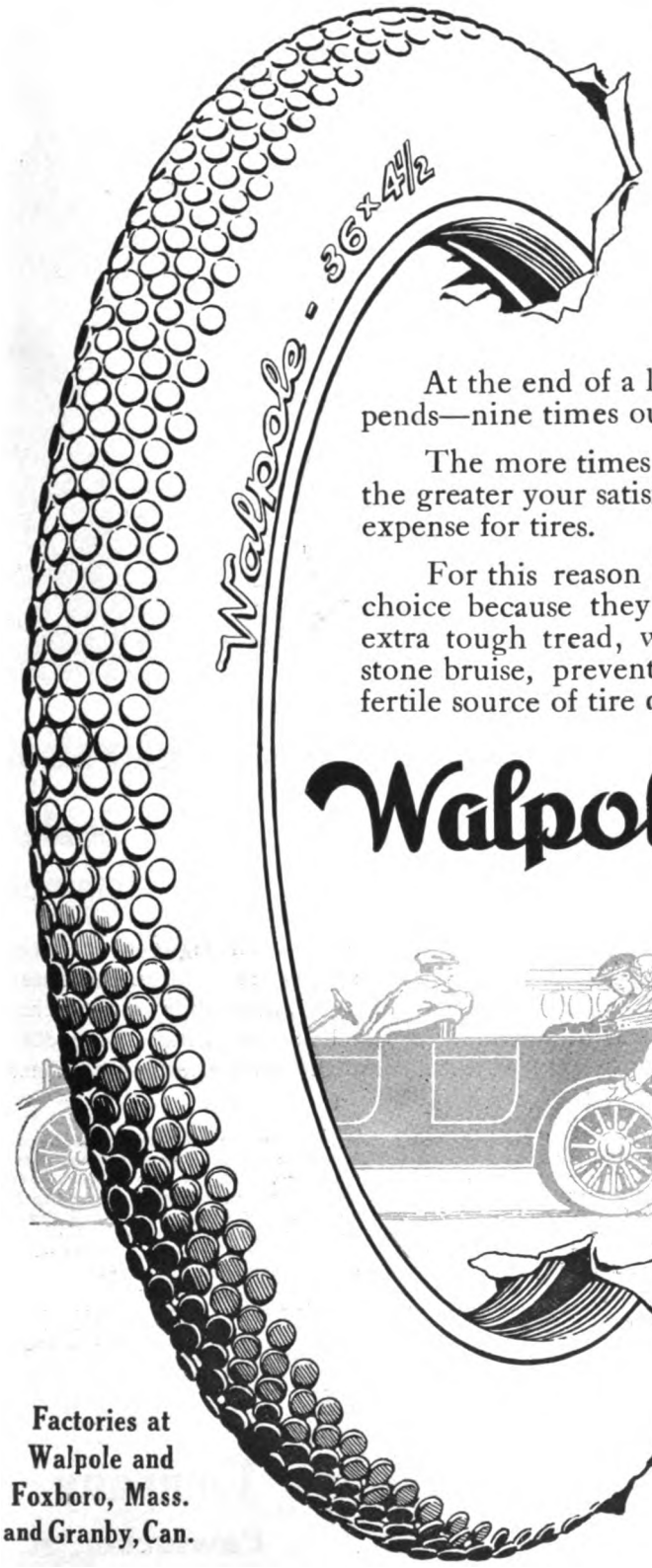
*British-American Engineers' Meeting....27
Factors to Be Considered with Pneumatic Tires, Paul W. Litchfield....29
Calculating Depreciation of Commercial Motors, Charles Wheeler....32
New Paige Factory....33
Secures Large Order....33
*Weber Is General Manager....33
*Becomes General Manager....34
Stockholders Approve Action....34
Organize Sales Company....34
Selling Harris Oils....35
Increase Capital Stock....35
Wagner with Ajax Tires....35
Separate Accessory Show....35
New Highway Policy....36
A Home-Made Filter....36
Army Men on Tour....36
*New and Novel Accessories....37
*Mechanical Notes for Owners—
Eliminating Noise in Rear Axle....40
Tire Rest and Car Stop....41
Simple Piston Clamp....41
Water Proofing the Windshield....41
Cleaning Tire Covers....41
Restoring Dry Cells....41
*Adjusting Stromberg Carburetors....42
*Diva Headlight Eliminates Dazzling....44
Handling the Buick Product....45
*Establishing Service Stations....45
*In the Commercial Vehicle Field—
Stewart Light Delivery Wagon....46
Commerce with Gas Company....47
New Law in Maine....47
Selden One-Ton Truck....48
Memorialize the Legislature....49
History of the Industry....49
Fuel Problem Is Solved....49
Reporting Automobile Accidents, Editorial....50
*Henderson Offers Bi-Fuel Carburetor....51
*With the Motoring Interests Abroad—
Vauxhall Cars in Contest Work....54
Creates Records on Benzol....54
The Prague Exhibition....54
Paris Objects to Motors....55
London-Edinburgh Run....55
Notes from Foreign Lands....55
*The Repair Shop and Garage—

Page

Easily Made Jig....56
Equalizing Valve Springs....56
Proper Wire for Lighting....56
*Details of the Warner-Detroit Motor....57
*Garage and Repair Shop Equipment—
Defiance Flywheel Balancing Machine....58
Gardner Air Compressor....58
Indians Will Compete....59
Motoring Laws and Their Enforcement—
Another Patent Case Decision....60
Pelletier Addresses Operators....60
Taxicab Fares Reduced....61
California's New Law....61
Must Report Accidents....61
Legislative Briefs....61
*Correspondence with the Reader—
Allowances for Fits....62
Function of Torque Arm....62
Triple Ignition....62
Cause of Tire Troubles....62
Increasing Efficiency of Motor....62
*Goux Takes Chief Speedway Honors....65
Wood and Metal Motor Truck Wheels, Arthur J. Slade....70
*In the Realm of the Motorcyclist—
Plan to Redistrict F. A. M....72
Ten Win in New Jersey....72
Minneapolis Police Modify Order....72
Yale in Business Life....72
Free Sanctions for State Meets....73
New Local Commissioners....73
Additional Registered Repair Shops....73
Massachusetts Rules Against Sidecars....73
To Celebrate Tenth Birthday....73
Kirk with Thor Maker....73
His Second Excelsior Mount....74
Lower Rate on Sidecars....74
Spencer Defeats Gove....74
Long Distance Emblem Run....74
New York Convention in July....75
Race Dates in Cleveland....75
Can't Get Merkel's Fast Enough....75
Enjoy Sidecar Trip....75
Club Notes, Here and There....75
*News of the Manufacturer and Dealer....76
Recent Patents....78
Coming Events....78
New Books Received....78
Becomes General Manager....80
Mulford's Braender Tires....80
Hopewell Bros. Wins....80

*Indicates that article is illustrated.

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At the end of a long journey, arrival on time depends—nine times out of ten—on tires.

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are specially constructed for hard touring wear. Their extra toughness stands more real wear than it would seem any rubber could stand.

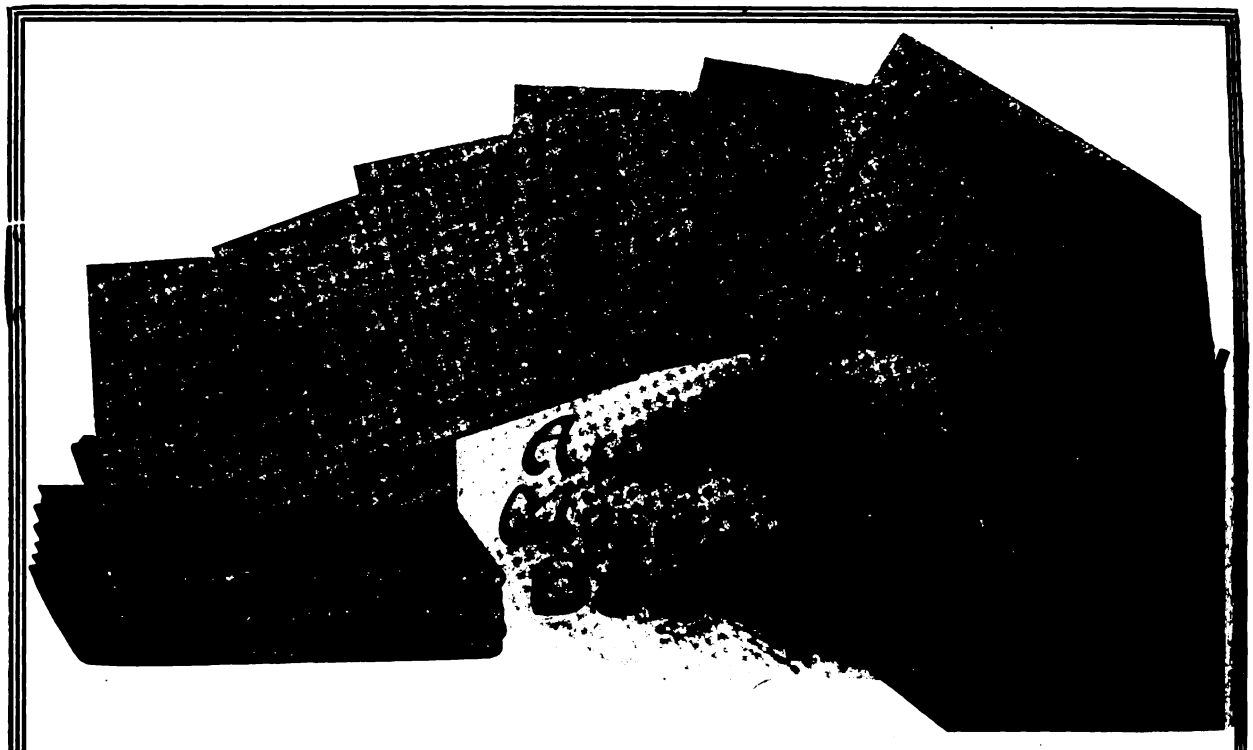
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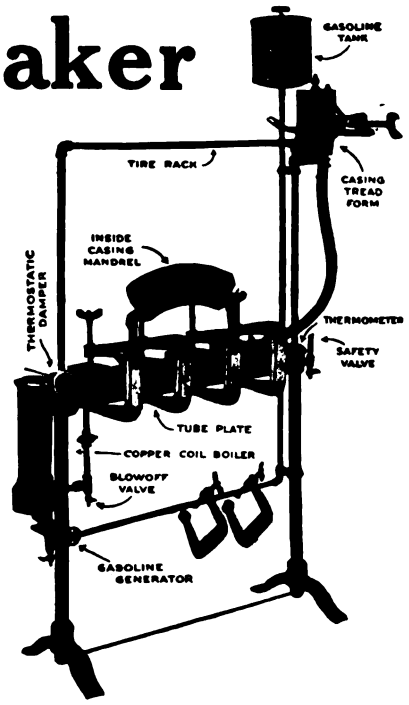
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Give your customers complete service. Don't force them to take their tire work to your competitor.

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Will do every kind of vulcanizing that you will want to handle—tube punctures to casing blow-outs. Handles six tubes as quickly as one. Casings are repaired by the approved wrapped tread process adopted by tire manufacturers.

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Other vulcanizers for every requirement

There's a Shaler for every requirement of motorist and garage, from the $2.00 Vul-Kit for mending tube punctures on the road, to the complete garage plant shown. Electric, steam, and alcohol heated models.

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MONOBLOC CYLINDERS *POWER AIR PUMP*
SINGLE IGNITION *CONCEALED DOOR FITTINGS*

White owners have their investment secured for years to come.

Those who do not own White Cars Should know that to purchase a car that does *not* have every one of these important features is to own a car that is *already practically obsolete.*

THE WHITE COMPANY
CLEVELAND

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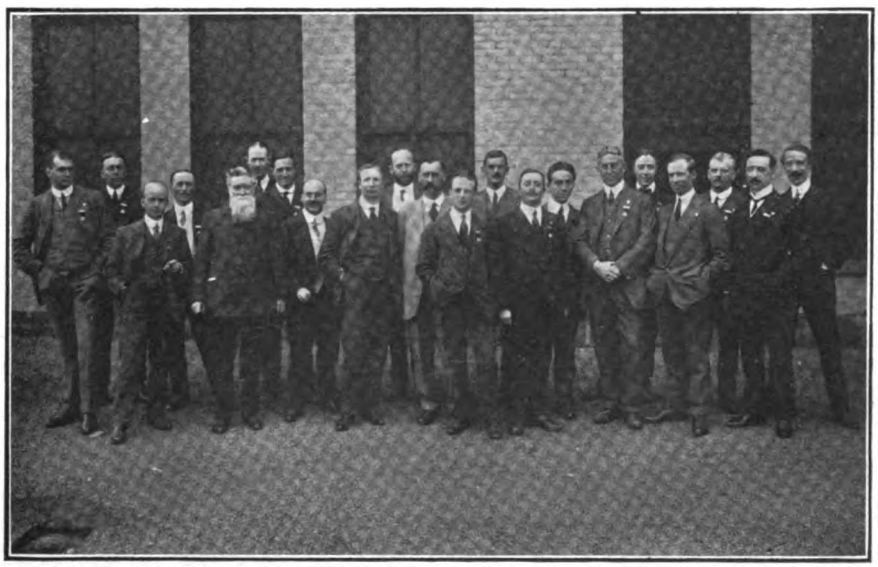
THE AUTOMOBILE JOURNAL

VOL. XXXV, No. 9 JUNE 10, 1913 Price, $1.00 the Year

BRITISH-AMERICAN ENGINEERS' MEETING.

Joint Convention of Representative Bodies in the Two Countries Proves an Important Event in History of the Industry—Visitors Include Men Well Known on Both Sides of the Atlantic—The Tour of Inspection.

"YOU are the most hospitable nation in the world," declared President T. B. Browne of the Institute of Automobile Engineers of Great Britain at the banquet tendered the members of that organization now in this country by the Society of Automobile Engineers in Detroit, the evening of June 3. But although the visitors had been entertained in various cities since May 26 and were to visit still other cities there remained the midsummer meeting of the American society on board ship from Detroit to Sault Ste. Marie and Mackinac island. There were some 600 engineers in the party, and upon its return to Detroit Saturday afternoon the last vestige of doubt as to American hospitality had been dispelled.



Members of Institute of Automobile Engineers of Great Britain at Automobile Club of America Soon After Their Arrival in This Country.

In many respects this has been one of the most notable incidents in the history of the automobile industry. It has afforded opportunity for an exchange of opinions and business methods. It is unfortunate that space does not permit the presentation of a detailed report of the trip and the meeting. Much that will prove of lasting benefit to the industry both in America and Great Britain has transpired during the past two weeks.

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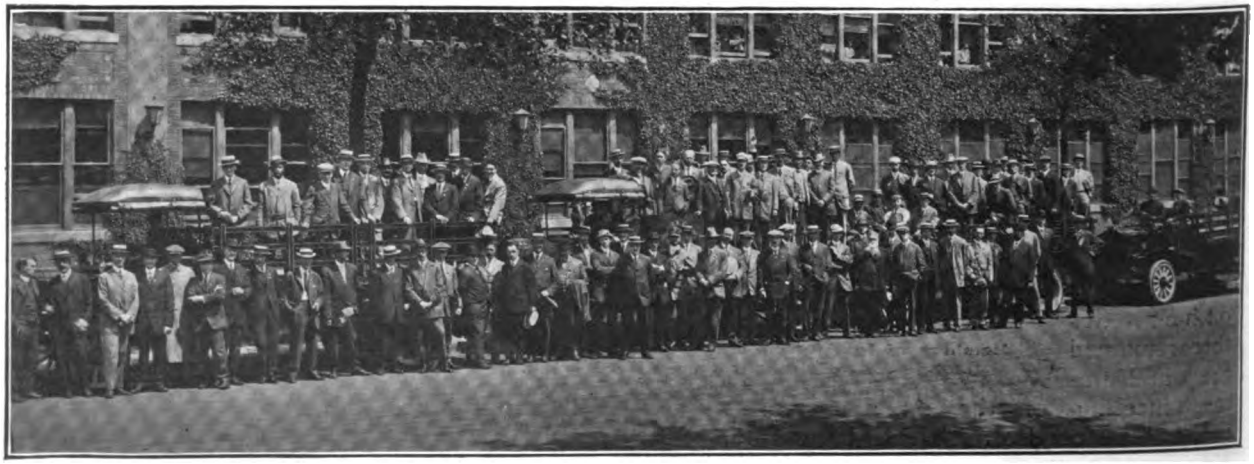
Representatives of the American and British Engineers During Their Visit to the Factory of the Ford Motor Company in Detroit.

The British party is composed of men long identified with the production of automobiles and their accessories. Perhaps the best known among among them is the venerable J. B. Dunlop, who invented the pneumatic tire in 1887, now in his 74th year. T. B. Browne, president of the English society, is one of the pioneers in Great Britain, having been an active participant in the first 1000-mile test given an old single-cylinder horizontal engine in 1900. Secretary Basil H. Joy is almost as well known in America as many of the American engineers. Charles Wheeler is engineer for the postal department in London. E. B. Wood has devoted much time to researches in combustion, which have been followed with much interest by American carburetor manufacturers. Thomas Clarkson and C. Gilbert Moore represent the Society of Motor Manufacturers & Traders, an organization corresponding in many respects to the Automobile Chamber of Commerce in this country. The other men are quite as well known in their respective fields.

The party arrived in New York May 26, where its members were greeted by President Howard Marmon, Secretary Coker F. Clarkson and the other members of the American committee of arrangements, Chairman Arthur B. Cumner, Robert McA. Lloyd and Alden L. McMurtry. That evening the visitors were entertained at a beefsteak dinner at which Joseph Anglada presided as toastmaster.

After a day of sight-seeing in New York the second evening was spent at the regular monthly meeting of the Metropolitan Section, S. A. E., the subject being "Motor Starters." This had been selected as one which should make a special appeal to the visitors, since the motor starter has not made the same progress in Great Britain that it has enjoyed in this country. Several manufacturers placed at the disposal of the meeting sample installations and equipment and full opportunity was afforded to study the subject from every angle.

Wednesday the party left for Pittsburg, Penn., where the Carnegie-Homestead steel mills and the works of the National Tube Company in McKeesport were visited. Memorial Day the Englishmen were guests of the Indianapolis motor speedway management at the 500-mile race, and the next day the plants of the Prest-O-Lite Com-



Members of the Institute of Automobile Engineers of Great Britain and the American Society of Automobile Engineers at the Packard Plant in Detroit.

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pany and Wheeler & Schebler were inspected.

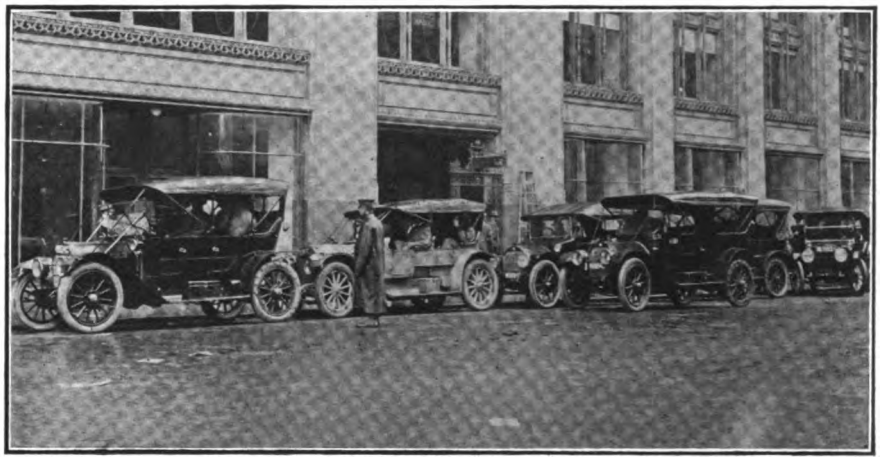
Detroit was reached Sunday morning. Monday morning was spent at the Ford factory, where cars were assembled in less than two hours. President Browne was invited to mark certain cylinder castings, etc., in the big piles and watch the progress of the work. Later, shortly after the party had finished its inspection of the plant, a car appeared in front of the office and Mr. Browne was asked to take a short ride. Upon his return to the office, the hood was lifted and his marks were disclosed to him. The next surprise came when George W. Houk, of the George W. Houk Company, Philadelphia, distributor for Rudge-Whitworth wire wheels in America, presented Secretary Joy of the English engineers with a touring car, the assembling of which he had just been witnessing. The presentation speech was made by Henry Souther, a past president of the American society. Mr. Houk resided in England for 14 years and came to know Mr. Joy very intimately. The gift was made in token of this friendship.

The entire afternoon was spent at the factory of the Cadillac Motor Car Company, where President H. M. Leland of the company explained the working of many machines which were entirely new to the British engineers. A particularly fitting compliment to the guests was the serving of afternoon tea, just before entering the testing department.

Tuesday morning was reserved for an inspection of the Packard plant, and the afternoon for the Timken axle factory. At the former luncheon was served with President H. B. Joy acting as host. In the evening the official banquet of the S. A. E. to the I. A. E. was held in the Hotel Pontchartrain. Howard Coffin, past president of the American society, who filled that position during the trip of the American engineers to Great Britain and the Continent in 1911, acted as toastmaster.

The freedom of the city was extended by Mayor Marx, after which President Marmon welcomed the guests on behalf of the S. A. E. President Browne responded for the I. A. E., in a fitting manner, recounting many of the pleasant features of the previous week and anticipating the additional pleasure to be gained by more intimate association with the American engineers at the forthcoming meeting. T. C. Pullinger of Scotland spoke concerning the matter of factory production, representing in a measure the British manufacturers, while H. M. Leland of the Cadillac company acted in a similar capacity for the American makers.

The next morning the plants of the Hudson Motor Car Company and the Continental Motor Manufacturing Company were inspected and in the afternoon the entire party embarked for the midsummer meeting on Lake Huron. Several papers were read, both by American and British engineers, some of which are presented herein, and others of which will be published in the near future. Besides the reports of committees and other routine business, plenty of time was found for social activities during the trip.



British Guests of the Metropolitan Section, S. A. E., Leaving Their Hotel for a Sight-Seeing Tour of New York City.

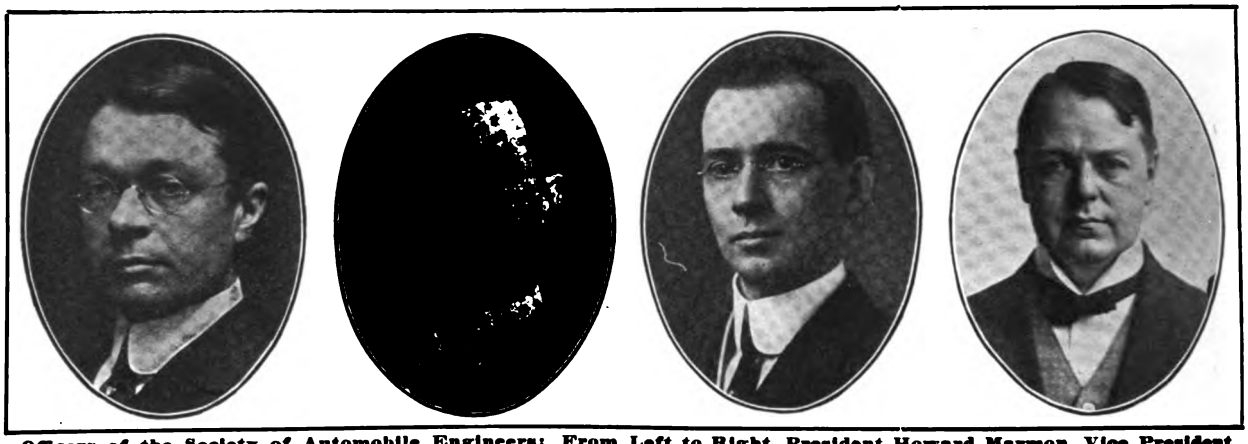
FACTORS TO BE CONSIDERED WITH PNEUMATIC TIRES.

(Extract from a paper read by Paul W. Litchfield at midsummer meeting of the Society of Automobile Engineers.)

The manufacture of pneumatic tires, an industry less than 25 years old, has grown until at the present time the value of its product in the United States alone amounts to about $150,000,000 annually. It has been the practise of automobile and vehicle builders for many years to make as nearly as possible the entire vehicle, but while the pneumatic tire is a component part of every vehicle, no manufacturer of bicycles, motorcycles or automobiles has ever successfully made his own tires, and the number of tire manufacturers has always been relatively very small compared with the volume of the industry.

About 1890 the safety bicycle and rubber tire were developed. This brought to the attention of everyone the simplicity, speed and healthful exercise to be obtained by abandoning the horse and propelling the vehicle by

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Officers of the Society of Automobile Engineers: From Left to Right, President Howard Marmon, Vice President J. G. Perrin, Vice President Russell Huff, Secretary and General Manager Coker F. Clarkson.

man power. While the horse could not call attention to the weaknesses of the vehicle which made his work harder and his progress slower, man, when he assumed the duties of the horse, began to analyze. Then began the study and development of the self-propelled vehicle industry of today. The development of the internal combustion motor and of the pneumatic tire to protect the delicate machinery from shock followed by various stages. Automobile engineers have been following largely the development of the machine, while the tire man has followed the development of the tire as a means of protecting the machine. While today the cost of rubber tire upkeep is one of the largest items of expense in the maintenance of a car, it must not be forgotten that it is the tire which is put where most of the abuse comes, which does for the car what the steel rail does for the locomotive and makes every road possible.

In a self-propelled vehicle, what are the functions of the tire? They are, first, and foremost, a cushion to protect all parts of the vehicle from the shock caused by the impact against inequalities of the road; second, to provide proper traction, avoiding unnecessary slip. These are the two main functions, and, therefore, the principal thing to be kept in mind in tire design is to satisfactorily accomplish them at as low a cost a vehicle-mile as possible, with the least possible consumption of power, and with the least amount of trouble and inconvenience to the driver and occupants. The pneumatic tire depends upon the elasticity or resiliency of a gas (i. e., air,) for its cushioning effect, while the solid tire depends upon the resiliency of a practically incompressible solid (i. e., vulcanized rubber). It is needless to say that air is the more perfect cushion and the lighter and cheaper, the cost lying only in the air container. No other solid body can compete with india rubber in acting as a cushion by being greatly distorted and recovering its original shape again repeatedly with very little fatigue.

One point regarding rubber must be carefully borne in mind, which is, that vulcanized rubber is practically incompressible; its cushioning effect is only possible by distortion and recovery, and it must be allowed by the designer plenty of room for this action. A glance at hundreds of patents on solid rubber tires shows that this point has been almost entirely ignored by inventors. Another point frequently overlooked is that the shock may come from almost any direction, owing to varying road surfaces, turning corners, running into curbstones, etc. Many tires and spring wheels carefully designed to take up blows acting directly from the ground vertically towards the rim are utterly unfit to withstand shocks in other directions.

Before selecting between the solid and pneumatic tire the weight to be carried, the speed to be attained, and the character of the road must be considered. The load to be carried can be worked out satisfactorily on either type. In a solid tire it requires a sufficient amount of properly compounded rubber, and in a pneumatic a sufficient combination of air volume and pressure contained in a suitable retainer. The character of the road and the speed have a great deal to do with the selection of type, as air being a much better cushion than rubber, allows the pneumatic to give much more efficient cushion and traction on rough roads and at higher speeds than is possible for the solid. As far as the efficiency of the vehicle is concerned the pneumatic would nearly always be chosen as the ideal tire were it not for the fact that in many cases the roads are sufficiently good and the necessary speed sufficiently slow to make the saving in cost a mile on solid tires, due to their longer life, offset the increased efficiency of the pneumatic. Again, the unreliability of the pneumatic due to injury through punctures or blowouts, making attention to it necessary at awkward places and times, often causes the selection of solid tires, as frequently occurs on pleasure electrics for ladies, fire apparatus, mail wagons, etc. In short, good roads and slow speeds are favorable conditions for solid tires; ordinary roads and high speeds for pneumatic tires. The solid tire having less cushion and less motion requires a lower percentage of pure rubber in its



Officers of the Institute of Automobile Engineers: From Left to Right, President T. B. Browne, Councillor T. C. Pullinger, Councillor Charles Wheeler, Secretary Basil H. Joy.

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composition than the pneumatic, which tends to lower tire mileage cost.

Rubber Supply.

A lowering of the price of crude rubber will tend to popularize the pneumatic tire, and it is well to bear this point in mind, as the average price of crude rubber will probably be lower each year until it reaches less than one-half its present market price. The selling price of crude rubber in the past has been fixed by supply and demand and speculation, with no reference to its cost of production, but its cultivation on a large scale is changing this condition, and it is probable that in five or six years there will be a sufficient amount of rubber to supply the demand at a cost of less than 40 cents per pound, which alone should save 33 1-3 per cent. in the cost of pneumatic tires. The danger of the rubber supply running out, which was very serious three years ago, causing rubber to advance to $3 a pound, caused successful cultivation to become an accomplished fact, which apparently solves the question of our future supply. It is hoped that the present scarcity and high price of gasoline will in a similar manner be the means of solving the question of the future motor fuel supply.

Vulcanization.

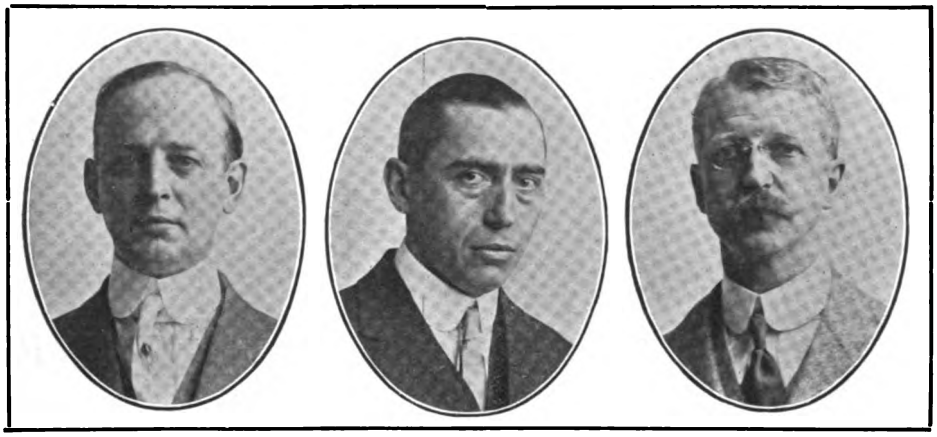
I would now like to discuss some of the differences between the principal pneumatic tires now in the market. Let us first take up the subject of vulcanization.

Vulcanization is the chemical change which is caused by the action of heat and time upon the mixture of rubber and its chemical compounding ingredients, transforming it from a plastic dough to a resilient and reacting solid. In order to get a properly vulcanized tire extreme care must be used as to the materials used in compounding, in regard to both quality and amount, and also as to time, temperature and conditions under which the vulcanization takes place. A tire revolving constantly along the road, carrying the weight of the car, and each moment changing its shape and recovering, generates a great deal of heat. This action of heat carried on for a considerable time has a tendency toward affecting the vulcanization. Therefore, all high grade guaranteed tires are usually compounded so that they take a very long time to vulcanize. This increases the cost of manufacture. Many unguaranteed tires are so compounded that they vulcanize quickly, saving from one-half to three-quarters of this time, in order to cut down the cost, but the heat generated along the road tends to overvulcanize these tires and they are apt to separate and blow out after a much shorter mileage on this account.

The three methods of vulcanizing now in use among the tire manufacturers are popularly known as: First, the one-cure wrapped tread, as examples of which may be mentioned the Fisk, Empire, Ajax and the G. & J.; second, the unit molded type, examples of which are the Republic, Goodrich, Michelin and Diamond; third, the two-cure wrapped tread, examples of which are the Firestone, Morgan & Wright and the Goodyear. Michelin and Diamond tires were formerly made by the third process, but recently have been made by the second. In the one-cure wrapped tread process the tire is completely built over an iron core, wrapped with fabric and put into an open steam boiler and vulcanized in one heat. In the unit molded process the tire is completely built upon an iron core, then put in an iron mold and vulcanized under hydraulic pressure in a press or open steam vulcanizer. In the two-cure wrapped tread process the carcass of the tire is built over an iron core and vulcanized in a mold, the same as in the unit molded type, but not entirely cured. It is then removed from the mold, buffed and cemented and the tread rubber applied and given a second vulcanization. With the Morgan & Wright and Firestone tires this second vulcanization is done while the tire still remains on the core, while in the Goodyear process the tire is inflated by means of an air bag on the rim; in either case after the tire has been cross wrapped the second cure takes place in an open steam vulcanizer. Each of these three methods of vulcanization has its enthusiastic supporters. Those who use the first two methods claim that they obtain a more perfect vulcanization. They are undoubtedly cheaper in first cost. Those manufacturers using the two-cure process believe that the vulcanization is more uniform throughout the tire and that there is sufficient increase in quality and durability of the tire produced to warrant the extra initial cost.

Fabric.

Another difference in pneumatic tires is in the style of fabric used, there being two distinct types upon the market, the close-woven fabric tire and the cord tire. Nearly all tires are of the close-woven fabric type as they are more durable, easier to repair in case of injury and can be operated at a much lower cost a mile. In driving a car considerable power is consumed by the flexing of the pneumatic tires, and it has been found that this loss can be reduced largely by using parallel cords instead of woven fabric, as much as 25 per cent. of the power sometimes being saved. The cord construction also permits greater speed and makes an easier riding tire than the square woven type. It is, however, a much more difficult tire to repair and in practise does not work out at as economical a cost a mile as the close-woven type. Its power-saving factor makes it desirable on electric vehicles, where the radius of action is limited by the capacity of the storage battery used. In a fuel economy test with a gasoline car the mileage in many cases could be increased from 15 per cent. to 20 per cent. by substituting cord tires for the square woven-fabric tires.



Members of American Committee of Arrangements: Left to Right, A. B. Cumner, Chairman; Allen L. McMurtry and Robert McA. Lloyd.

Size.

The next point to consider is the size of the tire. In the pneumatic tire the load is carried by an air cushion, and the amount of the load carried depends upon the combination of the volume and pressure of air used. For a given weight of car it follows, therefore, that the larger the volume of air in the tires the less inflation pressure required, while the smaller the tire the greater the inflation pressure necessary to carry the load.

Tires should be large enough to carry the load with very little flattening of the tire, say not over 14 per cent. of the sectional diameter at an inflation pressure which will give sufficient cushion to the vehicle. For instance, a car may be equipped with 32x3.5-inch tires and be of such a weight that it requires 90 pounds pressure in them to properly carry the load and avoid such excessive flexing of the tire walls as to cause rapid breaking down of the casing. This pressure would make the tire so rigid that the tendency would be to reduce the air pressure in order to get sufficient cushion, which would cause the tire to give short mileage. While, if a 33xfour-inch tire were used on this car, the air volume would be enough larger to permit the successful use of a lower air pressure, increasing both the cushion and the durability of the casing.

The inflation pressure which you see embossed on

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the casings are the pressures which the tire manufacturers recommend as necessary when carrying the maximum load for which the tire is guaranteed. There is always a certain amount of leaking of the air through either the pores of the rubber or through the valve connections, which causes the inflation pressure in the tire to be greatly reduced. It is frequently the case that a 32x3.5-inch tire will start out with 70 pounds air pressure and not be reinflated until the pressure is down to less than half this amount. Needless to say, the volume of air being constant, the ability of the tire to properly carry the load is reduced constantly as the pressure decreases. This shows the necessity of frequently testing the pressure with a gauge and keeping the tire up to the required pressure.

Whatever effort the tire manufacturer makes to put mileage into a tire is of no value unless the air pressure is maintained by the user. The extra power consumed by the use of the larger tire is so small as to be a negligible quantity in present day cars. It is also to be noted that the larger the cross section of the casing the greater the amount of tire wall which comes into action, which reduces the fatigue of the rubber and fabric and lengthens the mileage which the casing will give.

Fillers.

The use of tire fillers is another question which has commanded the attention of automobilists, owing to the extensive advertising carried on by tire filler companies during the past year. A pneumatic tire casing is designed for use with compressed air; when it receives a blow or shock from an obstruction in the road, the blow is distributed all over the casing, owing to the support of the perfectly fluid air cushion behind it, the tire absorbing the blow, turning it aside, with very little injury to the casing, except in very severe instances. When a filler is used the blow is localized in the immediate proximity of the point at which it is received, and the strain falls in one place, thereby weakening the tire. Constant repetition of these blows causes the casing to gradually disintegrate and wear out. The fillers add considerably to the weight of the car, require a great deal more power to drive the car, and do not absorb the shocks to nearly the same extent as is the case of air. Air retains its resiliency and is as perfect after being in use a year as when put originally into the tire, whereas the original maximum resiliency of a tire filler decreases gradually. The detrimental effect of the fillers was shown by the withdrawal of the tire guarantees as well as car guarantees by nearly all the principal manufacturers when tire fillers are used.

Another disadvantage of the filler is that as the casing stretches the filler, being a solid body, does not follow up the casing with a constant pressure, whereas air, being a gas, maintains its pressure continually, regardless of the flexing and stretching of the casing. The casing cannot carry the load for any considerable period without the required pressure in the case of a tire filler any more than it can with air. Substitutes for air other than solids have been used, especially different forms of gas. The use of these various gases as proper means of inflation has been questioned by the tire manufacturers, not because they are chemically injurious to the rubber, but because they filter through the walls of the inner tube much more rapidly than air, consequently reducing the inflation pressure.

Carbonic acid gas at usual riding temperature will leak through the walls of the inner tube many times faster than air. It has even been demonstrated that with air, the oxygen seeps out much faster than the nitrogen. The disadvantage of the carbonic-acid-gas-inflated tire is that the user does not realize how fast the pressure is reduced and does not restore it quickly enough. When sufficient care is used and the inflation pressure is frequently tested, there is no reason why carbonic acid gas should not be as satisfactory as air.

Rims.

Before closing I would like to touch upon the subject of rims for pneumatic tires, as it is of the greatest importance to the tire that it be fixed upon a properly designed rim. With clincher tires especially the exact contour of the hooks is of great importance, as it takes only a very litle variation from the standard to completely ruin the tire. The proper design for the width between clinches on a clincher tire has been standardized at 60 per cent. of the nominal cross section of the tire. It is the writer's opinion that the proper dimension for the width at the heel of the bead for the straight-side wired-on tire is 66 2-3 per cent. of the nominal cross-section of the tire, flaring outward from the heel of the bead. The less the required flexing of the casing when the tire is overloaded or insufficiently inflated, and the larger the supporting surface given by the rim to the tire where the flexing occurs, the less the tendency toward rim-cutting. The ideal rim would give continuous support to the tire, especially where the tire leaves the rim on the sides. Split and open side rings should be avoided as far as possible. When split rims are used it is also absolutely necessary that they be in perfect alignment.

CALCULATING DEPRECIATION OF COMMERCIAL MOTORS.

(Paper read by Charles Wheeler, member of the council, Institute of Automobile Engineers, Great Britain, at midsummer meeting of the Society of Automobile Engineers.)

Depreciation has been defined as the diminution which takes place in the value of a wasting asset in spite of the amount expended on it in repairs, and there is no doubt that in assessing the diminution in value of commercial vehicles something more than the application of definite accountancy principles is necessary. This is probably true as applied to all factory accounting, which in effect is dissection as opposed to combination, the usual operation of commercial accounting.

If exception be taken to this short paper on the ground that the subject treated is more of a commercial than of an engineering character, I would point out that the scientific keeping of accounts connected with automobile production and the running of automobiles is of vast importance, and necessitates expert engineering advice in nearly all departments. In fact, the engineering head must not only know what cost he is "up against" on the score of depreciation, but he must have a big voice in the determination of the governing factors.

The first factor to be considered is the estimated "working-life" of the automobile, and this depends very largely on the particular circumstances in which the vehicle is used. Thus a Maudslay motor 'bus runs some 700 miles a week, while a Maudslay stores van averages say 140 miles a week. Obviously, other things being equal, the length of the "working-life" must be considerably in favor of the stores van. The "working-life" also depends upon the quality of the vehicle, i. e., quality in design and manufacture, and is thus closely connected with the initial cost. The "working-life" further depends upon the condition in which the vehicle is maintained, and this in turn depends upon the driving and supervision, and the amount spent on renewals.

Having decided upon an estimated "working-life" L, the next step is to consider by what method the initial cost should be spread over the period decided upon—in other words how the depreciation should be written off year by year. Three methods at least warrant consideration, namely:

1. To divide the capital outlay C by the number of years at which the "working-life" L is estimated and charge the quotient against each year's working costs.

2. In the first year to write off a high percentage of the cost; in the second and succeeding years to write off the same percentage on the diminished value, that is, the balance left after deducting the previous year's depreciation.

3. To divide the capital outlay C, less residual value, R, (that is, the estimated value of the vehicle at the end of its "working-life") by the number of years, etc.

In each method, renewals and repairs, as they occur, are charged against "general running expenses." The first method cannot of course be recommended where any degree of accuracy is required. The second method is perhaps financially the soundest if it be desired to ascertain from one's books the actual realizable value of the vehicle at any moment. Although this method gives a fairly true result in the end, it has the objection that in its earlier years the cost of the service is overloaded.

The third method, expressed by the formula $\frac{C-R}{L}$, where C = capital outlay, R = residual value, and L = the estimated years of life, is that recommended as be-

(Continued on Page 70.)

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NEW PAIGE FACTORY.

Modern Building to Be Erected to House Entire Organization of the Company.

Plans are ready for operations on the new plant of the Paige-Detroit Motor Car Company, Detroit, maker of Paige cars, which is to be of the most modern construction and complete with every requirement for the latest efficiency methods in manufacturing. The total floor space will be 225,000 feet and the new machinery will be of special design for the production of car parts of the utmost precision and with the greatest economy.

Large sized presses, planers, boring machines, drilling machines and automatic lathes will be installed. The buildings will be of reinforced concrete and will be in the form of a large H, containing space sufficient to house the company's entire organization. Practically all of the wall surface will be of glass, except for the supporting piers into which the steel sash are to be set. Ribbed glass will be used on the front, which will face the west, diminishing the glare of the sun and at the same time admitting all the light. Plain glass will be used on the east side.

To the personnel of the Paige company is ascribed its rapid rise to success, which makes the new plant necessary. The organization includes the following well known Detroit business men: Harry M. Jewett, E. H. Jewett, Gilbert W. Lee, William B. Cady, C. B. Warren, Charles H. Hodges, E. D. Stair, Sherman L. Depew and Willis E. Buhl. H. M. Jewett is president. James F. Bourquin is general manager and Henry Krohn is sales manager.

SECURES LARGE ORDER.

Heinze Electric Company Is Enjoying Good Business—Branch Canadian Plant.

The Heinze Electric Company, Lowell, Mass., which is establishing a factory at Walkersville, Ont., to care for its Canadian trade, thus allowing the Lowell plant to be the headquarters for the trade in the United States, has closed a contract with the Ford Motor Company, Detroit, maker of Ford cars, to furnish electric coils for Ford machines. The contract is understood to be for a figure in excess of $1,000,000.

This will mean the operation of the Heinze company's three factories at Lowell on a day and night basis for many months. Over 500 skilled workmen are employed and the company is enjoying remarkable prosperity. The officials of the concern are: President, Paul Butler; treasurer, Col. Butler Ames; assistant treasurer and clerk, Joseph A. Legare. Recently the latter resigned his position of postmaster of Lowell to devote his entire time to the rapidly growing business of the Heinze company.

WEBER IS GENERAL MANAGER.

Will Take Charge of the Production of New Vaughan Six-Cylinder Car.

As announced recently, the Vaughan Car Company has been organized to resume the production of Vaughan cars in the old factory of Wyckoff, Church & Partridge, Inc., at Kingston, N. Y. The following officers have been elected: President, A. B. Cordner; vice president and general manager, Orlando Weber; treasurer, H. W. Johns; secretary and sales manager, Ernest S. Partridge; consulting engineer, Chester Griswold; directors, Britton N. Bush of Hollins & Co., banker; Howard Dickinson, Kearney & Dickinson, lawyer; William Swan, capitalist; George A. Ellis, Booth & Ellis, lawyer; H. Walter Webb, capitalist; Orlando Weber, A. B. Cordner, Equitable Life Assurance Company; H. W. Johns, capitalist; Chester Griswold, E. S. Partridge.



Orlando Weber, General Manager Vaughan Car Company.

By the election of Orlando Weber as vice president and general manager the company secures the services of a man of long experience in the automobile business. Since its inception he has been most active in both the manufacturing and sales departments of the business. He will make his headquarters at Kingston and will be in direct charge of the new undertaking.

It is understood that plans have been made

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for the production of 500 machines for the 1914 season, and that these will be designed to meet the demand for a popular priced six-cylinder car. The bodies are to be from specifications supplied by one of the leading body builders in America.

BECOMES GENERAL MANAGER.

A. G. Seiberling Wins Deserved Promotion with Haynes Automobile Company.

The most recent appointment announced by the Haynes Automobile Company, Kokomo, Ind., maker of Haynes cars, is that of A. G. Seiberling as general manager of the company to succeed C. B. Warren. Since October, 1912, Mr. Seiberling has been connected with the Haynes concern as factory manager and he assumed his new duties June 1.



A. G. Seiberling, General Manager, Haynes Automobile Company.

His executive ability has been demonstrated in various lines of endeavor extending over a period of 25 years. He was born at Akron, O., the home of the automobile tire and accessory industry, and after becoming familiar with the products of that city he removed to Kokomo in 1887 to take a position in the bookkeping and purchasing departments of the Kokomo Strawboard Company. Six months later he was appointed treasurer and purchasing agent of the Diamond Plate Glass Company, an office he held until 1895, when the company was absorbed by the Pittsburg Plate Glass Company, Pittsburg, Penn., Mr. Seiberling then becoming identified with the parent concern, as general purchasing agent with headquarters at Pittsburg. He next became interested in the rubber industry and moved to Peoria, Ill., where he organized the Peoria Rubber & Manufacturing Company in 1896. This concern developed into a successful enterprise and was consolidated with the American Bicycle Company in 1900.

Mr. Seiberling then became financially interested in the Great Western Plate Glass Company of Ottawa, Ill., and he remained with the concern until it was sold in 1905. Returning to Kokomo he entered the automobile industry and has remained there since. His appointment to the Haynes organization is a recognition of his ability, displayed while connected in an executive capacity with various Kokomo automobile manufacturers. He is enthusiastic over the future of the Haynes company and with the prestige of the firm name he is confident that the energetic campaign about to be launched will place the company in a new era of prosperity.

STOCKHOLDERS APPROVE ACTION.

Annual Meeting of United States Rubber Company Indorses Work of Directors.

At the annual meeting of the stockholders of the United States Rubber Company, held at the company's office at New Brunswick, N. S., President Samuel P. Colt presided and resolutions were adopted approving actions of the directors since the last annual election, and also an amendment changing the date of the annual meeting from the third Tuesday in May each year to the third Tuesday in March.

The directors nominated and elected unanimously were: Walter S. Ballou, E. C. Benedict, Anthony N. Brady, Samuel P. Colt, Harry E. Converse, James Deshler, James B. Ford, Frank S. Hastings, Arthur L. Kelley, Lester Leland, D. Lorne McGibbon, Raymond B. Price, Homer E. Sawyer, Frederick M. Shepard, William H. Truesdale, Theodore N. Vail, John D. Vermeule and Elisha S. Williams.

ORGANIZE SALES COMPANY.

Harry S. Houpt and L. A. Van Patten Head New Concern in New York City.

Harry S. Houpt, formerly general sales manager of the American Locomotive Company, New York City, maker of Alco machines, has organized the Henry S. Houpt Company for the sale of Lozier cars in that district. The Lozier Motor Company, Detroit, has maintained a sales branch in New York for a number of years, but it is announced that this will be abandoned in the immediate future.

Mr. Houpt has long been identified with the industry, having taken charge of the sale of the Thomas line in the earlier days. About two

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months ago he resigned from the American Locomotive Company to become vice president of a large elevator company in New York. Mr. Van Patten, who will be vice president and sales manager of the new concern, formerly was advertising manager for the Alco.

SELLING HARRIS OILS.

A. W. Harris Oil Company of Providence, R. I., Wins Two Legal Actions.

The A. W. Harris Oil Company, Providence, R. I., maker of Harris automobile lubricants, has recently conducted successfully two suits against others alleging infringement of its trade mark and the improper use of the name Harris in connection with the oil business. The defendants were James C. Harris, doing business as the Harris Oil Company, Muncie, Ind., and the Parker Refining Company.

In prosecuting these actions the A. W. Harris Oil Company maintained that it had been using the name Harris in connection with the oil business since 1885, and that the name had acquired a reputation here and abroad as denoting oils prepared by the A. W. Harris Oil Company of Providence, R. I. Injunctions were desired in each instance.

The United States court in Indiana has enjoined James C. Harris, his agents or associates, from the use of the name Harris or Harris Oil Company, in connection with the business of selling oils or in advertisements, unless preceded by "James C." and followed by "of Muncie, Ind.," in the same size and style of type, and unless accompanied by some statement showing that the oils sold are not the original oils of the A. W. Harris Oil Company. The defendant also is enjoined from the use of containers similar to those of the plaintiff.

The United States court in Ohio issued a perpetual injunction against the Parker Refining Company prohibiting the use of the name Harris in connection with the sale of oils or its use in advertisements or on labels, or the use of a word of similar sound or appearance.

INCREASES CAPITAL STOCK.

Fisher Body Company Secures Funds with Which to Erect Buildings.

Large extensions to the plant of the Fisher Body Company, Detroit, are to be made following the recent action of the company in increasing its capital stock from $50,000 to $1,600,000. The additional capital gives the Fisher company $1,100,000 of common stock, of which $800,000 is paid in, and $500,000 of preferred stock, $100,000 of which has been sold, while subscriptions are being received for $400,000.

A portion of the funds derived from the sale of new stock will be employed in completing and equipping with machinery the six-story factory building of mill construction which the company started last year at Harper avenue and Hastings street. This building will afford additional space for the limousine and closed body branch of the plant.

A second new building, five stories high, will be erected on Piquette avenue, equipped to give space for extension of the open body business.

WAGNER WITH AJAX TIRES.

Well Known Advertising Man Becomes Vice President of the Company.

Fred J. Wagner, who has long been identified with the automobile industry in various capacities, has been elected vice president of the Ajax-Grieb Rubber Company, New York City, maker of Ajax tires. Recently Mr. Wagner retired from Horseless Age, in which he was a part owner, and this announcement comes somewhat in the nature of a surprise.

Mr. Wagner's first connection with the automobile business was as advertising director for trade publications, in which work he has enjoyed decided success. Later he became identified with the contest board and has officiated as starter in a large number of the more important events. His many friends will wish him the same measure of success in his new venture.

SEPARATE ACCESSORY SHOW.

National Association Considering the Possibilities for Next Year.

The Motor & Accessory Manufacturers has under consideration the question as to whether or not the interests of the automobile motor and parts producers would best be conserved by a separate show in Madison Square Garden, or by participating with the car builders in the display at Grand Central Palace, New York City. It is possible that motorcycle and motorcycle parts makers will be invited to co-operate with this organization in case the decision is in favor of the former proposition.

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NEW HIGHWAY POLICY.

New York Commissioner Rules Against Changes in Original Specifications.

John N. Carlisle, New York state commissioner of highways, has issued a statement in which he makes clear his stand with reference to strict contract regulation of highway work, and declares he will approve of no more special agreements on highway improvement which include items not provided for in the original contract. This method of charging contracts, which was held, in the last analysis, to amount to the giving of an entirely new contract without competitive bidding, has been a matter for considerable criticism in the past.

Another ruling by Mr. Carlisle sets forth that no allowance will be made by his department for construction in incorporated villages and towns except the amount necessary to lay a pavement 16 feet wide of a type of construction that prevails on each side of the village or city. Heretofore, money that has been appropriated for the improvement of highways has been used for paving streets in smaller cities and towns. In the future, any locality desiring a better type of paving than that provided in the contract will be obliged to pay the entire expense, less the cost of state construction of a roadway according to the contract specifications.

A HOME-MADE FILTER.

Chas. E. Miller Makes Practical Suggestion for Saving in Oil Expense.

Chas. E. Miller, accessory and supply dealer of 97-103 Reade street, New York City, gives some interesting advice to motorists on the handling and conservation of lubricating oils. "In the home workshop," he says, "and especially where there is an automobile to be taken care of, much valuable lubricating oil must be thrown away when it becomes too dirty or gummy for further use, and yet the quantity is not sufficient to warrant the purchase of an oil filter. Practically all of the wasted oil could be saved and made as good as new by the use of an inexpensive home-made filter.

"Consider the Ward method as suggested in Oildom, which consists of a six by eight-inch glass battery jar, or other suitable vessel provided with a wooden cover having a large circular opening in the middle. Into this opening is fitted a cone made of wire gauze or mosquito netting, held in place by a few carpet tacks. When placed over the jar this serves as a support for a paper filter cone, which for ordinary grades of machine oil is best made up of two thicknesses of ordinary light brown manila wrapping paper, folded carefully so as to avoid tearing.

"After the dirty oil is placed in the paper cone it takes some little time for the filtered oil to begin to drip through, but it will be found that if the apparatus is left to itself for a few days, a surprising amount of clean, pure oil will accumulate in the glass jar. By the use of paper of a suitable texture, even the hopelessly black and gritty oil wrung out from the waste with which the engine drip pans are mopped up, may thus be purified for further usefulness."

ARMY MEN ON TOUR.

Soldiers from Fort Benjamin Harrison in Transcontinental Event.

The tour committee of the Indiana Automobile Manufacturers' Association has enlisted the assistance of the soldiers at Fort Benjamin Harrison, Ind., in looking after the commissary details for its transcontinental tour, which is scheduled to start from Indianapolis, July 1, with San Francisco as its objective point. The committee had little trouble in securing this concession from the commandant of the fort, particularly as it is expected that several motor trucks will accompany the tourists. The army men are very much interested in this feature of the event and will study the adaptability of the motor transport in this work.

At least three trucks will be used entirely by the commissary department for the transportation of food, cooking utensils, etc., these being under the direct charge of the soldiers. In addition, trucks will be utilized for the transportation of gasoline, water and oil for emergency uses in the sparsely settled districts, and still others will be required to carry the wireless telegraphy instruments. It is anticipated that this feature of the tour will be one of the most valuable in many respects, and it is not at all surprising that the army men should have been glad to lend their assistance in this manner.

The Long Island Automobile Club, Brooklyn, N. Y., Charles Herman, president, has purchased a site for an $85,000 club house fronting on Eastern Parkway, opposite the Brooklyn Museum of Arts and Sciences. The proposed building will include a large assembly hall.

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NEW AND NOVEL ACCESSORIES THAT APPEAL TO MOTORISTS.

Leak-Proof Piston Ring.

Much of the poor compression existing in motors is due to worn and consequently poor fitting piston rings. This results in lost power and the lubricant works up into the combustion chamber, creating carbon as well as causing ignition trouble through dirty or fouled spark plugs. These troubles are overcome in the Leak-Proof piston rings, so named because their mechanical construction is such that the gases cannot pass between the slots. There are two of these members, but they may be said to be practically sealed in that the mixture cannot escape on the compression stroke. The tension of the ring is even throughout, preventing wear of the cylinder walls at any one place as well as scoring. The rings are constructed in sizes to meet all requirements and it is not necessary to make any alterations to the piston. The Leak-Proof rings are marketed by the Motor Parts Company, 185-7 Columbus avenue, Boston, and 818 North Broad street, Philadelphia.

Crowe Master Vibrator.

The Lisle Manufacturing Company, 123 Main street, Clarinda, Ia., is marketing the Crowe master vibrator, which differs from those of usual construction in that it is non-adjustable. It is designed for model T Ford automobiles and is noticeable for its compactness and neat design, being but 2.5 inches in diameter. The company points out that the non-adjustable feature is important in that the vibrator always delivers the same hot spark and that the unit does not require any attention whatsoever after installation. Although designed to be utilized in connection with the flywheel magneto it can be operated as successfully when the source of current supply is dry cells or a storage battery. The Crowe vibrator is constructed of high grade material and the workmanship is first class in every respect.

McNutt Automatic Closing Can.

The McNutt Non-Explosive Can Company, 352 Pearl street, New York City, is manufacturing the McNutt automatic closing can, which is produced in five and 10-gallon types. The containers are equipped with the McNutt patent safety device, which prevents explosions as well as the loss of gasoline. They are constructed of a high grade material and to withstand severe service. The company also markets self-closing fuel cans in capacities ranging from one gallon to five. They are adaptable for private and public garages.

Apco Electric Speedometer Light.

The Auto Parts Company, Providence, R. I., is marketing the Apco electric speedometer light, an inexpensive lamp which comes complete with all fittings. The light proper comprises a 3.5-inch dash bracket with a silver plated reflector and a 2.5 candlepower tungsten bulb. The bracket is mounted over the speedometer by two screws, and illuminates the dial when the circuit is closed by a switch. The latter is a pearl faced push button which is located on the heel board or in any other convenient place. A quality of the outfit is that the lamp may be maintained about 50 hours by a single dry cell. The latter is installed under the seat or in the tool box. Eight feet of double cord wire is supplied with each equipment, and complete directions accompany each light.

Olympic Electric Horn.

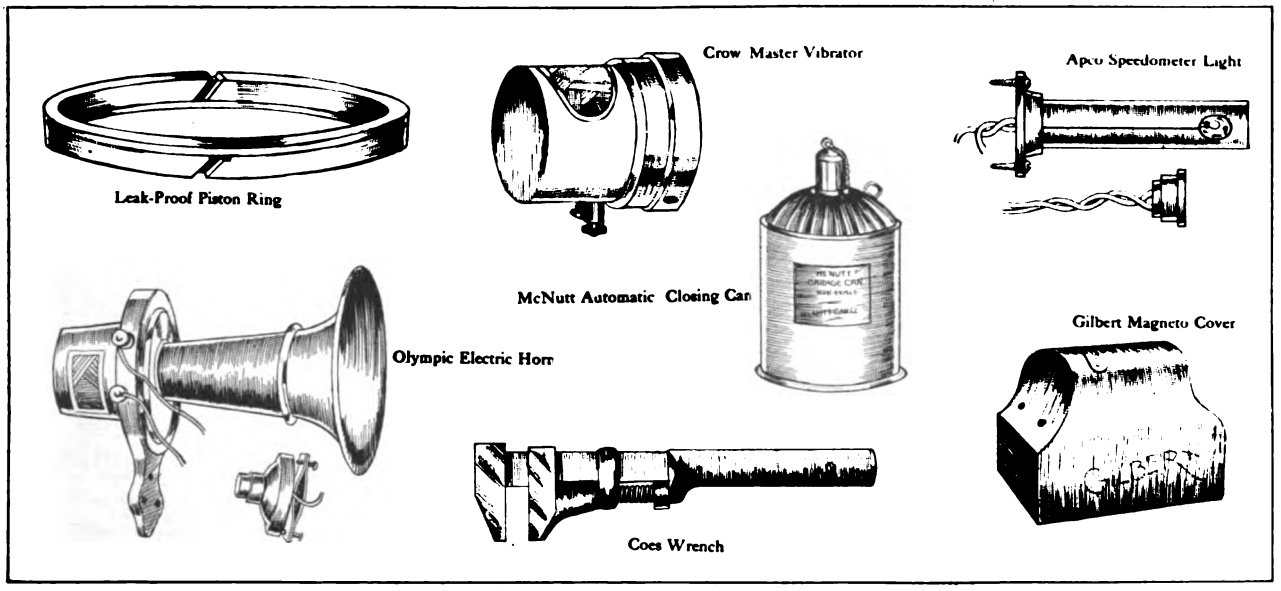
One of the latest types of moderately priced high grade electric horns is the Olympic, for which the Kolb Sales Company, 1790 Broadway, New York City, is distributor. It is of the vibrator type, but it is stated to be constructed on an entirely new principle, one eliminating all sparking and subsequent burning of the contact points. It is also held that the design is very simple and that adjustments are not required even after considerable service. Economy of current is emphasized, less than 1.25 amperes being utilized to obtain maximum efficiency. The sound is far reaching, but is free from harshness or discord. The Olympic is constructed in two styles, black enamel with nickel snare, or a metallic, brass or nickel finish. A suitable length of double cord wire and a high grade push button accompany each horn.

Coes Screw Wrench.

The Coes screw wrench, made by the Coes Wrench Company, Worcester, Mass., is a valuable addition to the tool equipment of both the owner and the garage. It is designed to withstand extra heavy service and being all metal is not subject to broken handles, etc. The bar is of steel, fully hardened and cold swaged, while the jaw is made extra heavy, of semi-steel and hardened. The screw is steel, a one-piece construction, not a screw plus a moving dowel and a hidden spring, and is provided with a polished and hardened ball race. The handle is a semi-steel casting, internally supported and retained by cross riveting, and the extension of the bar through the handle is also riveted.

Regent Breast Drill-Valve Grinder.

The Regent breast drill and valve grinder is manufactured by P. G. H. Bennet & Co., Lansdowne street, Fenway, Boston, and is a combination instrument. It is designed for the owner and repair shop and may be carried easily in the tool box of the car by removing the handles. It is furnished with a Star expansion chuck, taking drills up to .25 inch, a screw driver blade for slotted valve heads and screws, four spanner tools to fit different makes of cars, and a coil spring. The last named is fitted under the valve when grinding. One of the features of the tool is that it may be changed easily



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and quickly from a breast drill to a valve grinder or vice versa, by a simple movement of the index finger. This is accomplished by actuating a shifting trigger. By utilizing this member when grinding valves, the motion can be changed instantly to a reciprocating one of about 45 degrees.

Gilbert Magneto Cover.

It is important that the magneto be protected against foreign elements, especially road dust. The latter acts as an abrasive and unless removed subjects the working parts to undue wear. The Gilbert Manufacturing Company, New Haven, produces a variety of designs in magneto covers and carries in stock members to fit all standard types of magnetos. The covers are made in two types, a heavy sole and a patent leather. They are also made for motorcycle magnetos.

Albex Folding Goggles.

One of the qualities of the Albex folding goggles, which are made in two styles by T. A. Wilson & Co., Reading, Penn., is that they may be worn over the regular glasses without discomfort. It is held that the Albex goggles conform to the lines of the face without pressure and the bridge is of a special braid instead of the usual nose piece. They are very light, well ventilated and can be folded very compactly. Tinted, curved, circular lenses, Fieuzal glass are utilized, and it is pointed out that they admit all the light, assisting vision, while shutting out the harmful ultra-violet rays, giving all shades and colors their natural values.

Durno Motor Starter.

The Durno motor starter, marketed by the Durno Manufacturing Company, Rochester, N. Y., is of the compressed air type. It differs from the conventional air starters in that the pressure is utilized to actuate a mechanical device. The latter comprises a drum fitted to the front of the car and carrying an auxiliary shaft engaging with that of the motor. The drum carries a chain attached to a rod and connected to a piston rod of a cylinder having a four-inch bore and 12.5-inch stroke. Air is admitted to the cylinder from a pressure tank which is supplied by a four-cylinder air pump operated by the motor. Pressing a lever in the footboard of the car allows the air to flow to the cylinder member, forcing the piston backward and unwinding the chain on the drum. At the same time the auxiliary shaft is thrown into engagement with the motor shaft, spinning the latter, and it is held that the energy is imparted slowly at first. The system is provided with a night valve for the purpose of preventing escape of air when the car is not in service. A tire inflator is part of the equipment, and includes suitable length of tubing and a gauge.

Palmer Fire and Freeze Alarm.

R. P. Palmer & Co., Cincinnati, O., maker of thermometers and thermostats, has brought out an automatic fire and freeze alarm designed to give warning by a bell should the temperature rise to a fire or fall to a freezing point in the building in which the system is installed. It comprises two units, the mercury thermometer member and the signal. The former automatically closes the circuit and rings the bell in the house when the temperature falls to the freezing point or rises to that of fires. The device has a switch which can be set on fire and freeze, or fire only, the latter point being used when necessary precautions have been taken to prevent freezing. There is also a cut-out switch on the bell case. A conventional dry cell will operate the system six months and 150 feet of wire and complete instructions accompany each equipment.

Walworth Stillson Wrench.

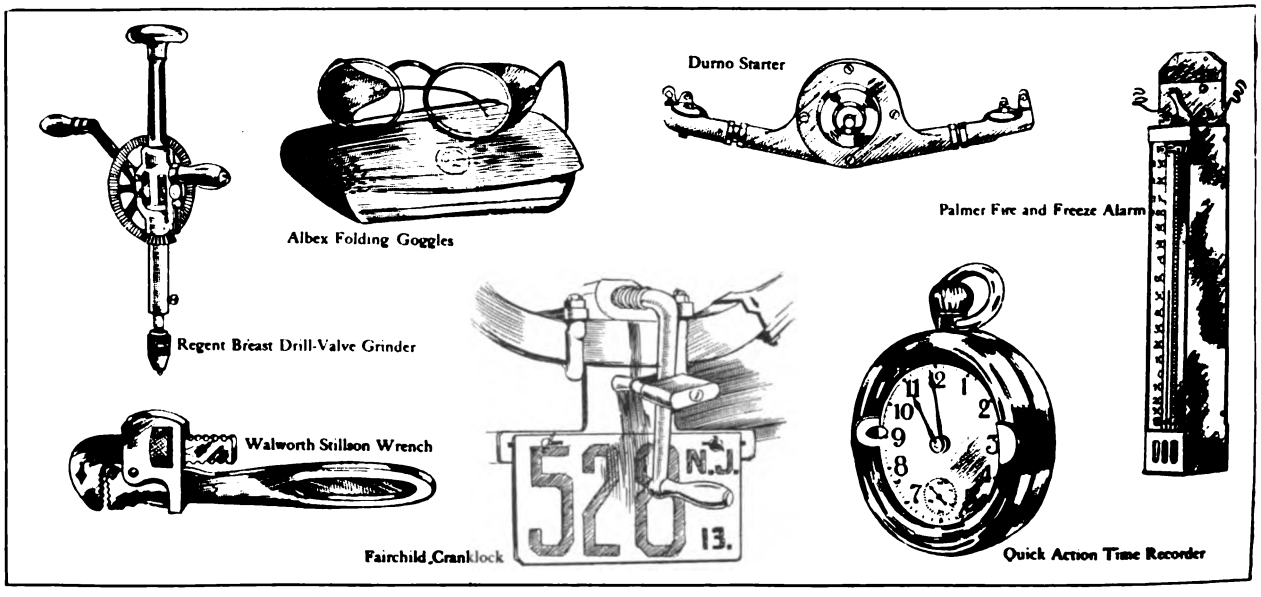
One of the most useful wrenches in the garage or tool kit is the Stillson, which comes in various sizes to meet individual requirements. These members are made by the Walworth Manufacturing Company, Boston, and that constructed especially for the motor car is the 10-inch size, which takes pipes from .125 inch to one. The wrenches are constructed of the best tool steel and are furnished in the following styles of finish: Polished, rustless black lacquer, polished nickel plated and rustless nickel plated. The company also manufactures an eight-inch automobile wrench suitable for piping up to .75 inch.

Fairchild Cranklock.

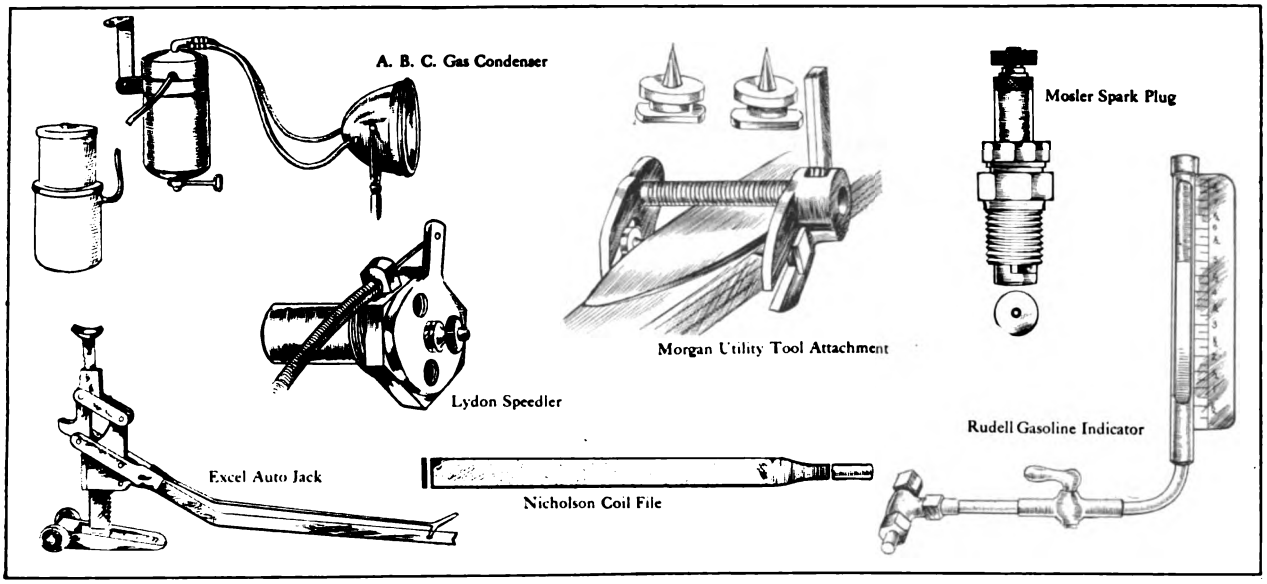
A large number of automobiles are stolen each month and the activity of motor car thieves has been responsible for the marketing of locking devices, among which is the Cranklock, manufactured by H. C. Fairchild, Maplewood, N. J. The device is simple and presents practical features in that not only is the starting crank locked securely, but also serves as a license number bracket. The Cranklock is designed for model T Ford cars and is attached to the front cross member of the frame, being retained by the usual clips. A stud or bolt projects horizontally from the vertical plate, and has an opening into which the loop of the lock is fitted. To lock the machine the starting handle is placed within the loop and the lock proper snapped into place, preventing movement of the starting handle. When not in use the lock does not interfere with the operation of the handle.

Quick Action Time Recorder.

The Quick Action time recorder and watch holder is manufactured by the Henry T. Adams Company, 6823 South Chicago avenue, Chicago, and is adapted to motor cars, motorcycles, motor boats, etc. When utilized on the automobile it is attached to the spoke of the steering wheel, although it may be fitted to the windshield, dash, coil or other convenient place. It carries two indicating hands, one for the minutes and the other for the hours, and these can be set instantly by pressing down on the watch. The markers are utilized to denote the time of leaving or when due, and serve as a reminder to the



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driver of an appointment, etc. They can also be employed to denote the time of leaving when one wishes to ascertain the time consumed on a trip. The clamp is universal and will fit any machine.

A. B. C. Gas Condenser and Purifier.

Chas. E. Miller, 97-103 Reade street, New York City, is marketing the A. B. C. gas condenser and purifier, which is a patented device for incorporating in the line between the supply of acetylene and the lamps. When a generator is utilized more or less moisture collects in the tubing and unless the fluid be removed the efficiency of the flame is impaired and sometimes a driving light cannot be obtained. The A. B. C. is a vibration gravity separator, which is guaranteed to abstract all moisture and impurities from the gas, and to prevent carbonization at the burners. It requires no adjustment, or the replacing of packing, etc., and once installed relieves the driver of the trouble of cleaning the tubing and burners. Economy of acetylene is also emphasized.

Morgan Utility Tool Attachment.

The Morgan Manufacturing Company, Newport, R. I., has brought out a new attachment for the utility tool made by this concern, it being a spring spreading or opening device. This is so arranged as to fit into the slotted portions of the utility tool and when the latter is operated the pointed members separate the leaves of the spring sufficiently to permit of cleaning and lubricating.

Mosler Spit Fire Spark Plug.

The marketing of low grade motor fuel makes it imperative that the motorist give the ignition closer attention than formerly as a hotter spark is required for starting. A spark plug is a spark plug to many owners who do not take into consideration that one adapted to the type of the engine is necessary to obtain maximum efficiency. The A. R. Mosler Company, 163 West Twenty-ninth street, New York City, electrical engineer, has developed the well known Spit Fire plug to a high degree of efficiency and it is produced in various lengths to meet the requirements of different types of motors. One of the features of the plug is the practically closed end, flat base entering the cylinder. It not only forms a compression chamber, heating the compressed mixture, but protects the sparking point from carbon or soot. The construction causes a flame of fire to be shot into the combustion chamber, fully igniting the gas.

Excel Auto Jack.

The Excel auto jack is marketed by the Excel Jack Manufacturing Company, 27 Lansdowne street, Fenway, Boston, and is designed for the private and public garage and repair shop. It is rapid and positive in action, occupies but little room and is a time saver in that it can be operated without stooping or risks to the user. It is provided with a swivel to permit of its use at any angle, and a toe is included for service where the top piece is too high. The initial adjustment is instantaneous and the jack has a lifting capacity of 6000 pounds. Its height when raised is 25 inches, when closed nine, and the weight is 35 pounds. It is made of steel, the housing being cast steel and lever a steel forging. The carriage is mounted on rollers, making for convenience and the jack lifts from either hub or axle.

Lydon Speedler.

The Lydon Speedler is the product of the Lydon Manufacturing Company, 1146 Michigan avenue, Chicago, and one of its uses is to correct or revaporize the mixture in the intake manifold. It comprises three parts, the controller, which is attached to the steering column; the sprayler, which is screwed into the intake manifold between the carburetor and the cylinders, and a flexible connection. The sprayler part has a number of suitable openings and is made in various sizes to meet the requirements of installation. The exterior portion of the device is provided with a movable shutter which uncloses and opens air inspirators or ports, and control of the shutter is by a flexible wire construction, the lever of which is mounted on the steering column. By moving the lever the size of the ports is increased or diminished to obtain the needed amount of air for creating a uniform mixture. The principle function of the Speedler is to break up and convert into a useful mixture particles of raw fuel not vaporized by the carburetor. This not only makes for economy, but provides more power, as it is possible to correct faulty operation of the carburetor without leaving the seat and when the motor is operating under a load. Starting is made easier as the low speed may be made slightly rich and compensated for by admitting more air through the ports of the Speedler. It may be used as a brake by shutting off the power and allowing cool, fresh air to pass through the cylinders. The ports may also be utilized for priming purposes.

Rudell Gasoline Indicator.

The Rudell gasoline indicator is manufactured by the Rudell Gasoline Indicator Company, Inc., 1044 South Olive street, Los Angeles, Cal. It differs from the usual gauges in that it is installed by inserting a T in the fuel line near the indicator. It operates on the gravity principle, and the maker points out that it registers accurately the amount of fuel on hand, also the quantity utilized. The indicator proper is calibrated to show half and full gallons and the height of the fuel is easily noted from the seat as the gauge is mounted on the dash.

Nicholson Coil File.

The Nicholson File Company, Providence, R. I., has brought out a file constructed especially for smoothing the platinum points of vibrators, magnetos, etc. As platinum is very expensive an ordinary file removes too much of the metal, and in addition is too clumsy to handle easily. The Nicholson file is made with a convenient handle attached and is inexpensive.

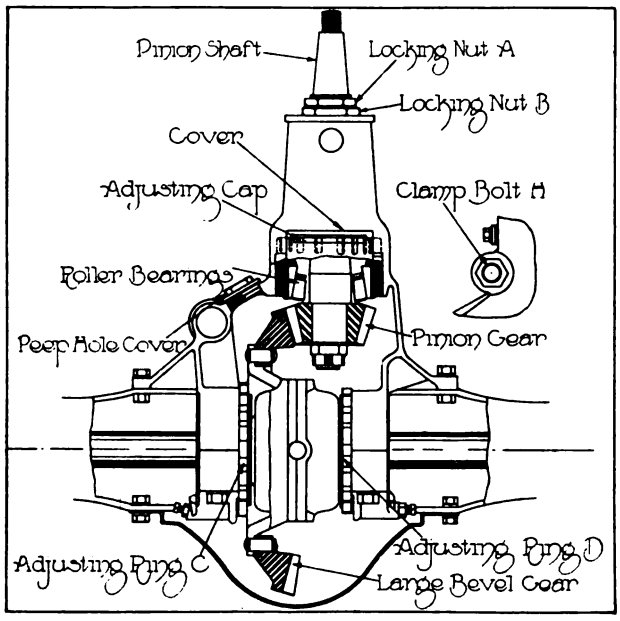
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MECHANICAL NOTES FOR OWNERS.

Eliminating Objectionable Noises in the Rear Axle---Suggestion for Keeping Tires Dry---Simple Piston Ring Clamp---Restoring Dry Cells.

THE rear axle of the modern car rarely requires attention other than that of replenishing the supply of lubricant. There are three conditions which may arise and which may make adjustment of the gears necessary, these being objectionable noise, back lash and looseness between the bearings on pinion shaft or differential.

Different constructions will require different treatment. Some designs are very accessible, while others will require considerable work to reach the components needing attention. If it becomes necessary to make a minor adjustment the details of the axle should be well studied before attempting the work and the instruction book of the maker will be of decided value.



Showing Components Utilized in Making Adjustment of Gears in Timken Type of Rear Axle.

Timken rear axles, such as shown in an accompanying illustration, are so designed that the adjustment of the gears is easily accomplished and without disassembling. Assuming that the bevels hum unduly and that one desires to eliminate the objectionable noise: The first step is to loosen the locking nut A on the pinion shaft, also the nut B. Next displace the cover, loosen the clamp bolt H and turn the slotted adjusting cap toward the left one notch and tighten up nuts B and A, taking care not to have bearings so snug that the shaft will not rotate easily. If upon trying out the car the noise is found to be diminished, but not wholly eliminated, loosen nuts A and B and rotate adjusting cap another notch and so on until the quietest point is secured. If it is found that the noise is augmented, adjust in the opposite direction. As arrows show the direction of adjustment it should be made without trouble. Upon making the final adjustment, and there is no end play to the shaft, back off nut B a quarter turn and tighten up on nut A. Bend the washer over the flat of each nut, tighten up clamp bolt H and replace cover.

To remove back lash of the gears, back off adjusting ring at D toward the differential and turn the ring at C against the bearing cap, which will move the gear toward the pinion. These rings have a right hand thread. Before turning rings, however, loosen the cap screws on the bearing cap one-half turn, after removing the locking wires. The proper amount of back lash should be approximately .005 inch, or a barely perceptible looseness. After the work is completed, make sure that the locking pins are back in the slots of the rings, that the cap screws are tight and the locking wires in place. After making adjustments care should be taken to renew the supply of lubricant and according to the directions of the maker of the car.

Looseness in bearings on the pinion shaft is eliminated by easing nut A and taking up on nut B, just enough to allow the shaft to rotate freely without end play. By backing off nut B about a quarter inch the right adjustment should be obtained. Relock nut A. If noisy gears result the same methods should be pursued as already outlined. Play in the differential bearings is removed by the adjusting rings C and D, the position of these being changed until end play is eliminated and the differential rotates freely. The cap screws and locking wires will require attention as when removing back lash. In the case of back lash resulting from the work, it may be removed as previously explained. If it be found that the gears are too far out of mesh, or new members must be fitted, set the gears with the backs flush as a starting point and follow the directions outlined above. The position of the teeth may be ascertained by removing the peep hole cover shown in the drawing.

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TIRE REST AND CAR STOP.

Tires should not be allowed to stand on moist ground as not only is the rubber affected, but the rims are likely to become rusted, creating trouble when changes must be made. A motorist having a place in the country and who keeps his machine in a building not equipped with a cement or wooden floor, contributes the following suggestion:

The building was originally constructed for other purposes, was set on posts and was not fitted with a floor. After considerable use the tires wore deep ruts, which held moisture, and after a storm the tires were kept constantly wet. I solved the problem by taking two pieces of joist about 10 by two inches and imbedding them in the ground as shown by the accompanying sketch. The joists were laid so that they were slightly higher at the front end where the front wheels rest so that the machine could be rolled out of the building with very little effort. This was done as there was not room in front to crank the motor.

With the car in the building and the doors closed there was no spare room in front or the rear, and as it was too much work to push the machine into its position, a chock was fitted to each board so that the car could be run in under its power and without danger of going through the side of the building if the brakes refused to hold. The blocks also served to denote the proper stopping place. The suggestion may be of value to your readers who have similar places in the country.

SIMPLE PISTON CLAMP.

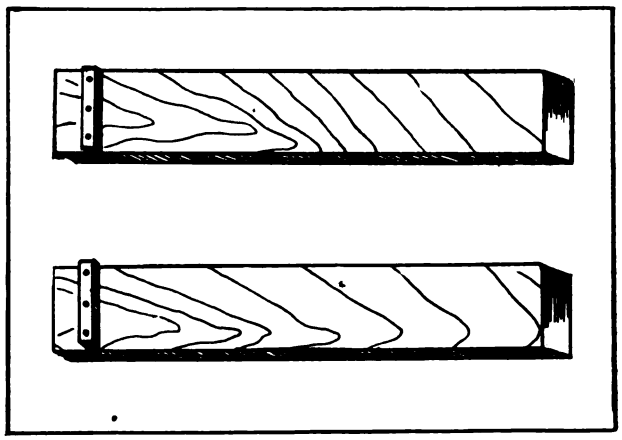
There are a number of tools, easily made and inexpensive, that can be constructed by the owner-repairman. Among them may be mentioned a piston ring clamp for holding the rings in place while the cylinder is being slipped over the piston. Assuming that the piston is 4.25 inches in diameter: Take a strip of band iron .125 inch thick, .5 inch wide and 16 long. Bend the metal into a circle, measure off 1.5 inches on each end, marking the distances. Place the ends in the vise and bend them over. This will provide extensions which may be gripped by the pliers when the clamp encircles the ring. The band should be slightly less than 4.25 inches in diameter to compress the ring fully. To use the clamp, place it over the top ring and draw the ends of the band together with a pair of pliers while an assistant slips the cylinder over the head of the piston and ring. Upon the latter being caught the pliers may be released and the clamp used on the next ring and so on.

WATER PROOFING THE WINDSHIELD.

While preparations may be purchased for rain proofing the glass windshield, a solution made from soap will serve and it is said that the raindrops will slide off and moisture will be prevented from gathering. Take a small quantity of semi-liquid or soft soap, or make a paste of ordinary soap and water, and smear a little over each side of the glass. Then with a handful of waste or with a soft cloth rub the solution evenly over the entire surface so that a fine film remains. If it is well distributed and rubbed, so that the surplus soap is removed, it cannot be detected when the screen is dry.

CLEANING TIRE COVERS.

Stained leather tire covers can be cleaned and be made to look as good as new by applying the following mixture: Pour carbon bisulphide on non-vulcanized gutta-percha, and allow it to stand 24 hours. After shaking well add more gutta-percha gradually until the solution becomes of a gelatinous consistency. Apply to leather and allow to dry about three hours. To



Suggestion from a Reader for Preserving Tires from Dampness in Garage Not Equipped with Floor.

remove gutta-percha, rub with fingers and roll off. The color is not injured in the least, only those leathers on which a dressing containing starch has been used look a little lighter in color. The dry gutta-percha can be dissolved in sulpheret of carbon and used over again.

RESTORING DRY CELLS.

Various methods are given for temporarily restoring dead dry cells, among which may be mentioned drilling through the sealing material and moistening the depolarizer with a little water and vinegar. The following hint is given by a battery concern: Take a piece of hard wood and with a light hammer drive down the material surrounding the carbon post. It is said that amperage is increased considerably by this action.

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ADJUSTING STROMBERG CARBURETORS.

TO OBTAIN efficiency and economy the motorist should have at least a practical knowledge of the carburetor fitted to his machine. Ad-

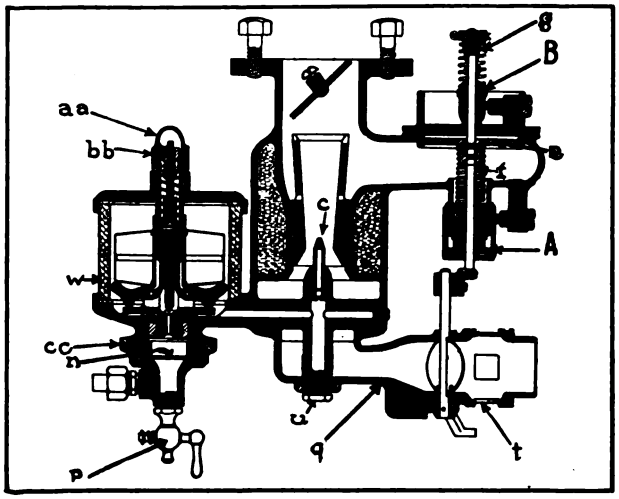


Fig. 1—Sectional View of Type A Stromberg Carburetor Showing Low Speed Adjusting Nut A and High Speed Adjusting Nut B—Type B Is Similar, Being Adjusted in the Same Manner.

mitting that the carburetor is adjusted properly when the car leaves the factory, it does not follow that the setting will not be altered by the employees of the agent in an endeavor to add to the motor's power or to increase the speed of the machine. And if the automobile was delivered late in the winter or early in the spring the mixture is likely to be rich on the low speed, a setting making for easy starting in cold weather.

An efficient mixture is one having the correct proportions of air and fuel at all motor speeds. Too much gasoline impairs the operation of the motor in that soot is deposited in the cylinders and muffler, and undesirable temperatures are created. In other words, all of the fuel is not being converted into useful energy. And with the present high price of motor fuel the cost of maintenance is increased considerably by an improperly adjusted carburetor.

The writer does not advocate tampering with the carburetor, provided it is performing its function satisfactorily and is delivering its maximum mileage to a gallon of fuel. On the other hand, one is warranted in checking up its performance and in altering the adjustments if the mileage is below normal or erratic operation of the power plant can be traced to defective carburetion. Climatic changes affect carburetion, such as high altitudes, cold and warm weather, necessitating slight augmentation or decrease in the amount of fuel or air. The effect of high altitudes is well known to the experienced motorist when touring in the mountains.

The modern carburetor rarely gives trouble after being properly set, but a number of conditions may arise on the road, such as a choked spraying nozzle, etc., and if one be familiar with the components and operation of the vaporizer, the fault may be corrected without impairing its efficiency. It is the intention of the writer to present the different types of carburetors, describing their practical side, and showing the components utilized in making adjustments. As it is not always convenient to call upon the expert to make a slight alteration, the suggestions contained herein should enable one to correct minor troubles.

Stromberg, Types A, B, C, D, G.

The Stromberg carburetors, manufactured by the Stromberg Motor Devices Company, Chicago, are made in five types, A, B, C, D, and G, respectively, and are easily distinguished from other designs by the glass float chamber. Each model is plainly marked and as the proper nozzle is fitted at the factory, instructions as to the selection of the required size will not be necessary. Types A and B are single jet carburetors, while C, D and G have double jets. By this is meant that the first named vaporizers have a single orifice through which the fuel is drawn while the others have an auxiliary jet, the function of which is to supply the necessary volume of gasoline for high motor speeds and for heavy duty work. All models have a fixed and auxiliary air inlet and are also provided with a high and low speed adjustment. In the accompanying illustrations the low speed adjusting nut is indicated by the letter A and the high by the letter B. The other components are also lettered.

Types A and B.

Types A and B differ only in that the latter is of the concentric, non-water jacketed type. As the adjustment of both is similar they will be treated as a single unit. The level of the fuel in the float chamber, Fig. 1, is important and with type A it should be about one inch from

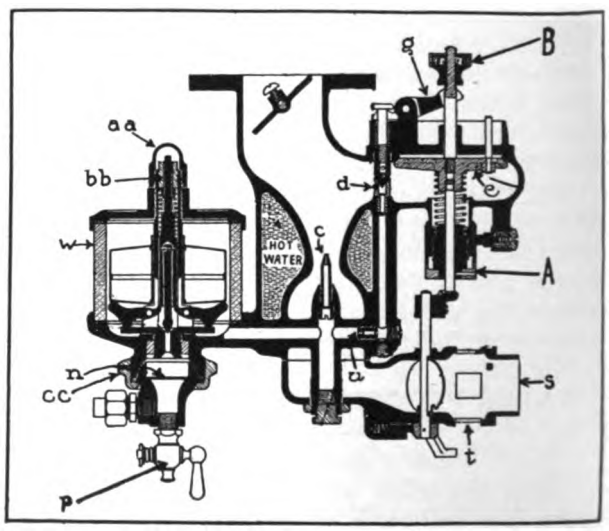


Fig. 2—Type C Stromberg Carburetor Having Auxiliary Jet for High Speeds—The Low and High Speed Adjustment Is by Nuts A and B Respectively.

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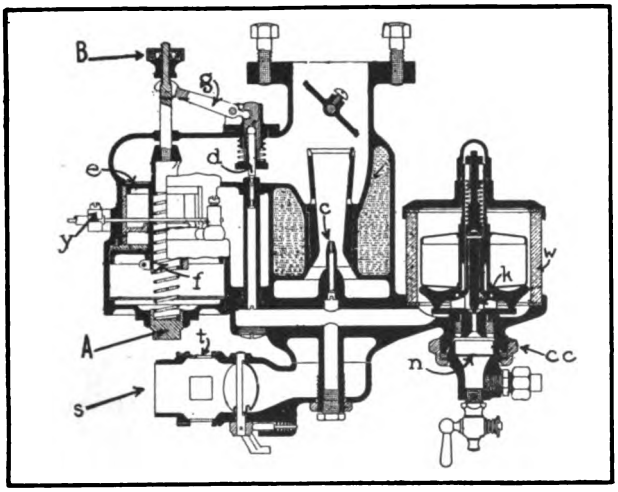


Fig. 3—Type D, Utilized with Six-Cylinder Motors and Having High Speed Adjustment Controlled by Dash or Steering Post Device.

the lower edge of the glass. The proper level with type B is .9375 inch. This level is adjusted at the factory, but if the fuel be too high, remove the dust cap a a and screw down the adjusting screw b b. If too low, screw it up.

The low speed is adjusted by the nut A, which controls the low speed spring f seating the valve e. This valve should seat lightly and care should be taken to have about .06125-inch play in the high speed spring g. By turning the nut A up or down the desired even, idle running of motor is secured. Stops are provided on the throttle valve lever, and by moving the screws in or out the desired motor speed may be obtained. The position of these screws should be taken into consideration when making low speed adjustments.

The high speed adjustment B is operated by turning the nut up to enrich the mixture and in the opposite direction to weaken it. The high speed spring g should always have at least .03125 inch play when the motor is running idle. Both the low and high speed adjusting members should be turned a notch at a time only in making adjustments. The type A carburetor is fitted with a season adjustment t, which should be open in summer and closed in cold weather. Type B is not equipped with this device.

Adjusting Type C.

The type C, Fig. 2, is designed especially for six-cylinder motors, and in addition to the usual spray nozzle c in the venturi tube, has a second jet d, which is automatically opened by the auxiliary air valve e. The second jet comes into action when the speed of the motor demands fuel in excess of the capacity of the primary nozzle. As the air valve e moves downward the auxiliary needle d is raised by a lever g, augmenting the supply of fuel proportionately to the speed of the engine. The low speed adjustment is made in the same manner as with types A and B, but it should be borne in mind that the auxiliary air valve should not operate when the motor is idling as all air should be supplied through s. The capacity of the primary or low speed nozzle is held by the maker to be ample for speeds up to 25 miles an hour. The high speed is regulated by the nut B, which should be about .09375 inch above the lever g for normal adjustment, although it may be altered to meet the requirements of the motor. Lowering the nut B brings the auxiliary or second jet into service quicker, while raising it weakens the mixture. Adjustments should be made with the spark advanced for high speeds.

Setting Type D.

The type D shown at Fig. 3 differs from those previously described in that the auxiliary air is regulated by a shutter operated by a dash or steering post control, providing adjusting means from the seat. Two nozzles are utilized, a primary c and auxiliary d. In adjusting this type the lever on the control member is moved to close the shutter around the air valve. After starting the motor, open the shutter about three-quarters way. For low speed or idle running the high speed nut B should clear the lever g about .03125 inch. The auxiliary air valve e should be on its seat. If not, loosen lock nut on A and turn up the latter until valve seats, and relock. This rarely requires attention, being set at the factory.

High motor speeds are taken care of by the auxiliary gasoline needle member d, and should the motor back fire with the shutter three-quarters open, and spark advanced and throttle open, it indicates that sufficient fuel is not being supplied by the nozzle d. This condition is not likely to exist as the proper needle is fitted at the factory. This type of carburetor presents advantages in that the control of the high speed is by means of the air valve shutter from the seat.

Adjustment of Type G.

Type G, Fig. 4, has a double jet, although it is made with a single member. It has a low speed adjustment A and high B, and these members are set as with types A and B. The dash or post control permits of weakening or enriching the mixture as may be required, and when moved to "rich" closes the fixed and auxiliary air inlets, making for easy starting in cold weather. With the lever one-third or one-half way toward "lean" a portion of the fixed air port is opened and the auxiliary partially. This enables economical operation. The control members are shown at Fig. 4 and are as follows: Fixed air inlet, s; control lever, v; rod leading to dash, e e; air shut-off for starting, r; season adjustment, t. The last named should be open in warm weather as with the other types.

It is an excellent practise occasionally to open the cock p and drain off about half a cup of fuel. Failure to strain the gasoline may result in the strainer n becoming clogged. It is accessible by loosening the coupling nut c c. In the event of accident requiring the replacement of nozzles with new members, those of types A and B are reached by removing the plug u and displacing the nozzle with a screw driver. The primary nozzles of types C, D and G are accessible in a similar manner, but the auxiliary of C is reached by removing the slotted plug in the gasoline channel opposite u. The high speed nozzle of type D is displayed at d, while the secondary nozzle j of type G is accessible by removing the slotted plug x x.

Aside from faulty ignition, which is often confounded with carburetor troubles, failure to start may be due to water in the fuel, clogged supply pipe or spraying nozzle, float too low, too much air, etc. Flooding is due to a leaky float, needle valve failing to seat, or float and its mechanism becoming stuck. Too much air is usually denoted by the motor being hard to start and by its speeding up upon closing the air valve, by the engine being slow to respond when opening the throttle, and by back firing. A lack of fuel presents similar symptoms.

Too much gasoline and not enough air is known by the motor speeding up when the air valve is opened slightly, by missing when the car is operating slowly on the level and by failing to pick up when the clutch is disengaged. The last named condition is indicative of a

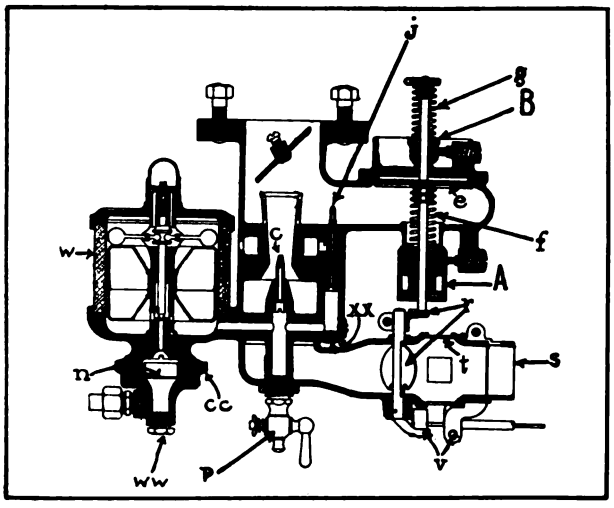


Fig. 4—Adjustment of Type G Is by Nuts A and B for Low and High Speeds and a Dash Control Is Necessary When Fitted with a Hot Air Horn.

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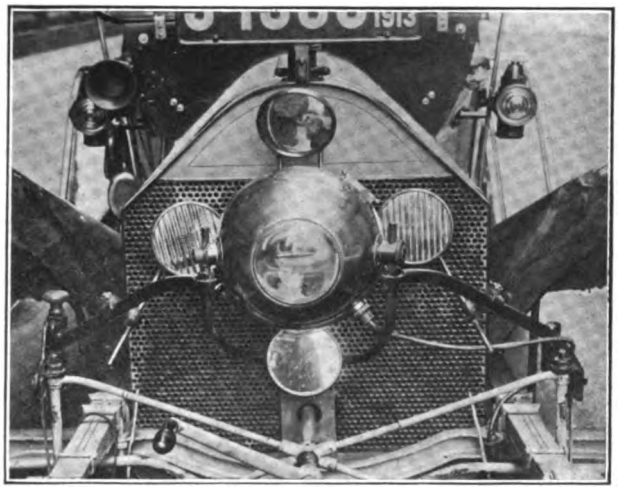
very rich mixture. If, after climbing a long grade, the motor does not respond quickly when the clutch is thrown out, or does not back fire with a rapid opening of the throttle, it may be assumed that there is too much gas or too little air. It should be remembered that warm weather has the effect of not enough air, while cold acts directly opposite.

There are two methods of noting if the mixture be correct, by the odor of the exhaust gases and by their color. If the gases are pungent or acrid, the mixture is too rich, and the fuel supply should be either cut down or the amount of air augmented. Those familiar with the adjusting of carburetors call the exhaust "sweet" when the mixture is correct. Too rich a mixture is denoted by a black smoke, which soots everything with which it comes in contact. The condition of the spark plugs will reveal to a certain extent the proportions of the air and fuel in carburetion. If covered by a black soot it may be taken for granted the mixture is rich, that gasoline is being wasted.

The test by color is by noting the flame from the exhaust through the cut-out. A blue flame denotes too much gasoline; a yellow, too much air; a red, poor quality of fuel or too much oil in the combustion chamber. A purple flame is considered indicative of the best proportions of gasoline and air.

DIVA HEADLIGHT ELIMINATES DAZZLING.

THE efficient headlight is the one that utilizes every ray of its illuminant, and concentrates all its light exactly where it is needed.



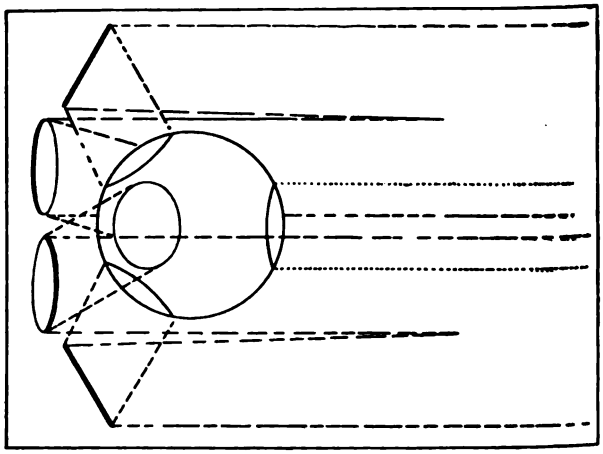
Diva Headlight, an Electrical Unit Eliminating Dazzling Effects and Projecting Powerful Parallel Beams Through Novel Use of Reflecting Mirrors.

There should be a certain width of illumination in order to cover the entire surface of the road, and to enable the driver to negotiate corners, as well as proper length and power of beam. But the most important factor to be considered is the dazzling effect and the elimination of this undesirable feature has been given serious attention abroad in headlight designs. Dazzling is caused when the light is projected from a lamp in the form of a cone, the apex of which is the lamp. These upward rays are most noticeable on foggy and misty nights, blinding the operator and making it difficult to drive except at a very slow rate of speed.

George Sumner of George Sumner, Inc., 1926 Broadway, New York City, on his recent trip abroad, made a special study of anti-dazzling lamps and secured the rights in this country for the Diva headlight, an English product, which not only presents interesting constructional features, but eliminates all glaring effects even in a fog. As will be noted by an accompanying illustration it is in the form of a sphere divided in half vertically. The front portion has one double convex lens placed in the centre of its circumference, and the back has four similar lenses, one each at the top and bottom and one at either side.

The interior of the sphere is electroplated, and in the exact centre is an electric bulb, held in position by a column which rises from a base. When the filament is heated the interior of the sphere becomes practically a ball of light, with beams streaming out from it in five different directions through the five lenses. One beam is projected directly forward from the single front lens and the other four at diverging angles from the four lenses in the rear half of the sphere. These beams, because of the dimensions and foci of the lenses, are composed of parallel rays, not those of a diverging or diffusing nature.

Every ray of light which strikes the interior reflecting surface of the sphere is reflected back to the focal centre, travels through it, and passes out of the lens opposite to that particular reflecting surface, at exactly the same angle of diver-



Showing the Searchlight Beams and How Light Is Diffused Sideways by Utilization of Fluted Mirrors.

gence as those rays which proceed direct from the illuminant to the lens. In other words, the reflected rays unite with the direct, doubling the

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intensity of each lens, making for efficiency.

The parallel or distance and penetration rays, are shown in an accompanying drawing and it will be noted that there are five circular beams but no upward rays. As a certain amount of diffused light is necessary to illuminate each side of the road, it is provided for in the Diva headlight by two special fluted mirrors which not only deflect the beams forward but outward. Thus it will be seen that there are three powerful searchlight beams—the centre lens and top and bottom mirrors—which illuminate the centre of the road, while the fluted mirrors spread their respective beams fanwise on either side.

It is held that dust or mud does not detract from the efficiency of the mirrors as the latter serve only to reflect the light, nor does the Diva impair the efficiency of the radiator as the light is spherical and the mirrors being set at an angle deflect air currents to it. As but one bulb is utilized the headlight is economical of current and makes possible an efficient lighting system with a storage battery as a source of supply. It is mounted, as will be seen by an accompanying illustration, on a gate or bracket, centrally in front of the radiator, and being a unit may be displaced easily and quickly if desired. The method of attachment is simple, the brackets supporting the gate being attached to each side of the chassis and in the majority of installations it is possible to utilize existing bolt holes. The Diva headlight is fitted to a number of high grade cars abroad, particularly in England, where fogs and mist prevail.

HANDLING THE BUICK PRODUCT.

Interesting Figures Which Indicate Business Done by Flint Concern.

The Buick Motor Company, Flint, Mich., maker of Buick cars, gives some interesting figures relative to the traffic department which handles its product. W. H. McCloud is in charge and it is estimated that the system he has worked out is saving the company $100,000 a year. Fifteen thousand cars were handled in the Buick yards during the year, inclusive of the 13 trainloads of Buick machines sent to the West. Outgoing cars numbered 7600 and incoming freight 8000 carloads.

In addition to the freight cars in service there are 22 motor trucks and 10 horse drawn vehicles in constant use. Four switch engines are kept busy all day and two at night, shunting cars and making up trains in the Buick yards. Three transfer cars are kept busy at the motor building for loading during the day, and at night they are rolled up to the dock at the assembly plant.

ESTABLISHES SERVICE STATIONS.

General Electric Company Assists Motorists in Securing Lighting Equipment.

A new departure that is expected to prove of benefit to automobile owners is the establishment of service stations all over the country by the General Electric Company, Schenectady, N. Y., where electric lamps of all types may be obtained readily.

These stations will stock with all types of lamps to suit any particular lighting system with which the car is equipped. Different systems, sometimes, call for a slightly different kind of



Signs Designating General Electric Company's Service Stations or Agents.

bulb and the variety carried by these houses will enable the selection of that which will make for the most efficient and satisfactory service. The signs shown herewith are utilized to indicate either a service station or an agent and should prove of convenience to motorists, resulting in a saving of much valuable time which might otherwise be wasted in searching for an establishment that could fill their needs.

Another example of good service rendered by the General Electric Company is that of putting up electric lamps in a compact, leatherette case. In this there are headlights, side and rear lights, fitting snugly, each lamp in a separate holder. The whole case measures only a few inches overall and takes up little room.

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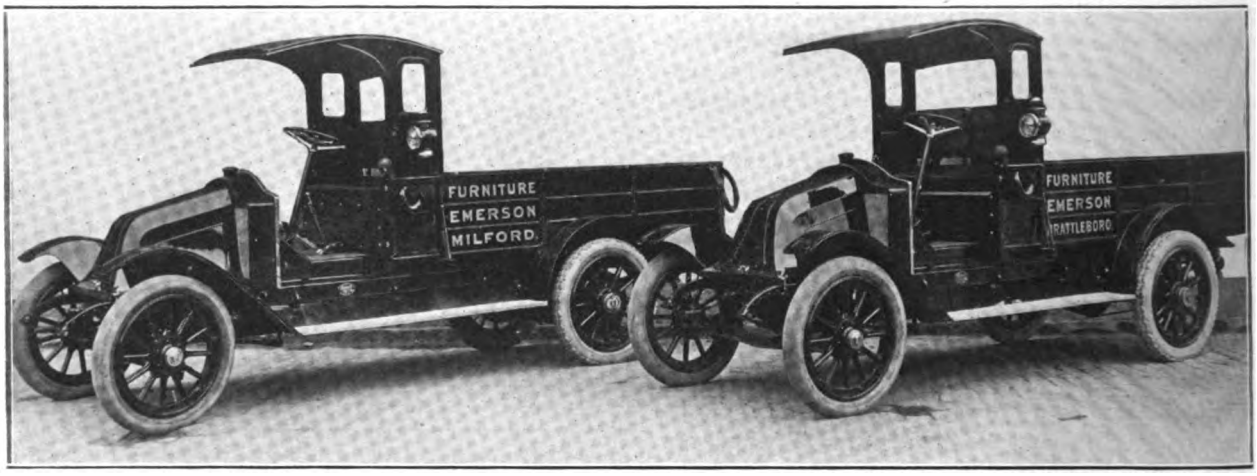
IN THE COMMERCIAL VEHICLE FIELD.

Constructional Features of Stewart Light Delivery Wagon---Text of Maine Statute Limiting Weight of Trucks---Selden One-Ton Design.

PRODUCING only one chassis design, rated at 1500 pounds, to which six types of standard body equipment are fitted, the policy of the Stewart Motor Corporation, Buffalo, N. Y., is to manufacture as high a grade machine as is possible for a price that will appeal to those who desire a thoroughly dependable vehicle. An accompanying illustration presents two of these wagons recently delivered to the Emerson Furniture Company in Brattleboro and Milford, Vt., and indicates the general appearance and characteristics of the line.

The motor is a Continental product, of the four-cylinder, water-cooled, vertical, L head type, with bore of 3.75 inches and stroke of 5.25. Under the S. A. E. rating this would give a horsepower of 22.5, but in view of a bore to stroke ratio of 1:1.40, the statement of the maker that it will develop 30 horsepower may be held to be conservative. Two plunger pumps actuated by an eccentric on the camshaft take the oil from a well in the reservoir, only filtered lubricant being used, and force it through a system of tubing to the rear main bearing and the timing gearcase. Other working parts are lubricated by splash. The water is circulated by centrifugal pump, and the radiator is of the so-called foreign type, being mounted at the dash on helical springs. Ignition is by high-tension magneto with fixed spark, and the carburetor is an automatic float feed type.

The clutch is a multiple disc in which there are 11 plates, five of these being faced on either side with Raybestos. The clutch case is integral with the transmission gearset, the latter being of the Brown-Lipe construction, affording three forward speeds and reverse. The driving shaft is of high quality steel, and there is a universal joint at either end. The rear axle is a Timken of the full floating type, and it is carried in a pressed steel housing that is strengthened by a truss. The housing is reinforced by sleeves at either end, which support the spring seats and carry the weight of the machine and its load at the wheels. The differential gears are of large proportions and are mounted on suitable Timken bearings.



Two Stewart Delivery Wagons, Built for the Emerson Furniture Company, Brattleboro and Milford, Vt.

The front axle is a heavy I section. The frame is a high carbon steel channel section, 4.5 inches deep at the centre and tapered toward either end, with wide webs. This carries the sub-frame in which is mounted the motor and transmission gearset, the supports of these units being designed to facilitate easy removal. Springs are semi-elliptic all around. The wheels are of the artillery type, and are shod with pneumatic tires, 34 by four inches front and 34 by 4.5 in the rear. The wheelbase is 126 inches.

The six standard body designs include panel, express, open box, special express, stake platform and undertaker's installation. The express body is provided with a top, the open box with a

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cape top and the special express a standing top and wire grating sides.

COMMERCE WITH GAS COMPANY.

Experience of Fort Worth Concern Indicates Better Service at Less Cost.

So well satisfied was the Fort Worth Gas Company, Fort Worth, Tex., with its initial purchase of a Commerce wagon, made by the Commerce Motor Car Company, Detroit, that it added the second vehicle of the same make at the end of three months. The repeat order was not filed until careful observation and accurate record of the work and expense had indicated a substantial saving over former methods of transportation. The first machine, a model C, is shown in an accompanying illustration.

Fort Worth and its suburbs comprise a community with a population of more than 100,000. The work of the company is widely extended and is constantly increasing. The model C was purchased as a result of a demonstration witnessed at the Dallas fair last fall, and was placed in service Nov. 7, replacing a two-horse team and a single horse and wagon. With this installation it was found that the services of two men could be dispensed with. Not only was it found possible to do the same work, but in a much more efficient manner, and the net saving was $91.65 a month. During the period of observation to April 18 the mechanical expense was $3.75, the cost of replacing a fibre ring Feb. 16. The record of the machine shows that it has been driven an average of 37.2 miles each working day at a monthly expense for oil and fuel of $9.50.

The second car is a model A, and this was placed in service Feb. 6. It is equipped with an open express body and placed at the disposal of the service department. Including the men and tools the weight is about 3000 pounds. This wagon has been driven an average of 25 miles a day, the fuel expense being $11.50 a month. The additional weight carried and the fact that it is worked over unpaved streets are assigned as reasons for the greater fuel expense. The two vehicles are doing the work for which five horses were employed formerly.



Commerce Model C Wagon in Service with Fort Worth Gas Company.

NEW LAW IN MAINE.

Weight of Vehicles Using Highways Limited to Not More Than Nine Tons.

Although similar bills have been introduced in the legislatures of several states, it appears that thus far Maine is the only commonwealth that has enacted a law limiting the weight of vehicles using the highways. In Massachusetts and New York measures having this object in view were strenuously opposed by organizations of motor truck owners and users. The text of the Maine law, which goes into effect July 11, is as follows:

Sec. 1—No traction engine, trailer, motor car or other vehicle shall be operated upon or over a highway or bridge in this state, nor shall any object be moved over or upon a highway or bridge, upon wheels, rollers or otherwise, in excess of a total weight of nine tons, including vehicle, object or contrivance and load, without first obtaining a permit, mentioned in section three of this act, from the authority or authorities in charge of the maintenance or care of said highway or bridge; nor shall any vehicle be operated or contrivance moved upon or over said highways or bridges which has any flange, rib, clamp or other object attached to its wheels or made a part thereof, which will injure, cut into or destroy the surface of the highway or bridge, nor shall any such engine, vehicle, object or contrivance for moving heavy loads be operated or moved upon or over any highway or bridge the weight of which exceeds 800 pounds upon any inch in width of the tire, roller, wheel or other object without first obtaining said permit. The owner, driver, operator or mover of any such engine, vehicle, object or contrivance over said highway or bridge, shall, unless relieved from liability in said permit, be responsible for all damage which said highway or bridge may sustain as a result of such action on his part, and the amount thereof may be recovered in an action on the case by the city, town or plantation, or in behalf of any unorganized township, by the county where the injury is done.

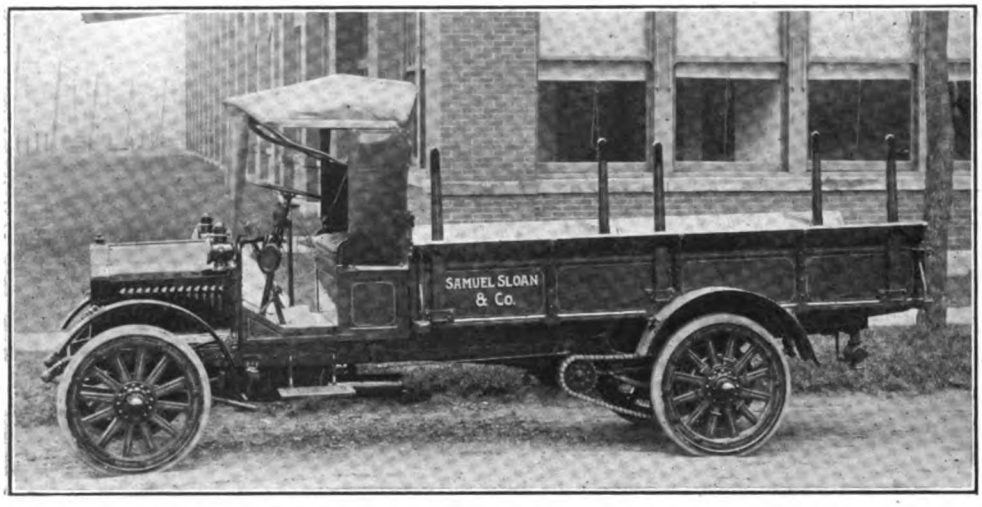
Sec. 2—No steam traction engine, with or without

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trailers, and no motor truck carrying a weight in excess of four tons, including the vehicle, shall be operated upon any highway or bridge at a rate of speed greater than 15 miles an hour; and no such vehicle carrying a weight in excess of six tons, including the vehicle, shall be operated upon any highway or bridge at a rate of speed greater than six miles an hour when such vehicle is equipped with tires of hard rubber or other similar substance.

Sec. 3—The Maine highway board, county commissioners, superintendents of streets, selectmen or road authorities having charge of the repair and maintenance of any highway or bridge in any of the cities or towns in the state, are hereby authorized, upon proper application in writing, to grant permits for the moving of heavy vehicles, loads, objects or structures over said highways and bridges, which permits, when duly granted, shall authorize such movement. Said permits may be general or may be limited as to the time and the particular roads and bridges which may be used, and may contain any special conditions or provisions which in the opinion of the authorities granting the same are necessary for the protection of said highways and bridges from injury. The authorities having charge of any such bridge are hereby authorized to make regulations limiting the rate of speed of any of the vehicles mentioned in this act passing over said bridge to a rate of speed not to exceed six miles an hour, provided notice is conspicuously posted at each end of the bridge affected by such regulation.

Sec. 4—Any person violating the provisions of this act or the regulations made or permits granted under authority thereof shall be liable to a fine of not less than $10 nor more than $500 for each and every offense, and said fines shall be paid into the treasury of the city or town when a highway or bridge is injured which is under the care of said city or town, and into the treasury of the county, in behalf of any unorganized township to be used in the repair of highways and bridges within their respective jurisdictions.



Selden One-Ton Truck in Service with Samuel Sloane & Co., Rochester, N. Y.

SELDEN ONE-TON TRUCK.

Features of Construction Which Mark This Product of the Rochester Concern.

An accompanying illustration presents a Selden one-ton delivery wagon in service with Samuel Sloane & Co., Rochester, N. Y., a large dealer in supplies for plumbers and steam fitters. It serves to indicate the characteristics of this product of the Selden company, although the body was designed and constructed to meet the special needs of the purchaser, being heavily ironed inside to protect it against damage and excessive wear due to the handling of large iron pipe and other similar materials.

The motor is a four-cylinder, water-cooled, vertical unit of the L head type, with bore of 3.75 inches and stroke of 5.25, giving a rating of 22.5 horsepower under the S. A. E. formula, although it is stated that it will develop considerable in excess of this. Lubrication is by a force feed constant level system. Ignition is by high-tension magneto, and the carburetor is of the automatic float feed type. The speed is governed to 16 miles an hour, at which a motor speed of 1150 revolutions is obtained.

The power plant is a unit construction, in which the flywheel, clutch and transmission are enclosed. The clutch is of the multiple disc type with 13 steel discs, six of which are faced on either side with Raybestos. The transmission is of the selective type, giving three forward speeds and reverse. The entire assembly is mounted on a subframe which protects it against the strains of chassis distortion.

Drive is by a driving shaft with a universal joint at the forward end to a jackshaft of the semi-floating type mounted in high duty roller bearings. The differential and driving gears are heavy and have an adjustment by a nut back of thrust bearing. Final drive is by side chains. The service brake is with internal expanding shoes operating within 10-inch drums on the jackshaft, while the emergency brake shoes operate within 16-inch drums on the rear wheels. The frame is of steel channel section with wide webs. The front axle is an I section and the rear a rectangular forging, both being of heavy construction and heat treated. Springs are semi-elliptic all around. The wheels are shod with 36 by 3.5-inch tires in front and 36 by four in the rear. The wheelbase is either 125 or 145 inches, and bodies are stocked to meet the requirements of purchasers in different sizes suited to the two lengths of chassis.

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The Selden plan of selling machines is a departure from what may be regarded as standard practise in that the Selden Truck Sales Company was organized to provide the necessary financial resources to sell the vehicles on a time payment plan. This policy has opened a very large field, making it possible for merchants and manufacturers to own machines without being compelled to carry the financial burden that would be entailed by the immediate change from one type of delivery to another. Under the Selden plan the purchaser is given a year in which to pay for the vehicle.

MEMORIALIZE THE LEGISLATURE.

Electric Convention Asks That Motor Truck Bill Be Defeated.

The matter of taxing motor trucks by increasing the registration fees was discussed fully before the convention of interests allied with the production and use of electrical energy in Boston last month, and besides calling the subject directly to the attention of the public the following resolutions were referred to the Massachusetts legislature:

At a joint convention of the New England section of the Electric Vehicle Association of America, the Electric Motor Car Club of Boston and the electric light companies of Massachusetts, representing a total membership of 798, employing over 18,000 men, it was unanimously

Resolved—That the passage of any bill arbitrarily increasing the registration fees on motor trucks would be injurious to the industry as a whole, would tend to retard the industrial development of natural resources and the manufacturing growth of this state, and would seriously restrict commercial progress. Such action would be contrary to the traditional spirit of progress which has always distinguished this commonwealth and its Great and General Court.

And Be It Further Resolved—That such a discriminating tax would be an unfair burden upon a growing industry which is assisting to promote commerce and improve fundamental conditions in the commonwealth's industrial life.

Resolved—Should it be found necessary to secure additional funds for building and preserving the state highways, that a scientific investigation of actual traffic conditions should be made, which we believe would show that horse drawn wagons and trucks tend to destroy the highways by reason of the sharp steel shoes of the horses and the narrow steel tires to a much greater degree than the broad yielding tires of the motor truck, and that fees should be proportionately charged on all vehicles using the highways.

HISTORY OF THE INDUSTRY.

When It Is Compiled It Will Show Effect on Business in General.

According to William C. Poertner, the well known National dealer of Brooklyn, N. Y., the growth of the motor car has been so fast that it has been next to impossible to keep pace with its advancement from year to year. In practically 15 years the motor car business has developed into one of the largest industries in the world, employing thousands of men and opening up channels for skilled labor never before dreamed of. Mr. Poertner believes, in view of these things, that an authentic history of the industry should be presented. He says:

Today the automobile monopolizes the public roadway and is as much a part of our daily life as the telephone, typewriter, telegraph or street car, and attracts as little attention as the ownership of an umbrella. But to anyone except those directly responsible for the automobile and its advancement little or nothing is known or appreciated of the vastness of the industry and what its development has meant to the welfare of the country at large. When the first edition of "The History of the American Industry" is off the presses no little space must be devoted to the fortunes spent annually in the production of automobiles in this country. If the writer will carefully collect his material he will surprise the country with facts relating to the effect of the motor car's growth on business in general.

FUEL PROBLEM IS SOLVED.

At Least That Is the Opinion of Some Planhard Carburetor Users.

That the fuel question is being solved to the satisfaction of some people is evident from their own testimony. In this connection the Planhard Manufacturing Company, 1790 Broadway, New York City, presents interesting statements by two manufacturers of motors. President H. G. Latimer of the McDowell-Latimer Company, Mystic, Conn., maker of the Latimac motor, says:

The Latimac motor and the Planhard carburetor certainly make a great combination. One of our four by five-inch motors in use in a commercial fishing boat averages less than five gallons of fuel a day of 10 hours—on low grade gasoline at that. Our motor has an almost unbelievable range of flexibility, never back fires, starts hot or cold and is not affected by fog or other weather conditions. This boat is owned by Henry M. Hoxie of Mystic, and is leased to a commercial fisherman who uses it every day. It is 22 feet six inches in length by eight feet six inches beam and weighs three tons. We equip all our motors with Planhards because of their great economy, simplicity, ease of adjustment and all around efficiency. I expect some may doubt my statement, but they can go to the boat for proof.

Frank Burtt, president of the Burtt Manufacturing Company, Kalamazoo, Mich., maker of stationary gasoline engines, discusses the subject as follows:

We have been using Planhard carburetors for some time and have adopted them as exclusive equipment because we are more than pleased with their performance. We find in comparative technical tests and in actual service that the Planhard is without a peer in handling fuel of low and high grades. Our motors start hot or cold without priming, and we always obtain the same mixture the carburetors are set for. But the qualities which attract us most are their ability to enable the motor to deliver great power, and unusual economy in fuel consumption. We have placed a great many of these carburetors on our engines and have yet to hear the first complaint.

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REPORTING AUTOMOBILE ACCIDENTS.

Massachusetts is to try a new experiment in its efforts to curb reckless driving. Under the terms of the statute every operator of a motor vehicle is required to report every accident in which any person or property is injured, under penalty of endangering his license. On its face the law would appear to carry the matter one step further than the requirements in other commonwealths; that is, instead of being admonished to stop and make known his name and address, the motorist is expected to make report to the state highway commission. The original bill was somewhat more drastic, the legislators having eliminated the clause, "with a full report thereof," fearing that it would prove unconstitutional, inasmuch as no person can be compelled to give evidence against himself.

The proof of the statute is in the enforcement thereof. If it is impossible for the local constabulary to secure the number of the fleeing machine, much less the name and address of the driver, how much more simple is it going to be to apprehend the operator who fails to report an accident? Inasmuch as a large majority of motorists are law abiding citizens, it may be forecasted that this percentage will conscientiously report all accidents in which they are involved, but those individuals who have given abundant evidence of their lack of consideration for the rights of others using the highways, including fellow motorists, may be expected to escape as easily as heretofore.

Ordinarily, when a concern finds it necessary to erect additions to its plant and increase its capital to take care of production, there is reason for believing that business is good. Basing the assumption on this premise it would appear that the automobile industry was experiencing little difficulty in maintaining its customary growth, despite conditions which were expected by some economists to result otherwise.

The aeroplane must be regarded as having established its practicability. It doesn't matter so much that world's records have been exceeded almost as fast as created, nor yet that a Chicago business man has acquired a machine to use in flying between his summer home and his office. The really important fact is that it can be registered by the state highway department, the license fee going toward the expenses of the commonwealth. It hardly can be maintained, however, that aeroplanes injure the highways to any material extent.

The kerosene car has arrived and the maker who offers this type of carburetor appears to have every faith in its possibilities. Two of these machines are to take part in the transcontinental tour of the Indiana Manufacturers' Association, and if the itinerary selected by the committee is followed in detail, most motorists will be satisfield with the test imposed. The proposed route includes some of the best roads in the country, only recently constructed, but it also includes some of the worst. The tour ought to prove one of the most interesting reliability events of the season, at least in America.

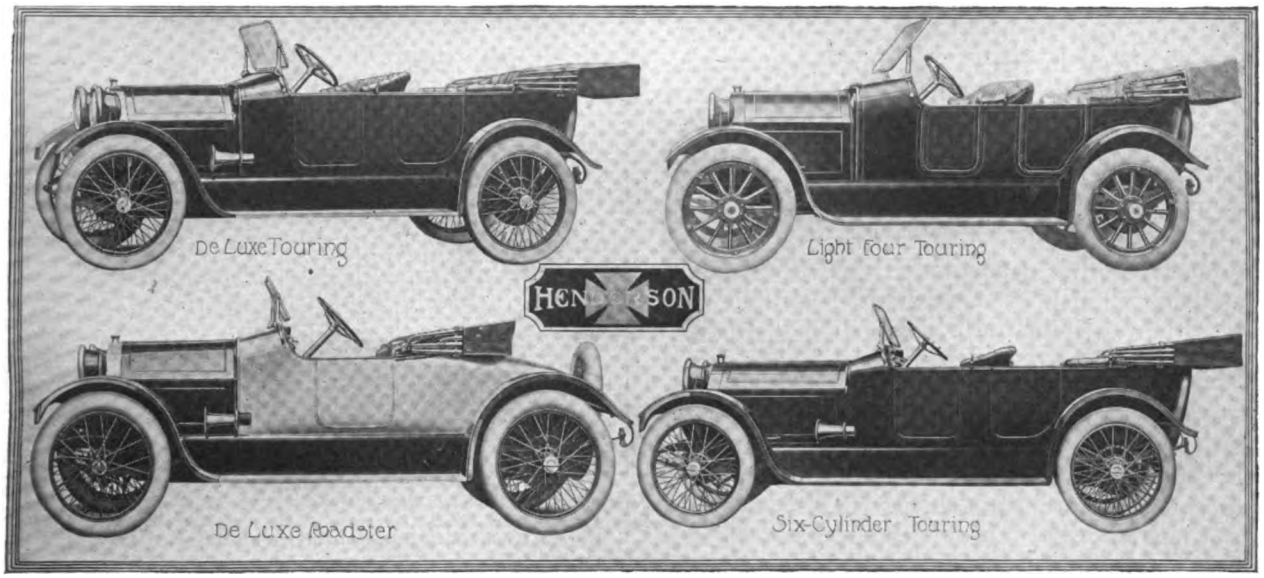
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HENDERSON OFFERS BI-FUEL CARBURETOR.

TWO new chassis, a De Luxe four-cylinder and a six, have been added to the Henderson line, manufactured by the Henderson Motor Car Company, Indianapolis, Ind. These two and a light four-cylinder car will constitute the 1914 series of the company which announces that all of the models are now in the hands of its distributors and agents. The new chassis will be fitted with five-passenger touring, roadster, Sedan and coupe bodies, while the light four is furnished only as a five-passenger touring car. The equipment of all models is very complete and every convenience for operation is provided, including electric lighting and electric motor starting.

The progressiveness of the Henderson company is noted in giving the purchaser option of a Harroun bi-fuel or a Rayfield carburetor. With the former, either gasoline or kerosene may be utilized independently and provision is made for adjustment from the seat. In adopting the Harroun the company believes that the motorist should be provided with means for using either fuel and points out that it is but anticipating the demand of many prospective buyers for a carburetor adapted to kerosene. The selection was made after a series of exhaustive tests which demonstrated the practicability and efficiency of the new vaporizer. As kerosene is easily obtained and its cost is considerably less than gasoline, a bi-fuel carburetor presents practical advantages. The company will equip its entries in the Indiana-Pacific tour this summer with the Harroun product.

The Henderson company claims to have been the first concern in America to list wire wheels as regular equipment, optional with wood members, and the success of its 1913 models utilizing these wheels has led it to offer the same option in the new series. The McCue product is utilized and is provided with a quick detachable ring in addition to its demountable feature, making possible the changing of tires without displacing the wheel. When the wire wheel is selected one extra wheel is standard equipment. All wood wheels are fitted with demountable rims, and one extra member is included in the equipment.

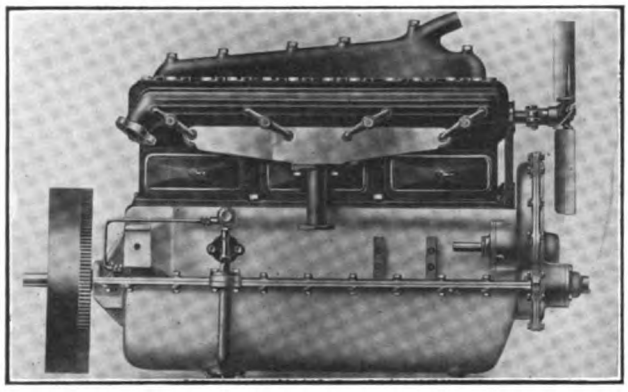


The Henderson Line for 1914 Has Been Augmented by the Addition of a De Luxe Four-Cylinder and a Six-Cylinder Chassis to Which Will Be Fitted Four Types of Bodies—A Light Four-Cylinder Car Also Is Marketed and the Equipment of All Models Is Very Complete.

Although many refinements are noticeable in the new chassis, the same mechanical features that made for the stability of the Henderson product during the past year have been retained. Except for a difference in the horsepower production and the strengthening of those components caring for the transmission of greater energy, the chassis are identical.

All motors are of the L head type, with enclosed valves, and a noteworthy feature is the high grade finish of the exterior components of the power plant, all mountings such as the water manifolds, breather tubes and the tube which car-

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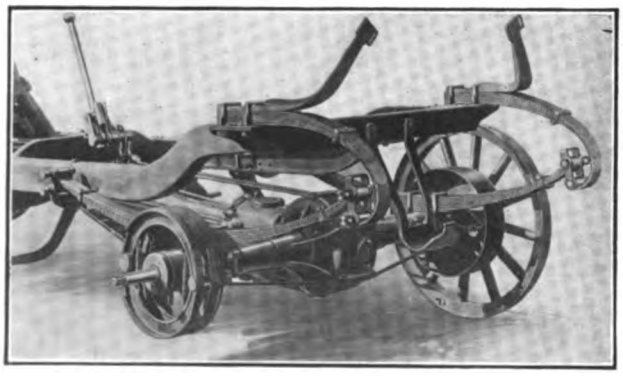


New Six-Cylinder Henderson Motor, Presenting Clean Lines and Compact Construction—The Design of the Intake Manifold Should Make for Efficient Carburetion.

ries the high-tension wires being nickel plated.

The cylinders are cast en bloc, very compact and all components are readily accessible. The power plant is supported by arms at the rear, these being cast integral with the upper crankcase and liberal in size. The third point of suspension is by a large trunnion mounted above a cross member of the frame. The timing gears and those driving the lighting generator and magneto are accessible through a large housing. A notable feature is the very short intake manifold, one free from bends. That utilized on the six-cylinder motor is particularly well designed, in that its proximity to the exhaust manifold precludes the possibility of condensation of the gas and makes for easy starting as well.

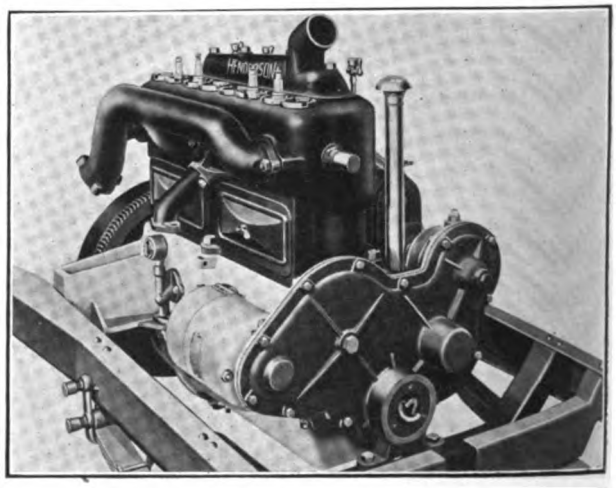
The De Luxe motor has a bore of 4.125 inches and a stroke of 5.5, a slightly longer stroke than the light four, which is 5.25 inches. The company's rating of the De Luxe is 46 horsepower, and that of the other model 44. The six-cylinder motor has a bore of 3.75 inches and stroke of 5.5, which places it in the long stroke class, and although the rating by the S. A. E. formula is 33.75, the company states that it has developed as high as 54 horsepower in block tests.



Showing Sturdy Rear Construction, Large Springs, Centre Control Lever and Liberal Sized Brakes.

The lighting generator and motor starter are separate units, manufactured by the Ward Leonard Electric Company, Bronxville, N. Y. The Eisemann dual magneto is standard on all motors. Cooling is by thermo-syphon with large intake and outlet manifolds which with the oversize honeycomb radiator assure proper temperatures under the severest service.

The clutch is a cone and the transmission is of the selective type providing the conventional three forward speeds and a reverse. The gearbox is located on the Stutz rear axle, making for accessibility and preventing the transmission of noises when operating on low ratios. Centre control and left hand drive are continued and the company claims that its control is not duplicated in any other car. The lever is placed between the cushions of the front seat and instead of the conventional H gate being employed in a horizontal plane, it is mounted vertically. The lever moves up and down and forward and back in a very short radius, and the second and third speed slots are located at the bottom and have the shortest movement.



Illustrating Three Point Suspension of Henderson Motors—Note Heavy Trunnion Mounted on Cross Member in Front and Substantial Rear Arms.

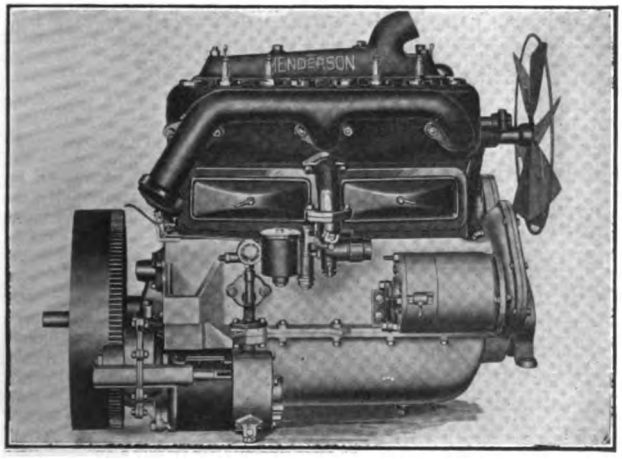
The usual emergency brake lever is eliminated by the Henderson method of control, the left pedal serving for the clutch and service brake while the right actuates the emergency members. The emergency brake pedal is fitted with a ratchet, and catches in the toeboard enable the driver to set the brakes without removing his hands from the steering wheel. Both sets of brakes are of the internal expanding type, liberal in size and provided with equalizers. These and the adjusting mechanism are located under the floorboard and forward of the front seats.

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The frame is provided with the usual kickup at the rear, making for a low centre of gravity, and to the rear cross member are bolted securely the tire carrier and spare wheel support. The spring suspension is the same as in former Henderson models, 38-inch semi-elliptic members being utilized in front and 50-inch three-quarter elliptic in the rear.

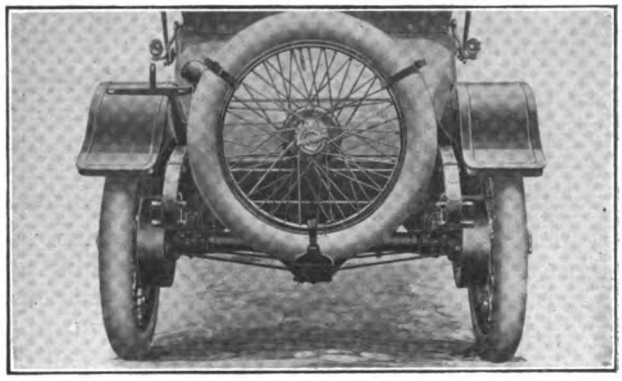
All Henderson models are over tired, making for greater mileage and easier riding qualities. Thirty-five by 4.5-inch Goodyear straight side shoes are fitted to all wheels on all models. The fuel tank in the dash cowl, which attracted attention to the Henderson line last season, is continued.

Throughout the models are noteworthy for their clean and attractive appearance. The running boards are free from obstructions and the dash instruments are mounted flush. All are



Right Hand Side of Four-Cylinder Motor, Showing Installation of Electric Lighting and Motor Starting Units.

heavily nickel plated and include from left to right: Magneto switch, eight-day clock, dash lamp, speedometer, fuel tank filler and carburetor adjustment. The clock and speedometer are of the same size and the dials are black with white characters, making for easy reading at night. The switch controlling the various groups of electric lights is placed back of the control lever, a position making for convenience. Another new feature is the position of the button controlling the electric horn. It is inserted in the top of the steering column just above the pivot of the spark and throttle levers. The design not only simplifies the control, but eliminates the usual cord and switch on the wheel rim or spider. All levers, pedals, etc., are nickel plated and this finish prevails throughout. The steering wheel on both the six-cylinder and De Luxe models is corru-

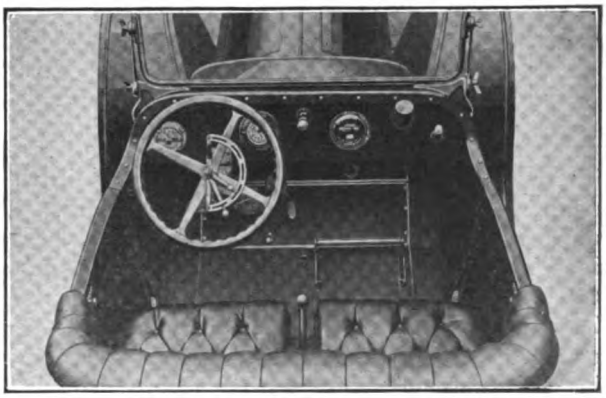


Method of Carrying Spare Wire Wheel—Note the Henderson Number Bracket, Which Is Protected from Mud and Properly Illuminated.

gated, the column being at a comfortable angle.

The one-piece universal windshield, a feature of the 1913 line, is retained, and it may be so adjusted that it will ventilate the front compartment or lowered to afford the operator a clear vision of the road. A rubber skirt on the bottom of the shield prevents rain from being blown under it. All models are provided with nickel plated foot rails and the touring bodies are equipped with robe rails. The battery box is placed under the right hand front seat and the tools are stored under the left seat.

The upholstery of the touring and roadster models is a high grade machine buffed leather with Turkish effect. The cushions and backs are deep and all touring cars are furnished with a genuine leather kick pad. The coupe and Sedan bodies will be upholstered in gray whipcord. The tops are of genuine silk mohair and come complete with dust envelopes and curtains to match. The standard colors are dark olive and gray, at option of the purchaser. The wheelbase for both the De Luxe and light four chassis is 116 inches and that of the larger model is 126 inches.



Showing Front of Touring Car with Windshield Raised—Control Members Are Conveniently Located and Include Electric Horn Button on Top of Steering Column.

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WITH THE MOTORING INTERESTS ABROAD.

Vauxhall Cars Show Up Well in Foreign Contest Work---Sunbeam Creates New Records When Using Benzol as Fuel---Studebaker Secures Gold Medal.

INTEREST in foreign racing machines has been increased somewhat by the performance of those which took part in the recent 500-mile international sweepstakes race at Indianapolis. Only one of these was of English make—the first to be seen in a contest in America, at least in recent years. Herewith is presented an illustration of another specially designed British racer, this being the Vauxhall, driven by A. J. Hancock, to lower the existing 50-mile record on the Brooklands track, Weybridge, England.

Although the car shown was designed for high speed the standard product of the Vauxhall Motors, Ltd., Luton, Bedford, has been particularly successful in contest work, not only in Great Britain and on the Continent, but especially in the colonies. A Vauxhall won the sweepstakes prize in the reliability trials in New Zealand last month, and more recently in the Australian interstate contest cars of this make finished in third and fourth place, being defeated in points for fuel consumption and hill climbing by two Talbot machines.

This last named contest was between motorists residing in the two most populous Australian states, Victoria and New South Wales. The route covered 570 miles and four days were devoted to the trials. Two American machines competed, the entire list of entries numbering 20. R. G. Carey drove a Ford and Miss H. Monk a Cadillac.

CREATES RECORDS ON BENZOL.

Sunbeam Car Sets New Marks with This Fuel on Brooklands Track.

While as a rule attempts at reducing class records in Great Britain do not have the same interest for Americans as similar events in this country, because the rating is not the same, the performance of a Sunbeam, with bore of 3.14 inches and stroke of 4.72, on the Brooklands track, Weybridge, is particularly worthy of note, because the fuel utilized was benzol. The records held by cars using gasoline were exceeded in both instances.

In the time trial for one-half mile, flying start, T. Hearne was at the wheel. The time was 0:20.7 as against the former mark of 0:23.81, held by a Humber, the respective speeds being 86.96 and 73.6 miles an hour. The second trial was for 10 laps, L. Coatalen driving. The distance was covered at a speed of 82.55 as compared with 72.46 with the Crossley, which previously held the record. A further comparison may be made when it is known that the Humber was with bore of 2.95 inches and stroke of 5.11. The Crossley had a bore of 3.12 inches and stroke of 4.86.

THE PRAGUE EXHIBITION.

Complaint That American Producers Failed to Assist Agents to Make Display.

The annual automobile exhibition at Prague, Austria, was held recently at Prague exhibition grounds and the opening exercises were attended by the local officials and foreign consuls. The number of cars exhibited was greater and the quality better than at the exhibition of 1912, especially those of American make, 10 of which were shown. The American manufacturers were severely indicted by the Prague and other Austrian agents for their lack of support, in comparison with that which other European makers accorded to their representatives.

One agent stated to Consul Joseph I. Brittain of Prague that he was obliged to pay upward of $400 from his own pocket in connection with an exhibit of four cars, while it is claimed that German manufacturers granted special subsidies to agents exhibiting their machines; in fact, practically defrayed the expenses connected with the exhibits. The American agents say they must fight their battles with their competitors alone.

The leading foreign cars displayed were: Benz, Opel, Renault, Mercedes, Hupmobile, Ford, Presto, Studebaker, Windhof, Minerva, Berliet, La Buire and Mathis. The Austrian machines shown were those made by Laurin & Klement of Jungbunzlau, Bohemia; the Praha, made by Bohmisch-Mahrische Machinen Fabrik, Lieben, a suburb of Prague; Josef Walter, Smichow, another suburb; Johann Puch, Gratz, Austria; W. A. F., Wiener Automobil Fabrik, Vienna; R. A. F., Reichenberg, Bohemia; Premier, Eger, Bohemia; Alois Nejedly, Koniggratz,

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Bohemia, and Austrian Daimler, Wiener Neustadt.

PARIS OBJECTS TO MOTORS.

Gasoline Machines Not Permitted on Fashionable Thoroughfare at Noon.

Paris, first of all the cities of the world to welcome the automobile, has also been the first to banish it from fashionable thoroughfares. A law recently went into effect forbidding any kind of gasoline car to put in an appearance upon the most exclusive drive in the city, the Avenue des Accacias, between the hours of 11 in the morning and 1 in the afternoon, the smartest period in all the 24 hours of the day.

For the first time in many months old time equipages were to be seen in the drives, most of them being Victorias. It is understood that the motive of the authorities in issuing the order was to revive the splendors of the second Empire, when the Bois was one of the show places of the world.

LONDON-EDINBURGH RUN.

Studebaker Entrant Was Successful in Qualifying for a Gold Medal.

This year's London-Edinburgh run, which has come to be a popular annual event, took the form of a celebration of the 10th anniversary of its founding. The start was from Highgate, the route being along the Great North road by way of Barnet, Hatfield, Welwyn, Baldock, Biggleswad, Buckden, Stilton, Stamford, Grantham, Doncaster, Ferrybridge, Tadcaster and York. At this point the route was changed to include places not included heretofore.

The following are the cars which finished, thus qualifying for a gold medal: Charles Jarrott, official car, Crossley; J. Van Hooydonk, Phoenix; Dr. E. W. Brewreton, Metallurgique; Barnard R. Banks, Albruna; F. W. Turner, Benz; F. C. Westall, Gregoire; A. J. Sproston, Studebaker; E. Birch-Reynardson, Beeston Humber; W. R. Norris, Morris-Oxford; A. Bray, Foy Steele; W. Whittall, Argyll.

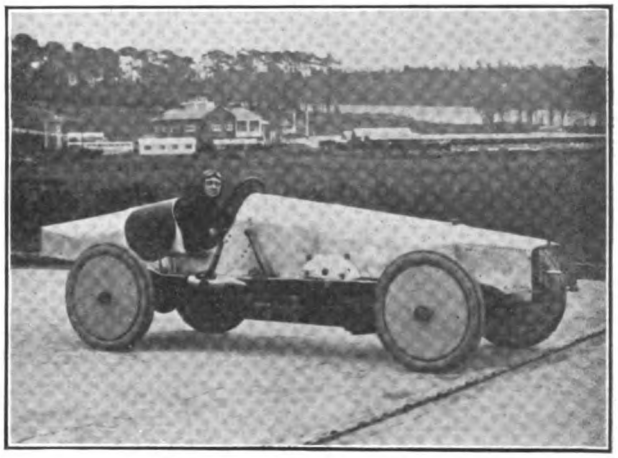
NOTES FROM FOREIGN LANDS.

In order to still further stimulate the activity of manufacturers of rubber goods in establishing factories in Brazil, the Brazilian government has fixed a customs duty of 65 per cent. ad valorem on all rubber articles. This is part of the government's project for discouraging the importation of "things that might just as well be manufactured in the Amazon valley."

The composition, geographically and otherwise, of the new council of the Scottish Motor Trades Association has evoked general satisfaction. The districts, as well as the various branches of the industry, are proportionately represented. J. S. Matthew, managing director of Argylls, Ltd., Alexandria, Scotland, has been appointed chairman, and W. L. Sleigh, managing director of Rossleigh, Ltd., vice chairman, for the current year. The election was unanimous, a fact which augurs well for a successful year's work.

There should be a good market at Plauen, Germany, for American motor cars if they are properly introduced. The roads are in excellent condition during the entire year. There are many manufacturers in that vicinity who are wealthy and well able to afford and maintain motor vehicles. Approximately 100 to 150 motor cars and trucks are sold yearly in the Plauen district and the demand for motor trucks is increasing. A 30 horsepower touring car selling for $1000 to $1200, with attractive appearance and finish, would no doubt find a good market if represented by a good active agent. It is also essential to have a repair shop well equipped, with duplicate parts to insure immediate repairs.

Although the day was rainy, the annual hill climb of the Lancashire Automobile Club, which recently took place in England, was a success and a large number of entries participated. The competition was divided into two closed classes for amateurs, a cyclecar class and four open classes. F. Stansfield, driving a Stoewer, won the silver cup presented by G. E. Baxter in the closed class



A. J. Hancock at Wheel of Vauxhall Racing Car on Brooklands Track, Weybridge, England.

for four-seated vehicles, while H. P. Forshaw's two-seated Stoewer won in its class. In the open cyclecar class the winner was G. W. Hands in a Calthorpe. The winner of the open event was J. Higginson, driving a Vauxhall. Four silver cups were given for the cars making the best performance on formula in their respective sections, as follows: W. Greenwood, Stoewer; W. M. Letts, Crossley; A. Fillingham, Vauxhall; L. Coatalen, Sunbeam.

German motor vehicle manufacturers report that 1912 was an entirely favorable year for them. It brought an expansion surpassing even in percentage that of 1911. According to official provisional statistics now available, the foreign trade increased from $14,268,000 to $21,347,000 in the course of the year, and reports of the home trade, although not yet in statistical form, indicate as favorable a situation. The greater part of the growth in foreign trade is accounted for by increased exportation, especially passenger vehicles. In 1911 Germany exported 5154 machines of this type, worth $10,099,000, and in 1912, 7948, worth $15,473,000.

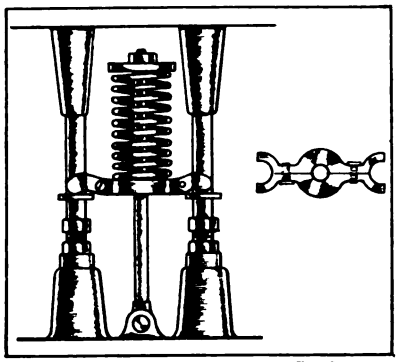
Few South American cities, in proportion to the number of inhabitants, show as many automobiles in use as Montevideo, and they are increasing very considerably. During December and January no less than 115 high priced cars entered that port and were sold. There are now more than 1300 machines licensed in Montevideo, about 2000 being the total for the whole republic. Machines of American manufacture are well represented.

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THE REPAIR SHOP AND GARAGE.

A Simple and Easily Made Jig for Replacing Clutch Springs---Equalizing Valve Springs---Loss in Watts Due to Small Wire.

REPLACING clutch springs sometimes means damaged hands unless the workman is careful and has the proper tools for the work. A simple and easily constructed jig for replacing multiple disc types is shown at A in an accompanying illustration. It comprises a tube of sufficient inside diameter to slip over the shaft and a plate equal in diameter to that of the tube. The plate is drilled to take a .625-inch bolt which is fitted with a nut. The head of the bolt is cut as shown so that it will not slip when the nut is being screwed up. The jig shown at B differs from the one described in that it is applicable for cone type of clutches, and as will be noted, the plate member is made in two pieces or halved, so that it may be removed easily.



Suggestion for a Valve Spring.

EQUALIZING VALVE SPRINGS.

A suggestion for equalizing or balancing the tension of valve springs and one which is of interest in that one member may be utilized in place of two, is given in a recent number of the Commercial Motor, an English publication. It is designed to be employed with four-cylinder motors, but could be utilized on other types by making the actuating parts conform to the engine.

As will be noted by the accompanying illustration a vertical rod is fitted centrally between the valve guides, two lugs being secured to the upper surface of the crankcase for the purpose of hinging or pivoting the rod member and to permit canting of the crossbar.

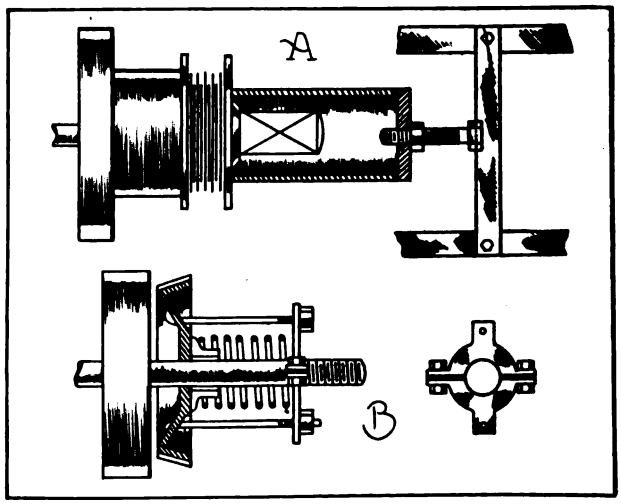
The valve spring is carried by a crossbar which is construced as shown in the sketch, and is provided with slotted ends which fit over and control both tappet spindles. As constructed the tension of the spring could be increased if desired and the device presents an additional advantage in that it would simplify the work of grinding valves as it would be an easy matter to remove the spring. Presumably the valve stem is relieved from undue side thrust by suitably proportioning the crossbar.

PROPER WIRE FOR LIGHTING.

Proper consideration should be given to the size of wires utilized in the installation of electric lighting outfits, or in replacing damaged leads. Too small a gauge results in deficiency, according to Emil Grossman, electrical expert. In experiments conducted with 12-foot duplex lengths of No. 16, 12 and 10 B & S gauge sizes of wires and used to supply 10 candlepower, six-volt, 12.5-watt tungsten lamps with current, the percentages of loss were as follows: On a basis of a No. 10 wire line the loss in the No. 12 size is 1.58 times; in a No. 14 size, 2.25 times; in a No. 16 size, four times—the least that would occur in a No. 10 wire size.

Size wire	Resistance in ohms a 12-foot length of line	Loss in watts	Ratio
No. 10	0.024	0.102	1.00
No. 12	0.036	0.165	1.58
No. 14	0.060	0.230	2.25
No. 16	0.096	0.360	4.00

The accompanying table shows the resistance in ohms and loss in watts and ratio. A line is considered as having two wires.



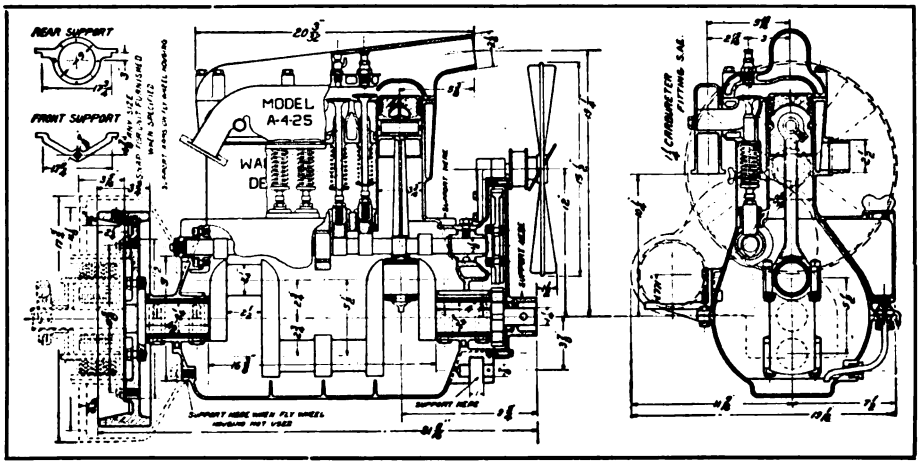
Jig for Replacing Clutch Springs: A, Type Applicable for Multiple Disc; B, Showing Application to Cone Clutch.

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DETAILS OF THE WARNER-DETROIT MOTOR.

H. L. WARNER, well known to the automobile industry as the founder of the Warner Gear Company and the Muncie Gear Works of Muncie, Ind., has designed a new motor which will be known as the Warner-Detroit, model A-4-25, and which will be manufactured by the Warner-Detroit Motor Works, Detroit. The new concern plans to build 15,000 motors during the next 18 months and announces that about Aug. 1 it will market a six-cylinder engine of substantially the same design as the A-4-25, also a suitable sliding gear transmission with multiple disc clutch and levers for both types.

The designs are to be made both for unit power plant and sub-frame construction. They will be built to carry any standard sliding gear transmission and will be furnished complete with either planetary or sliding gearsets, adapting them to pleasure or commercial car service. The A-4-25 model is designed to withstand severe and continuous service and is very compact, as will be noted by the dimensions in the sectional drawings presented herewith. Provision is made for the installation of electric lighting generator, motor starter and magneto by suitable brackets.



Sectional Drawings of Warner-Detroit Model A-4-25 Motor Having Long Stroke and Well Proportioned Components.

The most striking feature of the Warner design is the bore and stroke, these being 3.1875 by 5.5 inches, a bore to stroke ratio of 1:1.72, exceeding by .07 that of a well known car having a bore and stroke of 4.25 by seven inches. The components of the power plant are well proportioned, the bearings liberal in size, and throughout attention has been paid to those details making for accessibility as well as economical maintenance.

Although rated at 16.2 horsepower by the S. A. E. formula, it should develop double this rating, a contention that is borne out in practise by motors having approximately the same bore and stroke. The four cylinders are of the L head type, cast integral with the upper crankcase, and removable heads provide easy access for grinding valves and removing carbon deposits. The cylinders and pistons are of semi-cast steel and the latter members are provided with three rings above and one which is in line with the wristpin.

The crankshaft is of 3.5 per cent. nickel steel, heat treated, 2.5 inches in diameter with two bearings, four and 4.5 inches long. The camshaft diameter is 1.125 inches, width of cams one inch, and that of gears .875 inch. The timing gears are accessible through a removable cover. The magneto or timer shaft is one inch in diameter. The connecting rods are drop forged and have a crankpin bearing of 2.5 inches. The cast iron valves are electrically welded to steel stems and have a liberal opening. The valves are enclosed by easily detached covers.

Cooling is by the thermo-syphon system, the diameter of the water piping being very liberal, insuring proper temperature under all conditions of service. Lubrication is by splash, an adaptation of the water bottle principle being employed to maintain the proper height of oil in the crankcase.

The flywheel is machined to fit either cone or multiple disc clutch. The rear end of the motor is designed to receive the bell housing of any transmission connection enclosing the flywheel, or cross members for main or sub-frame construction, providing for three or four point suspension.

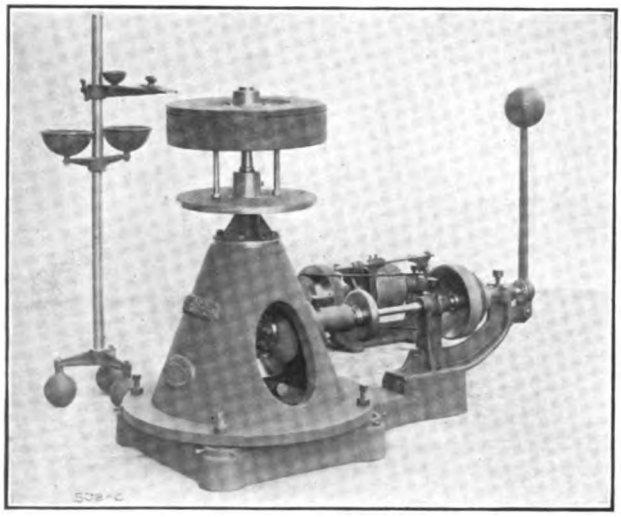
The Warner-Detroit Motor Works has offices at 1615 Dime Bank building, Detroit, and is financed by several prominent business men. William H. Downes, formerly of the Chas. A. Strellinger Company, is secretary, and William H. Lonsdale, for several years superintendent of the Knox Automobile Company of Springfield, Mass., is general superintendent. H. L. Warner is manager.

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GARAGE AND REPAIR SHOP EQUIPMENT.

THE proper balancing of motor flywheels and other similar rotating parts, and the elimination of undue vibration are important factors in motor construction. An engine will not run in an entirely satisfactory manner unless its flywheel is given both a running and standing balance. The old methods of balancing weights give only a static balance; that is, the rotating parts would be balanced perfectly standing still, but they would not always be in balance when running. High speed parts are so designed and balanced that they will not distort from centrifugal action if rotated free at any speed at which they may run in use, and thus destroy a state of running balance.

The Defiance Machine Works, Defiance, O., has made a study of this particular branch of the



Defiance Patent Motor Flywheel Balancing Machine.

automobile industry, and in an accompanying illustration is presented the Defiance No. 66 patent motor flywheel balancing machine, which is designed to give a flywheel or similar rotating part not to exceed 1000 pounds in weight, a perfect running and standing balance. Special effort has been made to eliminate complicated parts without dispensing with such essential features as are necessary to accomplish the desired results. The best grade of material and the highest skilled labor are utilized in the construction, and it has been adopted by some of the largest automobile manufacturers of the country.

The machine comprises a frame of conical form, in the centre of which is placed a vertical ground steel spindle in a step bearing in the base of the frame, and passing up through a long bearing at the top of the frame. This spindle at its upper end carries a face plate provided with two driving pins, which project upward parallel to the axis of the spindle. A steel centre with a taper shank is fitted into the vertical spindle. Its upper end is reduced to a conical point, and upon this rests the object to be balanced.

The vertical spindle is rotated by friction gearing driven by a horizontal shaft in suitable bearings at the base of the machine. The shaft is in two sections and they are connected by a friction clutch and moved longitudinally by a counter-weighted lever so arranged that the weight may be used to press the clutches together when it is desired to rotate the object to be balanced, and to disconnect the clutches when it is desired to examine, test and mark the object while running alone, as the driving pins are liable, when pressing against the part to be balanced, to produce uneven rotation. The true unbalanced condition is best shown when the disturbing influences are withdrawn after the clutch is released.

GARDNER AIR COMPRESSOR.

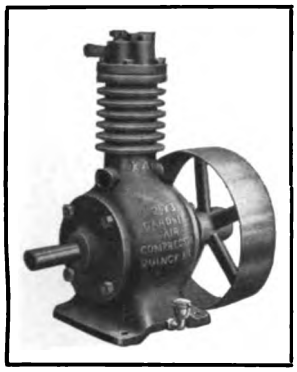
Compressed air in the garage is a necessity as it is expected by the motorist. Varying conditions require different installations and to comply with these requirements the Gardner Governor Company, 30 Williamson street, Quincy, Ill., is manufacturing air compressor systems both for the small garage and the service station. These include stationary and portable outfits, either operated by the power of the garage or by electricity.

The garage set shown in an accompanying illustration is an electrical unit and the design is provided with rollers so that it may be moved when desired, a construction making for convenience. It consists of a Gardner compressor connected by gearing to an electric motor, both units being mounted on a cast iron table underneath which are the air tank, gauge, automatic control, etc. The pipe connections are very complete and the outfit is supplied with either an air or water-cooled compressor as desired.

The automatic starting and stopping device is listed as extra and can be attached to the apparatus. They are made to suit any type of current and insure a constant pressure in the tank, it being maintained automatically. The garage sets are made in three styles, No. 1 G S comprising a two by 2.5 air-cooled compressor, .5 horsepower

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direct or alternating current, two or three-phase, 110 or 220-volt motor, cast iron table, 14 by 26-inch tank and gauge. The same is constructed with a single-phase alternating current motor. The weight is 400 pounds.



Gardner Air-Cooled Compressor.

The No. 2 outfit includes a two by three air-cooled compressor, one horsepower direct or alternating current, two three-phase, 110 or 220-volt motor, table, 14 by 26-inch tank, etc. A one horsepower, single-phase, alternating current motor is listed as extra. The weight is 500 pounds.

The third style, No. 3, comprises a three by 3.5 water-cooled compressor, three horsepower alternating current, two or three-phase, 110 or 220-volt motor, cast iron table, 18-inch by 3.5-foot tank, gauges, etc. Direct and alternating current motors are also supplied with this equipment, which weighs 750 pounds.

The Gardner air-cooled compressor is made of high grade material, is semi-enclosed, with trunk piston fitted with metallic packing rings. The crankcase and cylinder are one casting, and steel ball valves are utilized in the head. The crankshaft is a drop forging and the connecting rod of special bronze and of square hollow section. The safety valve in the head can be set at any desired pressure and eliminates all danger of explosion due to excessive friction. The journal bearings are bronze bushings and are easily renewed. Lubrication of the main bearings and cylinder is by compression cups, while the crank, piston and wristpin are lubricated by grease stored in the hollow connecting rod.

The water-cooled type is designed for service in large garages, and the three by 3.5 size has a capacity of seven cubic feet a minute at 500 revolutions, and it is stated that it will fill an 80-gallon tank to 200 pounds in 15 minutes. The Gardner Governor Company issues an illustrated booklet on air compressor systems which will be forwarded free on request.

Official notice of the motor car service between St. Louis, Alton and Chautauqua, Mo., on the C. P. & St. L. railroad, has been given to the effect that two cars will be put in operation, one between Alton and Chautauqua and the other between St. Louis, Mo., and Springfield, Ill.

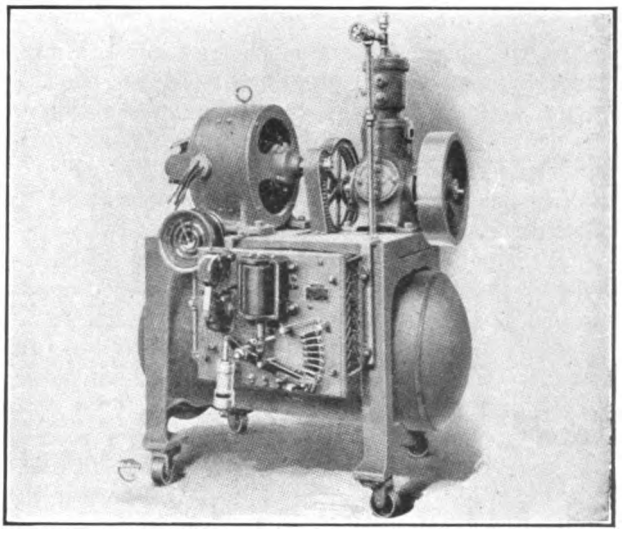
INDIANS WILL COMPETE.

Long Time Sleep Will Pilot His Car in National Reliability Tour.

For the first time in the history of automobile contests, full blooded American Indians will compete in the 1913 national reliability tour of the American Automobile Association, according to the announcement of the committee. Long Time Sleep, a Blackfoot Indian of the Glacier national park reservation, is the first to make entry, and it is stated that Chief Horse's Ghost of the Fort Peck reservation in eastern Montana, also is to drive a car in this event.

Following the plan adopted by the Minnesota State Automobile Association, which conducted a tour over the same route as will be taken by this year's national tour, a hotel train will accompany the entrants practically all of the way from Minneapolis to the Glacier national park. The tour is scheduled to start from Minneapolis, June 11, and will occupy nine days, covering 1131 miles.

Owing to the recent strict interpretation by the New York State authorities regarding inclusion in corporate names of words not in the English language, the application by organizers for a charter for the Motokart Company has been refused. The incorporation of this company was mentioned in a previous issue, but owing to this requirement the new concern has been incorporated as the Tarrytown Motor Car Company, Inc.



Gardner Garage Air Compressor Outfit, Including Electric Motor and Automatic Control.

The company will retain, however, the word Motokart as its trade mark, this having been registered some time ago.

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MOTORING LAWS AND THEIR ENFORCEMENT.

Supreme Court Hands Down Another Patent Case Decision---New York Aldermen Reduce Taxicab Rates---Massachusetts Requires Report on Accidents.

A DECISION of particular interest to the automobile and allied industries was handed down by the United States supreme court May 26, the case being that of the Bauer Chemical Company against O'Donnell, involving the right of the defendant to sell a certain patented medicine for less money than that which the plaintiff had established as a retail price. Five of the nine members of the court held that the owner of a patent is not given the right by the patent law to control the price at which retailers must sell to consumers. The opinion was announced by Justice Day.

It will be remembered that about a year ago the supreme court handed down a decision in the so-called Mimeograph case, Henry against Dick, in which somewhat the same question was raised, a mimeograph having been sold at cost with the restriction that the paper and ink should be bought from the company selling the machine. At that time there were but seven members of the court on the bench, and the decision was reached by a vote of four to three. The court held in favor of the patentee in this instance, because the owner of the patent had not relinquished his interest in the mimeograph, inasmuch as he sought to obtain his profit from the sale of the paper and ink.

In the latest case the District of Columbia court, before which it was tried, held that the title to the article had passed into the possession of the druggist when he paid the price demanded of the owners, and that he then could dispose of it at any price he chose. This view is upheld by the supreme court.

After pointing out that the supreme court had held in the case of the Miles Medical Company against Clark and others that an attempt to fix prices by agreements where the article is not protected by a patent monopoly was "against public policy and void," Justice Day said: "It was doubtless within the power of Congress to confer such right of restriction upon a patentee." But he holds it has not done so. Quoting the case of the Bobbs-Merrill Company against Straus, in which the court held that the copyright laws, in securing to the holder of the copyright the sole right to vend copies of his book, conferred on him no greater privilege than to part with the title of it, and that he exhausted his rights when he sold his book to the first purchaser.

"The sale of a patented article is not essentially different from the sale of a book," said Justice Day. "In each case to vend is to part with the thing for a consideration. In providing for grants of exclusive rights and privileges to inventors and authors we think Congress had no intention to use the word 'vend' in one sense in the patent act and 'vending' in another in the copyright law."

PELLETIER ADDRESSES OPERATORS.

Suggests That Future Action of State Legislatures Will Depend upon Them.

District Attorney Pelletier of Boston was one of the principal speakers before the recent meeting of the Massachusetts Automobile Operators' Association in that city, at which some 300 chauffeurs were present. The address was received with much interest and portions of it were compiled for publication as follows:

Try to get the good will of all those who use the highways. Remember that the people who are unable to own motor cars have a bit of instinctive animosity against those who have them. So do not go along and give a blast of the horn that has the tendency to flaunt wealth in the faces of others; a sort of peremptory order to get out of the way.

Motorists, or any other class in general in this state, are not intentional law breakers. But there are laws and ordinances to be obeyed, and you must do your best to respect them. No one knows better than a district attorney what a multiplicity of laws are being broken. You young men, and all others who drive motor cars, cannot be too careful.

Upon your conduct depends future control by the legislature. If you are reckless; if you show a desire to disregard the rights and welfare of others on the streets and highways, then some day the legislature may pass a law that will place motorists in the same category as those brought up on liquor charges.

That means the entire matter of discretionary action will be taken out of the hands of district attorneys, and every motor case, no matter how trivial, will have to go to trial. Now in my office careful consideration is given to every appeal, and, despite criticism, I have acted from a humanitarian standpoint, believing that where there was no danger to life or property a violation of a minor nature of small moment should not blacken the character of some worthy person in future years.

Do not misunderstand me and think I mean to convey that such action may have a tendency to countenance violations of law. I feel that where one has had to spend his time in court waiting the disposition of his case, and has been to an expense for an attorney, and then has to pay something for costs, he has been punished enough for a minor violation. It teaches one that the law must be obeyed, and I know it is from the very rare instances where one is charged with a second or third offense.

So you have it in your hands to bring about a greater

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feeling of good will. You set the example and others will follow. For those who have a willful disregard for the safety of others I can be as severe as any other prosecutor, for it is my duty to protect the rights of all. So what I would like you young men to do is to be careful, exceptionally so, and in that way you will be co-operating with me in securing protection and justice for all.

TAXICAB FARES REDUCED.

Private Stands Also Abolished in New Ordinance Passed in New York City.

After one of the most interesting sessions yet held the board of aldermen in New York City passed the so-called Grimm taxicab ordinance May 26, by a vote of 65 to one. The ordinance becomes effective 60 days after it is signed by the mayor. It not only abolishes the right of hotels and others to grant taxicab companies the right to stand in front of their doors, but reduces the present tariff.

Under the old tariff the same flat rates applied whether there were one passenger or more, these being 50 cents for the first half mile and 10 cents for each additional fifth of a mile, making a charge of 80 cents for the first mile and 50 cents for each additional mile. The new rates provide as follows: Not more than two passengers, 30 cents for the first half mile and 10 cents for each succeeding quarter mile, making a charge of 50 cents for the first mile and 40 for each additional mile; three or more passengers, 40 cents for the first half mile and 10 cents for each succeeding sixth of a mile, making a charge of 70 cents for the first mile and 60 for each additional mile.

The taxicab owners have requested a public hearing before the mayor, and some of them declare that in case the ordinance is signed they will take the matter into the courts.

CALIFORNIA'S NEW LAW.

Several Bills Before Legislature Combined in This New Statute.

Almost as soon as the legislature in California was organized for business this year several motor vehicle bills were presented, until something like 30 were before the two bodies. Members of the state and local automobile clubs were invited to co-operate with the legislative committee in the preparation of a new motoring law, and the result was placed before Governor Johnson for his signature last month.

The new law creates a road fund under the department of engineering, and an entirely new system of license fees is adopted. Heretofore California motorists have been permitted to escape with a perpetual fee, but beginning Jan. 1, 1914, they will be called upon to register their machines annually at the following fees: Less than 20 horsepower, $5; 20-30, $10; 30-40, $15; 40-50, $20; 50-60, $25; over 60, $30. The law also raises the speed limit on country roads from 20 to 30 miles an hour.

MUST REPORT ACCIDENTS.

Failure to Obey Law Will Mean Loss of License in Massachusetts.

The attempt to secure a practical method of eliminating reckless driving has been responsible for a number of interesting bills in the several legislatures during the past few months. Massachusetts will try an entirely new experiment, judging from the text of the new law in that commonwealth, which reads as follows:

Sec. 1—Every operator of a motor vehicle which for any reason is involved in an accident in which any person or property is injured, shall forthwith report the same to the Massachusetts highway commission.

Sec. 2—For any violation of the provisions of this act said commission may revoke or suspend the license of the operator.

It is understood that the original bill at least had the support of the Highway Protective League, but it appears to have been amended slightly before passage, the words "with a full account thereof" being eliminated.

LEGISLATIVE BRIEFS.

The Connecticut legislature is considering an amendment to the present motoring law, increasing the registration on commercial vehicles to $7 for the first 1000 pounds and $3 for each additional 1000 pounds.

Chief of Police Philip Smith of New Haven, Conn., has notified the Automobile Club of New Haven that many motorists in that city are violating the state law with respect to the rear lights and rear number plates, which provides that the sign shall be so placed with reference to the lamp that it shall be visible a distance of 60 feet.

Governor Foss of Massachusetts has signed the law making it unlawful for any person to operate air craft unless licensed to do so by the Massachusetts highway commission. The law also provides that no air machine may fly over a city at an altitude of less than 3000 feet or over a town at an altitude of less than 500 feet.

According to Secretary James Fortescue of the Massachusetts State Automobile Association, several members of that organization are anxious that a test case shall be brought in the courts of that commonwealth to determine the constitutionality of the present motoring law, with respect to registration fees. Mr. Fortescue says that in case action is determined upon motorists will be advised to file a protest when paying their fees, in order that they may recover, in the event the courts declare the law unconstitutional.

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CORRESPONDENCE WITH THE READER.

Allowances for Fits.

(1593)—What is meant by a drive fit of an automobile part? I note reference made to it in your book. What other kinds of fits are used in automobile work? I repair my own cars and am anxious to learn all I can about the work. A. F. D.

Jersey City, N. J., May 16.

A drive fit is used in parts where close adherence is required, but which must be assembled and disassembled with no other help than an ordinary hammer; such as flywheels, gear wheels, ball bearing inner races, etc. The allowance over nominal diameter for driving fits is as follows:

Nominal diameter	.5-inch	1-inch	2-inch	3-inch
Maximum	0.50050	1.00100	1.00125	1.00250
Minimum	0.50025	1.00075	1.00100	1.00150

Force fits are employed in parts where disassembling will hardly be required, and which are assembled by means of hydraulic or screw presses, or when hot.

Push fits are employed in parts without relative motion in actual work, but which must have sufficient freedom to be assembled by hand, such as bolts, slip joints, ball bearing outer races, etc.

Running fits are used in parts possessed of relative motion in normal running. These can be sub-divided into easy, close and fine. Easy fits are those where great freedom of running is required with possibility of scant lubrication, such as valve guides, control connections, clutch shafts, etc. Close fits are to be used in all high speed work and especially the motor and transmission. Fine fits are employed in parts where great accuracy is required or where, while the motion is slight the stresses are of an alternating or vibratory nature, such as the small ends of connecting rods, steering connections, etc. Efficient lubrication must be provided if the motion is frequently recurring.

Function of Torque Arm.

(1594)—What is and what's the use of a torque arm? I note mention made of it in the descriptions of cars in your publication. I have a Cole car which I purchased recently and note that there is a brace from the rear axle to a cross member. Is this the torque member? COLE OWNER.

Pittsburg, Penn., May 25.

The function of the torque arm is to keep the axle in proper elevation alignment with the driving or universal joint shaft. It takes up all the rotation torque of the rear axle.

In the Cole car the torque arm is in the shape of a letter A, with drop forged fittings at each of the lower ends brazed to heavy tubing, and a crotch forging brazed to the other end of the tubing carrying a ball at the apex. The tubes or legs are secured together in two places through transverse clamps to prevent spreading and to eliminate vibration. The front end is securely but flexibly suspended from the centre cross member of the frame through a large, strong tubular casting, which makes it possible to utilize a 300-pound cushion spring on either side of the ball to soften or absorb the torque shock.

The thrust or drive of the car is not through the torque arm, but through the lower half of the springs direct to the large spring housing bolts at the side of the frame. The torque arm is attached to the axle by a large hardened and ground torque pin which permits a swivelling action sideways, and is encased in hardened steel bushings in the axle member.

Triple Ignition.

(1595)—I am very much interested in your article on fitting a Bosch magneto to a Ford car, but do not understand how you get the triple ignition referred to as possible. As I understand it one side of the double plugs is used for the magneto and the other for the regular generator. Can you give me an idea of the cost of installing the system described? A FORD OWNER.

Boston, May 30.

The installation of the magneto provides the third source of current for ignition work, although in the article referred to it is to be used for both starting and operation, it being possible to start the motor easily on a quarter turn of the starting handle. It should be borne in mind that the regular ignition system of the Ford car provides dual ignition with one set of plugs when dry cells or a storage battery are employed, although the auxiliary source of supply is not generally fitted because of the efficiency of the flywheel magneto for both starting and operation.

By examining the switch and coil on the dash it will be seen that the former has three positions, "Bat.," "Off" and "Mag." By connecting one side of a battery to the battery terminal on the coil and carrying the other lead to ground, a circuit is completed when the switch lever is moved to "Bat." and contact made by the commutator. With this arrangement it is possible to operate the motor on either the batteries or generator.

The system is entirely separate from the Bosch magneto and as the latter is of the true high-tension type, a separate switch is provided It differs from the usual member in its operation in that the circuit is open when the magneto is supplying current to the plugs, and closed to stop the operation of the engine. But one primary wire is utilized with the system, this being at-

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tached to a terminal on the breaker box and led to the switch, thence to the frame. Closing the switch diverts the primary current generated by the magneto from the secondary windings to the frame circuit. The question relating to the cost of installation cannot be answered satisfactorily by the writer. The A. C. Danver Company, Providence, R. I., will supply the desired information.

Cause of Tire Troubles.

(1596)—I have a car that I rebuilt into a roadster. It was a five-passenger touring car and I figure that the removal of the tonneau and top has lightened the load several hundred pounds. But in spite of the lighter weight I am experiencing as much tire trouble as formerly. The front shoes wear out much quicker and according to my figures I get several hundred more miles from the rear casings than the front. All the blow-outs come in the front shoes. I was of the opinion that the rear tires get the hardest wear. How do you account for the difference? CONSTANT READER.

St. Paul, Minn., June 1.

The difference in mileage obtained is doubtless due to the fact that the rear shoes are carrying considerably less weight than formerly when the machine held five persons. Unless the front seats were moved back the front tires are subjected to practically the same stresses as before. There are a number of other conditions which might cause the front casings to deteriorate, such as the wheels not being in line, improper inflation, etc. The capacity of the shoes could be checked up by weighing the car as outlined in the May 10th issue, and noting the difference between the weights carried by the front and rear axles.

Increasing Efficiency of Motor.

(1597)—Is it possible by slightly altering certain parts of the motor to increase the horsepower, such as boring out the cylinders, changing timing, etc.? Would you advise the work and would the results warrant the expense involved? I have a four-cylinder motor of 4.25-inch bore and 4.75-inch stroke and although the valves are in good condition I do not get the power I did formerly. Would timing the valves slightly earlier prove beneficial? I am a reader of the questions and answers department and derive considerable practical information from same. One garageman advises me not to change any part of the engine while another repairman states that he could improve the motor considerably by boring out the cylinders, fitting double ignition and larger valves. He would not give me any price, stating that it would be a case of labor and material. Kindly give me the benefit of your experience in such matters. INFORMATION.

Worcester, Mass., May 23.

The efficiency of some types of old motors may be increased by certain alterations, such as reboring the cylinders, enlarging the valves, etc., but in the case of an old engine the results obtained would not be proportional to the cost. Of course much would depend upon the condition of the power plant and other components of the chassis.

While reboring the cylinders would increase the power slightly, it would mean fitting new pistons and new rings, the need of the former depending upon the amount of metal removed from the cylinder walls. Fitting a new or larger power plant entails radical alterations which rarely justify the expense involved, and a car converted in this manner is not always easy to dispose of.

There are a number of conditions aside from the power plant that waste power and the chief factor is the resistance created by all four wheels not being in alignment. Too much emphasis cannot be laid upon the importance of having the wheels track perfectly. The general tendency is for the front wheels to spread at the front, while the rear axle, and often the front, settles further back at the right hand side owing to the fact that the right hand springs generally take a permanent set. This is caused by the car being utilized only by the owner. As a result the right springs carry more load and this has a tendency

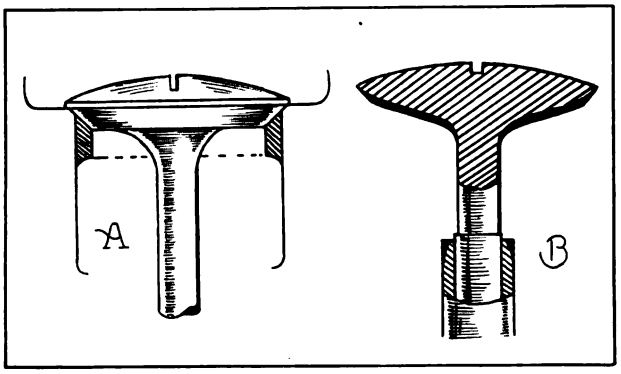


Fig. 1—Increasing Efficiency of Motor: A, Showing How the Valve Port Area May Be Increased by Cutting Away a Portion of the Seating; B, Improving Outline of Inlet Valve, the Solid Black Portions Representing the Metal Eliminated.

to push them toward the rear, causing the tires to drag slightly and absorbing power.

Brakes are often the cause of lost power. Because the wheel spins freely when jacked up it is not indicated that friction does not develop when the machine is loaded, and slight frictional contacts often pass unnoticed under these conditions. Worn bearings in the rear wheel, the presence of mud, etc., frequently create friction. The writer knows of an owner who adjusted the brakes and the wheels rotated very freely when free from a load. The loss of power through friction was not discovered until it was noticed that the mileage a gallon of fuel was considerably less than formerly. A search revealed the fact that the brake drums became warm after a spin. A correction of the faults resulted in maximum efficiency.

Unnecessary resistance may occur in the

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transmission and is sometimes caused by the use of a heavy grease because a light lubricant leaks out. It has been demonstrated in tests that from three to four horsepower is consumed by the utilization of too heavy a grease. The universal joints are another source of lost power when not properly lubricated. The radius rods or their equivalents should be perfectly free, also any sliding joints in the driving shaft, as any interference with the rise and fall of the rear axle will cause slip of the driving wheels and loss in speed. Rusty springs and dry shackles prevent free movement, adding their mite to the friction. Thus it will be seen that the proper lubrication of each working part is an important factor.

Regarding valves, it is not as a rule possible to fit larger ones, but alterations may be made to improve their efficiency. Without going into details it may be stated that it is important that the flow of the mixture from the carburetor to the cylinders be not obstructed. Any projections, such as squares or corners on the valve and near

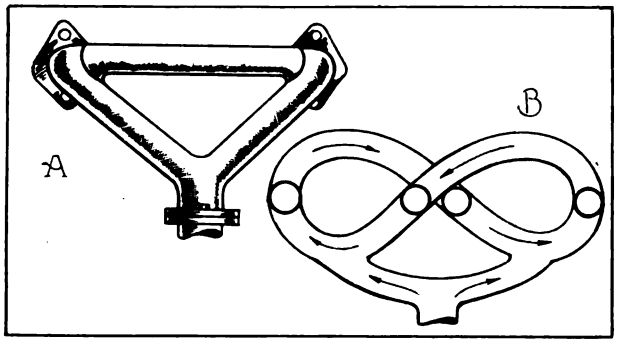


Fig. 2—Improving Design of Intake Manifold: A, Connecting Tops of Y Shaped Member; B, Type Utilized on Racing Cars and Which Causes the Gases to Travel in One Direction Only.

its seat, tend to obstruct and deflect the gases.

An improvement can be made in the inlet valve as shown at Fig. 1 A. The same size valve is retained but the port area has been increased by cutting away a portion of the seating, the metal removed being denoted by the shaded sections. This naturally reduces the obstruction to the incoming gas very materially.

At B is presented a sketch showing how the outline of an inlet valve may be improved and brought nearer the streamline shape. The suggestion was made by a prominent English engineer in Internal Combustion Engineering. In order to give the incoming gas a flow as easy as possible, a part of the under side of the inlet valve is removed. This part of the valve requires the most treatment, leaving only a narrow conical face for the proper seating. It was suggested that the valve guide be rounded off correspondingly at its upper end, and that the neck of the valve also be reduced to minimize the obstruction to the under side, but this would appear to weaken the valve at a point where it receives its maximum stress, particularly with quick drop cams and strong valve springs. The exhaust valve could be treated similarly by cutting away the metal as shown at A and enlarging the port area.

Sometimes a considerable improvement is possible by fitting a new intake manifold, especially if the old member be small and its bends such as to obstruct the flow of the gases. To obtain efficiency the intake pipe should be of liberal dimensions and have easy bends, such as is noted in modern motor construction.

With a motor firing 1, 3, 4, 2, the gas goes first to the cylinder, next to the radiator, and is then forced to travel to the third and fourth, after which it must flow back to the second. There is a pulsating effect set up, which at high speeds becomes an important factor and with poorly designed manifolds prevents two cylinders from being filled properly.

At Fig. 2 A is presented a suggestion for improving a Y shaped intake manifold. It consists of connecting the tops of the Y together, giving the gas a short cut. On some racing cars utilized abroad, induction pipes of an eight shape are employed, such as shown at B. The advantage of this construction is that as successive inlet valves open the mixture continues to travel in one direction, eliminating the reversal of the gases with the usual form.

As the use of the cut-out is prohibited in many states a loss of power may be caused by back pressure existing in the exhaust pipe and muffler. A large pipe of easy bends is to be preferred to a smaller one, and a long member is better than a short as the momentum of the exhaust gases passing through it has a slight scavenging effect.

Whether an alteration of the timing of the valves would improve the power would depend on the condition of the cams, gears, etc. If they be worn badly the timing gear might be set one tooth ahead and the results noted. As a rule the timing given by the maker is best used. Two spark plugs in each cylinder and fired simultaneously, are held to improve the power, but the results obtained would depend upon the location of the plugs.

The writer does not advise making any radical changes in the power plant as the expense would be apt to be considerable. A thorough overhaul would prove more satisfactory.

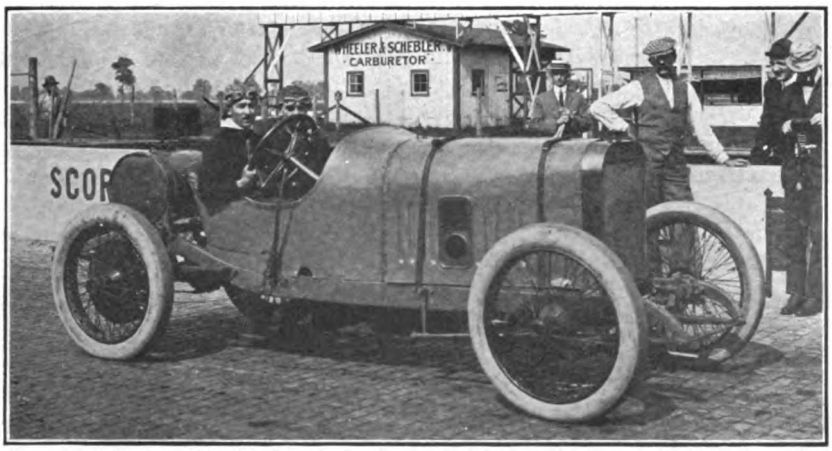
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GOUX TAKES CHIEF SPEEDWAY HONORS.

Wishart Second with Mercer---Spectacular Finish for Merz and Stutz in Third Place---Race Much Slower Than Last Year---Splendid Driving the Feature.

JULES Goux of France, driving a French built Peugeot car, won the third annual international sweepstakes race on the Indianapolis speedway Memorial Day, his speed being 75.92 miles an hour, as against 78.73 for Joseph Dawson in a National last year and 74.65 for Ray Harroun in a Marmon in 1911. Spencer E. Wishart, in a Mercer, one of the smaller cars in the race, was second, and Charles Merz, in a Stutz, was third. The full list of prize winners is given in tabular form elsewhere, and this table also shows that the first four cars to finish a year ago travelled at faster speed than the winner in this third event.

The result, insofar as determining the winner was concerned, occasioned very little surprise, since the Peugeot has long been regarded as the fastest machine produced abroad, but it was expected that much greater speed would be made. Goux won last year's Sarthe Grand Prix in France with a car of this make, covering 402 miles of highway at a speed of about 73 miles an hour. While Goux is considered one of the best drivers in Europe, his work has been confined almost entirely to road racing, until recently, when he tried out the so-called Indianapolis machine on the Brooklands track, Weybridge, England, covering 106 miles 307 yards in an hour, and creating a new world's record. It is only fair to state, in this connection, that Goux maintains he was not permitted by his manager to drive his car as fast as he desired, greater speed not being necessary to win the race. And in this comment is found a clue as to the methods used by foreign drivers, Americans being free to exercise their own judgment while at the wheel.



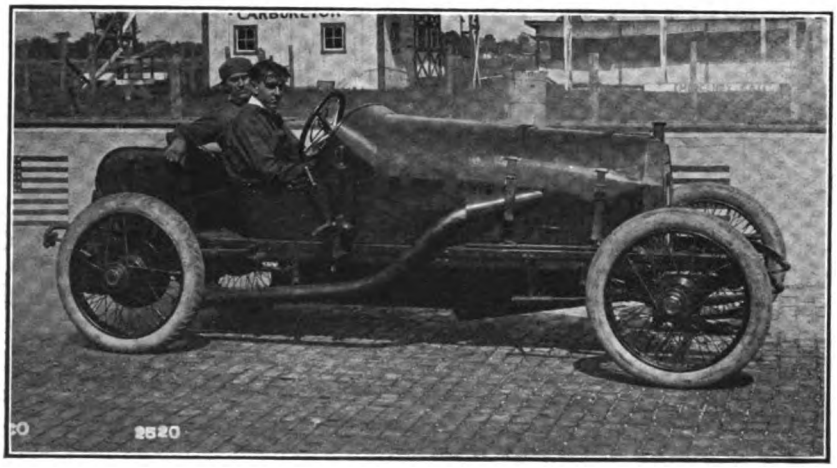
Jules Goux of France and the Peugeot, Winning Combination in the Third Annual International Sweepstakes Event at Indianapolis.

Another element which worked against fast time was the excessive heat. This not only was hard on the tires, tire changes being much more frequent than heretofore, but it had its disastrous effect upon the drivers, several of whom were replaced at intervals by those who had been retired from the race and by others who were not scheduled to appear. The fact that the event was limited to cars of not more than 450 cubic inches piston displacement, instead of being a free-for-all as in previous years, probably also was reflected in the final score.

An accompanying table sets forth some of the intermediate times, by which it may be determined that several new class records were established. The free-for-all marks were never endangered, it would appear, and with the exception of that for 50 miles all these were created during the 500-mile event of 1912.

Over 100,000 persons saw the race, according to the statement of the management, and seldom, if ever, has it been possible to witness a better exhibition of generalship in a high speed event. Only one serious accident took place. According to eye witnesses, the Mason, driven by Tower was approaching the west end of the bleachers at a fair rate of speed when one of the front wheels was seen to give way. The car rushed toward the retaining wall and then backed down across the course until it struck the soft earth at the side of the track, where it turned completely over. Tower and his mechanician, Lee Gunning, were thrown out, the former receiving a broken leg and the latter internal injuries. Examination of the machine immediately after the accident failed to disclose the cause.

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Spencer E. Wishart and the Mercer Car He Drove to Second Place in the Memorial Day 500-Mile Race.

Twice during the race one of the machines was discovered to be in flames. At 137.5 miles, Burman's Keeton, which had been showing some of the best speed of the day up to that time, caught fire. He put out the blaze with sand and returned to the pits, losing much valuable time. Later, soon after returning to the track, he was driving beside the Sunbeam, when that car lost a tire. A piece of this casing struck the Keeton's gasoline tank and thereafter it became necessary to stop the leak with chewing gum, etc., at frequent intervals. Burman and Hugh Hughes, who spelled him at times, managed to keep the car on the track and at the finish it was still running, the only one of the 27 starters which was running and failed to get a prize. Despite these two pieces of hard luck the Keeton gave every evidence of being a splendid machine, and the crowd shared in the disappointment which followed its initial appearance in racing.

On the next to the last lap the Stutz, driven by Merz, was seen to be in flames. Starter Root gave the machine the green flag, indicating but one more lap to go, and instead of stopping to put out the fire, Merz and his mechanician, Harry Martin, apparently gave no heed to the flames, which were then blowing in their faces. The final 2.5 miles were driven at the same pace as the others, and just before the car was slowed down for the finish line, Martin crawled out on the hood and loosened the straps, while Merz stood up in his seat, his hand on the wheel.

This winning of the third prize by one Stutz was preceded by a practical duplication of the ill luck which befell Ralph DePalma and his Mercedes in last year's event. It will be remembered that last year DePalma had been in the lead practically throughout the race until the next to the last lap, when his Mercedes failed him and although he and his mechanician attempted to roll it into the pits by hand, he was forced to retire with the sweepstakes award almost in sight. This year Gilbert Anderson and his Stutz, which had been in second place since the 150th mile, stopped at the pits for tires at the end of 495 miles. He inadvertently stalled his engine, and when his mechanician attempted to crank it again he was unable to turn it over. The trouble could not be located and remedied before the race was finished, and second place went to Wishart in a Mercer.

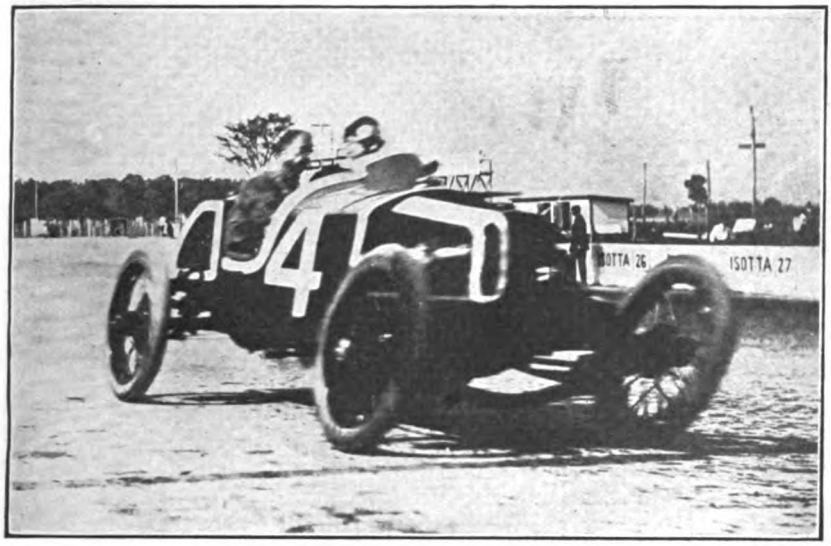
At one point in the race Evans' Mason lost a tire and in the double skid which followed the machine was turned completely around. The mechanician cranked the engine and the car was under way to the pits without serious loss of time. No one was injured. This completes the list of accidents.

The racing machines lined up behind the president's car for the formal parade around the



Charles Merz Won Third Prize with a Stutz in One of the Most Spectacular Finishes Ever Witnessed.

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Robert Burman and the Keeton, Which Gave a Splendid Exhibition Despite Repeated Ill Luck.

track and were sent away with a flying start. Evans was the first to complete the initial round of the course, with Goux close behind him and Herr's Stutz in third place. The second time around Goux was leading Evans, and Clark and the Tulsa had replaced Herr. Evans regained his lead on the third lap, but failed to show up when Goux appeared for the fourth time. Haupt's Mason took second place at this point.

During Evans' temporary retirement Goux came very near lapping him, but the Mason was back on the track just in time. Goux lapped Disbrow and Clark on the seventh round. On the eighth the Schacht made the first stop for tires, and thereafter there was plenty of work for the men in the pits. Goux made his first stop for tires at the end of 25 miles, and Burman took the lead, followed by DePalma's Mercer, Nikrent's Case and Haupt's Mason, in that order.

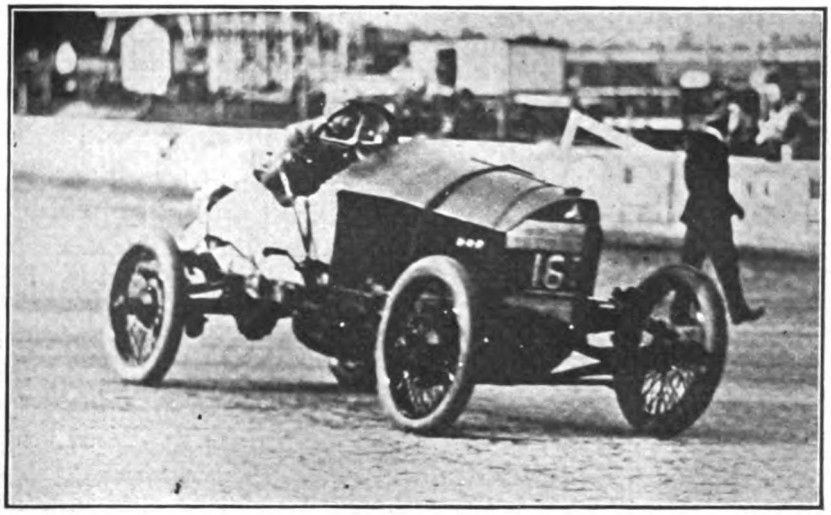
DePalma's ill luck appeared to be with him as he was the first to be retired permanently on the 17th lap. Harry Endicott followed him closely. Jenkins and Zucarrelli both were out at the conclusion of 50 miles. At this point Guyot's Sunbeam was in the lead, his time for the distance being 37:29.29, a new class record.

Burman again took the lead at the end of 60 miles. At 75 he was still leading with Goux and Guyot fighting for second place, and Haupt not far behind the three. At 87.5 miles Nikrent had worked into second place, with Burman leading him by only 30 seconds. At 100 miles it was Burman, Goux and Anderson, with a new class record of 1:15:50.55 to Burman's credit.

Grant was out at 85 miles and his teammate, Trucco, followed him at 90. Later, Grant was in the race for a short time, taking the wheel of the Henderson from Knipper for some little distance. William Endicott went out at 120 miles, when Burman was leading, with Goux, Anderson and Merz behind him. Goux went into first place when Burman's car took fire, but lost his position to Anderson when forced to stop at 140 miles. At 150 miles it was Goux, Anderson, Guyot, Merz and Wishart, with the others making up the field.

Mulford had replaced Merz in fourth position at 200 miles, at which point Goux took the Remy grand brassard and Remy trophy. Mulford's first stop, and that for gasoline and oil, was made at 285 miles. This was the best showing of any car in the race, and it may be well to add that the machine was the same as that which failed DePalma on the final stretch a year ago.

At 300 miles Goux was the victor of the Prest-O-Lite trophy. Anderson was in second place and Mulford in third. These positions were unchanged at 380 miles, when Merz made one of



T. Pillette's Mercedes-Knight, the Smallest Car in the Race, Using First Knight Motor in an American Long Distance Event.

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TIME AND SPEED OF PRIZE WINNERS IN THE THREE 500-MILE RACES

1913.			1912.			1911.		
Car and Driver	Time	M.P.H.	Car and Driver	Time	M.P.H.	Car and Driver.	Time	M.P.H.
Peugeot, Goux	6:35:05.00	75:92	National, Dawson.	6:21:06	78.73	Marmon, Harroun.	6:42:08	74.65
Mercer, Wishart	6:48:13.40	73.49	Fiat, Tetzlaff	6:31:29	76.63	Lozier, Mulford	6:43:51	74.29
Stutz, Merz	6:48:49.25	73.38	Mercer, Hughes	6:33:09	76.30	Fiat, Bruce-Brown.	6:52:29	72.74
Sunbeam, Guyot	7:02:58.95	70.92	Stutz, Merz	6:34:40	75.99	Mercedes, Wishart.	6:52:57	72.65
Mercedes-Knight, Pilette	7:20:13.00	68.14	Schacht, Endicott.	6:46:28	73.87	Marmon, Dawson.	6:54:37	72.36
Fox, Wilcox	7:23:26.55	67.65	Stutz, Zengel	6:50:28	73.09	Simplex, DePalma.	7:02:02	71.08
Mercedes, Mulford	7:28:05.50	66.95	White, Jenkins	6:52:38	72.70	National, Merz	7:06:20	70.37
Case, Disbrow	7:29:09.00	66.67	Lozier, Horan	6:59:38	71.49	Amplex, Turner	7:15:56	68.79
Mason, Haupt	7:52:35.10	63.47	National, Wilcox.	7:11:30	69.54	Knox, Belcher	7:19:09	68.31
Tulsa, Clark	7:56:14.25	62.99	Knox, Mulford	8:53:00	56.29	Jackson, Cobe	7:21:50	67.89
						Stutz, Anderson	7:22:55	67.74
						Mercer, Hughes	7:23:32	67.65

the quickest tire changes of the day, being off the track hardly more than 30 seconds. At 400 miles Goux took the Wheeler-Schebler trophy. Shortly afterward, at 420 miles, Goux and Anderson entered into one of the prettiest brushes of the entire race, but Goux was not to be dislodged from first position.

The finish already has been told. There was no doubt concerning first place. Anderson's unfortunate failure at 495 miles, moved all other contestants up one point each. Mulford had long since lost his position as third, and Wishart immediately went into second place. Merz seemed secure in third, the only doubtful factor being the fire mentioned above. The other contestants were too far behind to disturb these positions unless other failures should take place.

If the result of the race depended largely upon the tires, then a substantial share of the credit should fall to the product of the Firestone Tire & Rubber Company, Akron, O., for Firestone tires were fitted to the machines finishing in first and second place. The two front shoes on the winning Peugeot went through the entire race without change.

Despite the fact that tire changes were frequent, there were several sets which stood forth prominent in this contest. Among these were the Braender shoes, made by the Braender Rubber & Tire Company, Rutherford, N. J., fitted to Mulford's Mercedes, finishing in seventh place. It already has been mentioned that Mulford's first stop was at the end of 285 miles. He did not stop throughout the entire race because of tire trouble, the four original Braender shoes going the entire 500 miles without changing.

Equally as gratifying was the service rendered by the Miller tires, made by the Miller Rubber Company, Akron, O., and used on Louis Disbrow's Case, in eighth place, which went through the entire race without trouble. Similar shoes were fitted to Tetzlaff's Isotta, which went out at 290 miles, and with the same results.

The ignition is another important factor in long distance events. Bosch magnetos were fitted to the first seven cars to finish, and seven of the prize winners also used Bosch plugs. The Bosch Magneto Company, New York City, has forwarded checks for $500, $300 and $200 to the first, second and third place drivers respectively.

The Rayfield carburetor, made by the Findeisen & Kropf Manufacturing Company, Chicago, was fitted to the Mercer finishing in second place, and therefore is entitled to claim American honors for the event. Rayfields were utilized by two other machines finishing within the prize money. Burman started the race with another make but changed to the Rayfield after the fire.

Truffault-Hartford shock absorbers were used by the cars finishing in first, second and third place, and were fitted to 25 of the 27 machines which started. It is maintained by the maker, the Hartford Suspension Company, Jersey City.

COMPARISON OF RECORDS CREATED ON INDIANAPOLIS SPEEDWAY.

	New Class Marks.		Old Class Records.		Regardless of Class.	
Miles	Car and Driver	Time	Car and Driver	Time	Car and Driver	Time
50	Sunbeam, Guyot	37:29.29	Marmon, Dawson	39:47.35	Lozier, Tetzlaff	36:35.80
100	Keeton, Burman	1:15:50.55	National, Kincaid	1:23:43.11	Fiat, Tetzlaff	1:13:37.25
150	Peugeot, Goux	2:00:25.65	Buick, Chevrolet	2:05:02.17	Fiat, Tetzlaff	1:40:52.84
200	Peugeot, Goux	2:33:30.40	Buick, Chevrolet	2:46:48.47	Fiat, Tetzlaff	2:25:59.52
250	Peugeot, Goux		Buick, Burman	4:38:57.40	Fiat, Tetzlaff	3:07:13.94
300	Peugeot, Goux	3:52:26.75			National, Dawson	3:48:49.30
350	Peugeot, Goux	4:32:03.90			National, Dawson	4:25:15.27
400	Peugeot, Goux	5:09:53.00			National, Dawson	5:04:14.23
450	Peugeot, Goux	5:52:20.20			National, Dawson	5:44:04.54
500	Peugeot, Goux	6:31:43.45			National, Dawson	6:21:06.03

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N. J., that these devices added materially to the comfort and safety of the contestants.

The accessory equipment of the various cars, as supplied either by the entrant of the machine or the maker of the equipment, is to be found in an accompanying table.

This was the first American long distance event in which the Knight motor has been entered. Two cars utilizing this type of engine were entered, although the Pennebaker, with a reconstructed Stearns-Knight engine, was withdrawn shortly before the start. The Mercedes-Knight, driven by Pilette, finished in fifth place. This would appear to establish the Knight motor as being capable of competing successfully against engines of the so-called poppet valve type. It may be added that the Mercedes-Knight machine was the smallest car in the race.

The winning Peugeot is of particular interest because this make of machine is somewhat new in this country. The motor is with cylinders cast en bloc, and with the valves set into the cylinder heads at an angle of about 30 degrees. The valves are in duplicate throughout and the seats are on the under side of the cylinder casting so that they are closed when they are raised. They are operated by a single camshaft running over the top of the cylinders, covered by an aluminum housing and driven by a vertical shaft from the crankshaft. Oil is forced to the engine bearings at a pressure of 30 pounds to the square inch as compared with a pressure of about two pounds with most American racing machines. The weight of the car, with tanks empty, is given as 2200 pounds. The capacity of the gasoline tank is 36 gallons and of the oil tank, eight. The wheelbase is 108 inches.

No less than 15 of the 27 cars were fitted with wire wheels, this being a much larger percentage than has been true in former contests in America. Rudge-Whitworth wheels, made by the Standard Roller Bearing Company, Philadelphia, and sold through the George W. Houk Company of that city, were utilized on the cars to finish in first and second place, as well as on a number of other machines. Merz's Stutz was fitted with wood wheels.

The accident to the Keeton, driven by Burman, was particularly unfortunate, because the machine was well established in first place when it happened and lost its opportunity to win the event through no fault of its own. That it was able to continue for 465 miles after having been damaged by fire and with its gasoline tank leaking as the result of a puncture caused by a flying valve from the Sunbeam's bursted tire, would seem to indicate its superior ability. It may be added that during the time it was on the track only one of its four Firestone shoes was changed. Its next to the last lap was the fastest of the day, and Burman drove the car, without change, the following Sunday, covering one lap of the speedway in 1:36, or at a speed of 93.5 miles an hour. Burman has challenged Goux for a 500-mile match race between the Keeton and the winning Peugeot, and it is understood that A. G. Kaufman, president of Peugeot Auto Import Company, New York City, has accepted in behalf of Goux.

DETAILS OF CARS AND EQUIPMENT TAKING PART IN THE 500-MILE RACE.

No.	Car	Driver	Cyl.	Bore	Stroke	P. Dis.	Magneto	Plugs	Carburetor	Tires
1	Nyberg	H. Endicott	6	4.00	5.00	376.9	Remy	Red Head	Schebler	Goodyear
2	Stutz	Merz	4	4.81	5.50	400.2	Bosch	Bosch	Schebler	.....
3	Stutz	Anderson	4	4.81	5.50	400.2	Bosch	Bosch	Schebler	.....
4	Keeton	Burman	4	5.10	5.50	448.7	Remy	A. C.	.....	Firestone
5	Mason	Evans	4	4.31	6.00	350.5	Splitdorf	.....	Schebler	Michelin
6	Mason	Tower	4	4.31	6.00	350.5	Splitdorf	.....	Schebler	.....
8	Stutz	Herr	4	4.81	5.50	400.2	Bosch	Bosch	Schebler	.....
9	Sunbeam	Guyot	6	3.54	6.29	367.5	Bosch	Bosch	Caudel	Dunlop
10	Henderson	Knipper	4	4.31	6.00	350.5	Bosch	Bosch	Rayfield?	Goodyear?
12	Fox	Wilcox	4	4.75	5.50	389.9	Bosch	Bosch	Miller	Michelin
15	Peugeot	Zucarrelli	4	4.40	7.20	442.5	Bosch	Bosch	Caudel	.....
16	Peugeot	Goux	4	4.40	7.20	442.5	Bosch	Bosch	Caudel	Firestone
17	Anel	Liesaw	4	4.50	5.00	318.1	Bosch	Bosch	.....	Diamond
18	Schacht	Jenkins	4	4.87	5.75	429.3	Splitdorf	Bosch	Rayfield	Michelin
19	Mercer	Bragg	4	4.80	6.18	448.0	Bosch	Bosch	Rayfield	.....
21	Mercer	DePalma	4	4.80	6.18	448.0	Bosch	Bosch	Rayfield	.....
22	Mercer	Wishart	4	4.37	5.00	300.7	Bosch	Bosch	Rayfield	Firestone
23	Mercedes-Knight	Pilette	4	3.93	5.12	251.3	Bosch	Bosch	Mercedes	Michelin
25	Tulsa	Clark	4	4.75	5.50	389.9	Bosch	Bosch	.....	Diamond
26	Isotta	Grant	4	4.72	6.30	443.8	Bosch	Bosch	Zenith	.....
27	Isotta	Tetzlaff	4	4.72	6.30	443.8	Bosch	Bosch	Zenith	Miller
28	Isotta	Trucco	4	4.72	6.30	443.8	Bosch	Bosch	Zenith	.....
29	Mercedes	Mulford	4	4.40	7.12	434.6	Bosch	Bosch	Rayfield	Braender
31	Case	Disbrow	4	5.10	5.50	448.6	Splitdorf	Red Head	Rayfield	Miller
32	Case	Nikrent	4	5.10	5.50	448.6	Splitdorf	Red Head	Rayfield	Miller
33	Case	W. Endicott	6	4.25	5.00	425.4	Splitdorf	Red Head	Rayfield	.....
35	Mason	Haupt	4	4.31	6.00	350.0	Splitdorf	.....	.....	Michelin

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(Continued from Page 32.)

ing the most practical and accurate. The only observation necessary on this method is one dealing with the reconsideration of L at a later period. When the life of a vehicle is reconsidered, the unexpired capital outlay should be taken as the basis for the revised charge for depreciation. Thus suppose $\frac{C-R}{L} = \frac{500-50}{5}$, the annual depreciation being £90 ($437.98); by the end of two years the capital outlay would have been written down to £320 ($1557.33). If the estimate of life be then revised and extended to seven years in all, with five more to run, then $\frac{C-R}{L} = \frac{320-50}{5}$ = £54 ($262.78) annual depreciation.

Obsolescence is a factor which has to be considered, as it is by no means improbable that some combination of circumstances may render it desirable to dispose of a particular vehicle before it is really worn out. From a strict accounting point of view obsolescence may not be depreciation, but the factor is at least of sufficient importance to "round up" any percentage that may be determined by other considerations, and if, in the future, by perfecting the machines, their ordinary working life can be reckoned as longer than it is at present, obsolescence will become of more importance, for a machine which is still quite efficient mechanically may be rendered uneconomical by the introduction of improved types. When such time arrives it may be prudent to make provision under this head, which while not strictly proper to depreciation may very conveniently be connoted.

There remains one other detail for consideration, namely, the treatment of small additions to plant. The effective life of the additions may or may not be coterminous with that of the vehicle, and any attempt to bring their depreciation within the scheme for the depreciation of the vehicle itself would cause complications which it would not be worth while to incur. The practise recommended is to regard such small additions as chargeable to maintenance, which, in effect, means writing them off at 100 per cent. in their year of purchase.

WOOD AND METAL MOTOR TRUCK WHEELS.

(Extract from paper read by Arthur J. Slade, member Society of Automobile Engineers, at midsummer meeting.)

It is perhaps natural that wheels built of wood should have been developed to a high state of perfection in this country where such a large and varied supply of wood is available. The rapid development of the West called for vehicles of rugged and sturdy type for the pioneer's use in opening up a country without roads of any sort. Later the transportation companies, operating stage coaches over roads little more than trails, as new sections were settled, and eventually the agriculturist, who even now often operates his farm wagons over roads unworthy the name, demanded the highest quality of wheels.

The majority of the motor trucks built in this country have been equipped with wooden wheels; the earlier wheels conforming closely to the design of horse-drawn wagon wheels, especially with regard to size of spokes, but also, in some instances conforming to wagon wheel practise even to the extent of wooden hubs. Some of these wheels, dating back perhaps 10 or 12 years, are still in service on motor trucks in New York City.

Development of Wood Wheels.

The first radical improvement was in the substitution of metal for wood hubs, primarily to make possible the use of anti-friction bearings. Next came a radical change in the matter of spokes. When it is considered that a wagon wheel on a five-ton capacity vehicle seldom has a tire exceeding four inches in width, whereas the tires on the five-ton motor truck will usually total from 10 to 12 inches in width, it becomes obvious that the wide felloe on the truck wheel should be supported by a spoke of much greater width than the narrow felloe of the wagon wheel.

Since 1907, when the importation into America of one of the most successful European trucks began, the improvement in the design, as well as construction, of wood wheels has been very marked. At that time one of our leading wheel builders undertook to practically duplicate these European wheels with spokes about five inches in width, flaring at the outer end so as to form an adequate support for the felloe, and also of sufficient cross section to ensure a good shoulder on the end of the spoke against the inner surface of the felloe. Ever since that date the wheel builder in question has been manufacturing wheels, from designs similar to this, with great success; and, although some other wheel builders contended at the time that it was not feasible to procure wooden billets of a size suitable to finish spokes of such unusual dimensions, the majority, if not all, of the wheel builders catering to the motor truck industry are now building wood wheels of this general type.

Early Metal Wheels.

It must not be assumed, however, that the practise of motor truck builders in this country has been confined exclusively to wooden wheels. As far back as 1858 and 1862 motor trucks are reported to have been built, in an experimental way, with steel wheels. In the years 1903 and 1904, when the motor truck industry in this country was making a definite commercial start, the Gibbs Engineering & Manufacturing Company equipped trucks with cast steel and steel disc wheels. The cast steel wheels were similar to those now being advocated by several manufacturers, having hollow spokes integral with hubs and felloes. They were made of crucible steel and used a tire constructed from a combination of wood, steel and rubber. About 20 five-ton trucks were built and the wheels were found to be on the whole satisfactory. The disc wheels were made of boiler plate, riveted to cast steel hubs and to a steel tire band. These wheels were also said to have given satisfactory service, but the company building the trucks in question no longer exists.

In 1905 the Couple-Gear Freight-Wheel Company brought out a line of trucks equipped with wheels made up of steel plates. In the interior of the wheels an electric motor was mounted, and this same construction has been followed by that company up to the present date. At about the same time the Four-Wheel-Drive Wagon Company of Milwaukee, brought out five and 10-ton capacity gasoline trucks equipped with wheels on which the tires were segments of rock elm and the side plates were steel discs. This company is not now in existence.

In 1906 a metal wheel, known as the "Indestructible Steel Wheel," was introduced to the market in Chicago. These wheels were built of side discs of steel, reinforced inside with structural shapes; the various members of the wheel being riveted together. They were used on trucks built by the Reliance, Commerce, Rapid, Plymouth, Grabowsky and Packard companies, of which all but the latter have discontinued manufacturing, and the Packard company only used a limited number. The Rapid company is said to have continued their use the longest, covering a period of about two years. The severe strains and shocks due to irregular road surfaces are reported to have loosened the rivets holding the various members together, and the wheels were not found to be permanently satisfactory.

In 1908 the Morgan truck of five tons capacity was brought out with a disc type of cast steel wheel which proved unsatisfactory and was superseded in 1910 by a cast steel wheel with spokes of the general design with which we are familiar.

In 1909 the White company introduced steel wheels on the larger sizes of its commercial vehicles. It is understood that modification of the design of these wheels was necessary to eliminate breaking of the spokes near their point of union with the felloe, and their present design seems comparatively free from breakage. The A. O. Smith Company on its heavy gas trucks has used cast steel wheels since 1911. The same is true of the Locomobile company on its well known trucks.

From time to time trucks have been imported from abroad equipped with steel wheels, notably the Orion, Bussing, Gaggenau, etc. However, the best known European trucks coming into this country are equipped with wood wheels, notably the De Dion and Saurer. I wish to acknowledge my indebtedness to Charles E. Stone, member of this society, for his assistance in compiling the above facts.

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Current Practise.

It will be noted that comparatively few well-known truck builders in this country are at present using metal wheels and those who are using them have not previously used wooden wheels.

There is one notable exception, however, the Pierce-Arrow Motor Car Company, on some of whose trucks I have recently seen cast steel wheels, although since the introduction of the Pierce five-ton truck on the market wooden wheels have been standard. It is hoped the engineers of that company will give us the benefit of their experience and their reasons for making this change.

The vast majority of motor truck manufacturers, including those whose product dates back to the beginning of the motor truck industry in this country, have used wooden wheels consistently, improving their design from time to time, but not abandoning a material for wheel construction which has on the whole proved entirely satisfactory.

Through the courtesy of George R. Wadsworth, member of this society, I have been furnished with reports on the mileage and condition of the wood wheels on a large group of gas trucks of three, four and five-ton capacity, which show that in some cases the mileage covered approaches closely to 70,000. On the assumption that the tire mileage secured on these trucks is 10,000 miles a tire, this would mean that some of the wheels have been subjected to six tire changes. The report states, regarding these wheels, that "they were all in first class condition and not a moment's inconvenience or delay has been caused by them and there is not the slightest indication of trouble in the near future." These wheels, it is scarcely necessary to say, are of modern design, are accurately constructed of suitable material, and are carefully inspected for conformation to the accepted S. A. E. motor truck wheels standards. The contention that wood wheels get out of round and present difficulties in tire application does not seem to be substantiated in this case.

Claims for the Metal Wheel.

At the present time there is undoubtedly a general effort being made by manufacturers of parts for motor trucks to add metal wheels to their product; and with the exception of one manufacturer, who proposes to build wheels of malleable iron, all of them are building their wheels of cast steel.

What, then, are the specific advantages offered by metal wheels which should influence a motor truck designer to specify metal construction rather than wood? The advantage must be such that it can be proved to the purchaser of the truck that he will secure an actual financial gain by the change which the engineer proposes, because to the purchaser the prime questions are the expense of operating and maintaining the truck over a period of years and the earnings or savings which the vehicle will effect. Theoretical considerations, unless borne out and proved in practise, are unavailing. Practical service conditions count with the hard-headed business man—not laboratory or experimental tests and calculations.

First, it is claimed by one of our members, who is chief engineer of a company about to place cast steel wheels on the market, that: "It is now conclusively proven that there is a distinct saving in tires on steel wheels. Some of the largest tire manufacturers guarantee as much as 30 to 40 per cent. longer life on steel than wood." Inquiry made of the leading tire manufacturing companies, verbally or by letter, has failed to verify that statement. The opinion of several tire company officials seems to be personally in favor of metal wheels for the one reason that they are likely to be made more accurately to size, but the tire companies positively decline to guarantee an added mile or to even express the opinion that added mileage can be expected.

As to the question of accuracy of workmanship, it is entirely feasible for the wood wheel manufacturers, under the present S. A. E. standards, equipping the wheels with S. A. E. bands, to work within the necessary tolerances and provide wheels which will have the accuracy required. Accuracy in workmanship is a question of care in construction and careful inspection and the manufacturer who insists upon accurate wood wheels conforming to S. A. E. standards has no trouble in securing them.

Another claim made for metal wheels is that their strength is greater than wood wheels. Assuming the cast steel wheels to be free from defects, and to have the chemical and physical characteristics recommended by the iron and steel division, these wheels certainly develop marvelous resistance to shocks. I witnessed a test of such a wheel recently which was subjected to the impact of a weight swung as a pendulum against the side of the felloe and the wheel was deformed beyond the semblance of a wheel and even then did not show any fracture. At the same time, as has been pointed out by the iron and steel division, steel castings cannot be inspected against blow holes, and had the wheel in question contained some concealed defect, failure in testing would probably have resulted. The difficulty in securing uniform steel castings free from defects and conforming to the S. A. E. standards is generally conceded and several of the foundries making cast steel wheels in this country at the present time are having difficulty in making steel castings of other motor truck parts which will pass the inspection of some of their customers. As to the strength of well constructed and properly designed wood wheels, the front wheel of a truck manufactured by one of my clients came in contact recently with a road obstruction with such impact that the strain broke the steering gear, but the wheel was uninjured, and on another truck a rear wheel was subjected to such an impact that the axle spindle was bent without injury to the wheel. Therefore, on the question of strength, that of the high-grade wood wheel is entirely adequate for commercial purposes.

The contention is also made that the metal wheel will dissipate heat more effectively than the wood wheel. There has come under my observation no case in which a truck tire on a modern motor truck has been injured by lack of heat radiation under service conditions. I assume that the heat developed in a solid rubber tire is due to the deformation of the rubber and this is greatest near the surface of the rubber which comes in contact with the ground. This surface is in contact with the air and I should expect that the heat would be radiated through the air more easily than transmitted through the base of the tire to the wheel and hence radiated by the wheel, felloe and spokes.

Cost and Weight.

The fourth point in considering the relative merits of wood and metal wheels is the comparative cost and weight. From information received from one of my clients regarding wood wheels being regularly manufactured and used on this company's trucks, and from information received from the chief engineer of one of the companies which is bringing out cast steel wheels, the following comparison of weight and cost has been made:

Set of wheels for three-ton truck to take 36 by five-inch tires, front; and 40 by four-inch dual tires, rear; wood wheels equipped with S. A. E. band and Timken hubs and flanges—steel wheels having band and hubs integral—

	Weight.	
Wood	Steel	Increase of Steel Over Wood
Front 122 lb. each	151 lb.	12.4%
Rear 212 lb. each	373 lb.	76.0%
Set 668 lb. each	1048 lb.	57.0%—380 lb.
	Cost.	
Front each $20.00	$26.80	34.0%
Rear each 30.00	52.10	74.0%
Set each 100.00	157.80	57.8%—$57.80

Information obtained from a European manufacturer of cast steel wheels indicates that their weight is substantially the same as American cast steel wheels, but the price is 25 to 50 per cent. higher, thereby placing the steel wheel at a still further disadvantage as far as cost is concerned. Consequently, it would appear that the cast steel wheels are both costlier and heavier than the wood wheels. The burden of proof seems to rest with the metal wheel manufacturer, that they have an economic advantage over the wood wheels, resulting in a financial saving to the owner of the truck equipped with metal wheels.

Drop Forgings.

There is one type of metal wheel which might overcome the disadvantage, real or fancied, of the wood wheel, and which would at the same time eliminate the element of risk always existent in a casting, and also the criticism of the built-up structural steel wheel, the loosening rivets. This is the drop forged wheel. Drop forgings of high grade steel, which after suitable heat treatments, develop extraordinary physical characteristics, would, in my opinion, be an ideal construction, unless their first cost proved prohibitive. I hope we may hear something from the drop forging experts among our membership in regard to the feasibility of such a construction for motor truck wheels.

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IN THE REALM OF THE MOTORCYCLIST.

Another Plan to Redistrict F. A. M. So That All Sections May Be Represented on the Board of Directors---General News of the Industry and the Clubs.

DIRECTOR J. Leo Sauer of New York, chairman of the legal action committee of the F. A. M., has presented his official resignation from the directorate to take effect at the annual convention at Denver, Col. His term does not expire until August, 1914, but he is willing to retire a year in advance in order that certain measures may be carried through which he believes will benefit the organization as a whole.

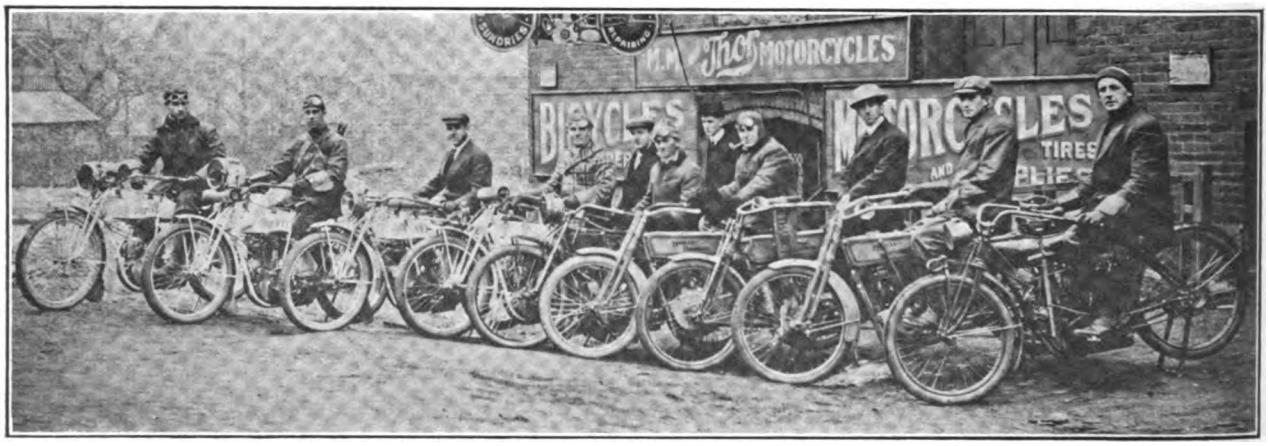
Mr. Sauer, as a result of his recent trip to the Pacific Coast, when the differences between the F. A. M. and W. F. M. were settled, will introduce a by-law at the general session at Denver which will provide for territorial distribution of the directorate. The latter then would consist of nine members, including the president, the preceding ex-president and seven other directors to represent respective divisions. At present there is another director in New York City besides Mr. Sauer and his resignation is offered to open the way for a single director to represent a territory to be known as the Atlantic district, at the same time making easy the transfer of a second director to the Pacific Coast to represent a new district in that section. The amendment to the constitution contemplates the following districts: Pacific Northwest, Pacific Southwest, Rocky Mountain-Mississippi River, Middle West, South, Atlantic and New England.

Ten Win in New Jersey.

Ten of the 17 starters in the recent annual spring run of the North Jersey Motorcycle Club of Paterson, N. J., over a course of 143 miles, were the recipients of prizes. The order of the winners and their scores follows: Everett M. Young, Indian, 941.5; Thomas K. Lee, Thor, 938; Harvey Snyder, Indian, 937.5; Harry Eike, Thor, 890.5; John Kop, Indian, 874; Charles Van Way, Indian, 870; Dr. C. O. Regener, Indian, 857.5; Frank Hunter, Harley-Davidson, 855; L. M. Axford, Harley-Davidson, 854; John Steele, Indian, 849.

Minneapolis Police Modify Order.

A committee representing the motorcycle riders of Minneapolis, Minn., recently visited the chief of police and as the result of a conference an order issued by the police department forbidding the carrying of passengers on motorcycles has been modified to permit tandem riding. The previous ruling of the police chief absolutely prohibited even the carrying of a passenger on a tandem seat.



Thor and Harley-Davidson Riders in Worcester, Mass.: Left to Right, Flint, Goodwin, Orcutt, Zickell, Swenson, Beaudin, Dounker, Tannebring, White, Livingstone.

Yale in Business Life.

Motorcycles have been found very effective in certain lines of business and many firms are using them for quick delivery of parcels and in the taking of orders for goods. The King County Lighting Company, New York City, has a Yale, with tandem and sidecar, made by the Consolidated Manufacturing Company, Toledo, O. The machine is driven by a gas meter mechanic, while his helper rides the tandem and meters are carried in the sidevan. The machine is also used at times for employees to make their routes to

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read meters. A number of wholesale salesmen also utilize Yale machines, among them being Clarence Harrman, coffee salesman; John Siemson, milk; Joseph O'Brien, lace goods; Julius Horn, wholesale butcher; Frederick Rothschild, wholesale butcher; Benjamin Huerlander, wholesale ice salesman.

Free Sanctions for State Meets.

The following resolution has been passed by the competition committee of the Federation of American Motorcyclists, and such sanctions will be issued free of charge with the understanding that the proceeds are to be turned in by the state commissioner to the national treasury to his account and drawn from for F. A. M. expenses:

Resolved, That the chairman of the competition committee be, and is hereby, authorized to grant sanctions free of charge for all competitive events held in direct connection with an annual F. A. M. state convention. Application for such free sanctions shall be made by an authorized state official or state committee, who shall demonstrate to the satisfaction of said chairman that said sanctions are desired for an endurance run, race meet or other competitive event which is part of a programme including the regular annual state F. A. M. convention. Such sanctions shall be granted not more than once a year in each state and may be for an endurance run, race meet, or both.

New Local Commissioners.

The following local commissioners of the F. A. M. have been appointed by the state commissioners: John W. Treat, 29 Palm street, Bangor, Me.; August Ansback, 132 Market street, Louisville, Ky.; Charles Baumeister, Pewee Valley, Ky.; R. K. Judy, Middlesboro, Ky.; B. C. Ogden, 302 East Central avenue, Ashland, Ky.; Henry F. Pardon, Third street, Owensboro, Ky.; Joseph Wandstradt, 26 East Tenth street, Covington, Ky.; G. T. Washington, Russell, Ky.; E. W. Willock, Campbellsville, Ky.; G. R. Moses, 760 Bayard avenue, St. Louis, Mo. Glenn S. Dirlam, Freemont, O., has been appointed state commissioner for Ohio.

Additional Registered Repair Shops.

New repair shops registered with the F. A. M. include the following: Miles McIntyre, 604 South Sixth street, Grants Pass, Ore.; George G. Hayden, Bond street and Bangs avenue, Asbury Park, N. J.; J. W. McGee, 22 West Second street, Tulsa, Okla.

Massachusetts Rules Against Sidecars.

The motorcycle riders of Massachusetts are confronted with a peculiar situation regarding the use of sidecars. The Massachusetts highway commission has made a ruling that the addition of a side or forecar to a motorcycle changes its legal status and that its owner must take out an individual and motor vehicle license before he can legally operate the same on the highways. Secretary Gibson of the F. A. M. has written to the commission, which has decided that this ruling holds good for this calendar year. It is hoped to change this condition at the next session of the legislature and it is also possible that a test case will be brought in the courts.

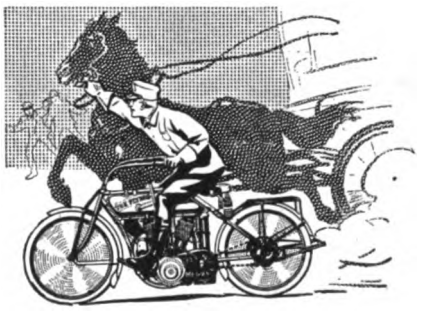
To Celebrate Tenth Birthday.

Plans are being considered for the celebration of the 10th anniversary of the birth of the F. A. M., to be held on a date in September to be selected later, in the city of its founding, Brooklyn, N. Y. Secretary-Treasurer Gibson and other charter members of the organization approve of the idea and there promises to be a large gathering of old time motorcyclists. State Commissioner J. A. Hall of New York has the matter temporarily in charge.

Kirk with Thor Maker.

H. N. Kirk, one of the most prominent men of the bicycle and motorcycle industries in this country and for almost 20 years connected with the Excelsior Supply Company, later the Excelsior Motor Manufacturing & Supply Company, Chicago, has left the service of that concern. June 1 he took charge of the sales department of the Aurora Automatic Machinery Company, Chicago, producer of the Thor motorcycle.

Mr. Kirk will greatly strengthen the Thor



ALWAYS READY FOR ANY EMERGENCY!

With its ability to pick up speed quickly—(60 miles an hour from a standing start within a city block)—the 1918 Flying Merkel Motorcycle is always ready for instantaneous use. These features and the fact that the Flying Merkel Motorcycle is the most economical in the world to operate has led to its universal adoption by Police Departments, Park Boards, Gas Companies, Telephone and Electric Light Companies and all other business concerns and individuals whose requirements demand a sturdy, reliable motorcycle at the minimum cost of upkeep. Remember, the Flying Merkel

"Made Its Name on Merkel Mileage."

Free Art Catalog on Request.

The Miami Cycle & Mfg. Co.

320 Hanover St. Middletown, Ohio, U. S. A.

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Lincoln R. Arnold, Providence, R. I., and His Latest Excelsior Mount.

force and will establish an efficient and capable selling staff which will be able to handle the increased output of the company the next year. His appointment carries out the firm's policy of development inaugurated with the decision to transfer the motorcycle department to larger and more appropriate quarters.

His Second Excelsior Mount.

An accompanying illustration presents Lincoln R. Arnold, son of George C. Arnold, treasurer of the Motor League of Rhode Island, on his Excelsior mount in front of the Worcester Polytechnic Institute, Worcester, Mass., where he is a student in the class of 1916. Young Arnold finds his machine of decided value in furnishing opportunity for getting into the country. He frequently makes week-end trips to his home in Providence, R. I., and often covers the triangle between Worcester, Providence and Boston. This is the second Excelsior he has owned, the first having been purchased through Hirah G. Baxter, the Providence agent, while the 1913 model was secured through the New England Motor & Supply Company, Boston.

Lower Rate on Sidecars.

C. R. Rogers, manufacturer of the Rogers sidecar, which is handled by the Aermore Manufacturing Company, Chicago, has announced that the railroads in the western classification territory have granted a lower freight rate for the shipment of sidecars as the result of a conference which Mr. Rogers held recently with the railroad officials. He represented at the conference the Greyhound, Angsten-Koch and Anders sidecars, in addition to his own interests. Previously the rate has been 2.5 times the first class rate. In future when shipped unassembled and crated, the rate will be twice the first class rate. They also will be allowed to be mixed with motorcycles in carload lots, when the rate will be 1.5 times the first class rate. When shipped separately in carload lots the rate will be at the first class rating.

Spencer Defeats Gove.

The big event at Taunton, Mass., Memorial Day, was the 15-mile professional motorcycle race held under the direction of the Taunton Gentlemen's Driving Club. It was won by William B. Spencer of Attleboro, Mass., although Earl Gove of Brockton, Mass., who had been defeated previously but once since he started racing, was second. Spencer finished about 30 yards ahead of Gove and at no time throughout the entire distance were the riders more than that distance apart. The time was 19:20.2. Cunhar and Guilmet were third and fourth respectively. Spencer made all his gains at the turns, when he let his machine out, while Gove speeded on the stretches and slowed down at the turns.

Long Distance Emblem Run.

H. E. Gale, accompanied by Willard Hudson, recently left the factory of the Emblem Manufacturing Company, Angola, N. Y., maker of Emblem motorcycles, riding a 1913 model, 10 horsepower twin fitted with the Gale sociable seat, which permits the riders to ride side by side, for a run to Boston. The start at Angola was made on Thursday afternoon and Friday morning at 11 they arrived at Boston after riding 19 hours,



Mr. and Mrs. H. E. Gale and an Emblem Mount Fitted with Gale Sociable Seat.

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during which time no mechanical or other trouble was encountered.

The distance covered was nearly 600 miles. Mr. Gale weighs about 180 pounds and his passenger between 180 and 190. Part of the journey was through a severe rain storm, which put the roads in bad condition in spots. The performance of the Emblem machine is a most notable one and one which reflects credit upon its manufacturer.

New York Convention in July.

It has been decided that the annual state convention of the New York F. A. M. will be held this year at Elmira, N. Y., on July 4, 5 and 6, which includes a holiday, Saturday and Sunday. There will undoubtedly be a large attendance and an elaborate programme will be arranged.

Race Dates in Cleveland.

The Luna Park Amusement Company, Cleveland, O., has received sanctions to conduct series of races during the weeks of June 15, 22 and 29.

Can't Get Merkels Fast Enough.

F. J. Barr, shown in the accompanying illustration, is one of the most progressive distributors of Flying Merkel motorcycles in the country. He has as his territory the State of Iowa and was the source of some embarrassment to the maker, the Miami Cycle & Manufacturing Company, Middletown, O., because of his energetic sales campaign in that district. The company is authority for the statement that Mr. Barr could easily have sold 1500 machines in Iowa this season, but because of the press of orders from other parts of the country he could not be supplied with the necessary number. With the constantly increasing size of the Merkel plant this difficulty will soon be overcome and the production will be increased sufficiently to meet all demands, such as those made by Mr. Barr.

Enjoy Sidecar Trip.

Mr. and Mrs. J. W. Newton of Fall River, Mass., recently enjoyed a trip from that city to Monson, Mass., and return, on an Excelsior motorcycle, equipped with a De Luxe sidecar. The distance was 210 miles and included the famous Leicester hill at Leicester, Mass. Mr. and Mrs. Newton started at 4:30 in the morning and arrived back at Fall River at 7:45 in the evening.

Club Notes, Here and There.

Members of the Worcester Motorcycle Club, Worcester, Mass., recently held a pleasure run to Springfield, Mass., 35 persons enjoying the journey. After luncheon the motorcyclists went to the Springfield driving park, where their machines were tried out and a number of impromptu races were held.

The St. Peter Motorcycle Club has been formed at St. Peter, Minn., and a number of trips through southern Minnesota are being planned for the summer.

A number of club runs have been arranged for the next few months by the members of the Fremont Motorcycle Club, Fremont, O. Port Clinton, Lakeside, Marblehead and Toledo will be included in the list.

At a meeting of 25 motorcycle riders at Bucyrus, O., the Bucyrus Motorcycle Club was formed and a number of club runs and race meets will be arranged during the summer. The officers elected follow: President, J. E. Swank; secretary, Robert Carroll; treasurer, Claude D. Keel, President Swank is also road captain.



Interior of Salesroom Maintained by F. J. Barr, Iowa Distributor for Flying Merkels.

The Vancouver Motorcycle Club is planning to organize a motorcycle polo team in the near future.

The Yavapai Motorcycle Club, Prescott, Ariz., held a tandem party and picnic on Memorial Day at the American ranch, 12 miles distant. The ranch is directly back of Granite mountain and is said to be a most excellent spot for an out-of-door rendezvous.

The Four Lakes Motorcycle Club of Madison, Wis., recently held its annual spring run or "mud plug," to Columbus and return. All the riders made the trip on time.

The Grady County Motorcycle Club, Chickasaw, Okla., was formed recently and the first run was held over 65 miles of prairie roads among the surrounding towns. About 25 members took part and it was the initial event of its kind held in that territory.

1913 F. N. SHAFT-DRIVE MOTORCYCLES.

Lightweight Single, with Two-Speed Gear $275
Only Machine Built With Handle Bar Control of Clutch.
Four-Cylinder $300
With Handle Bar Control of Clutch $350
Two-Speed Gear, Extra $50
Equipment includes two brakes, footrests if desired, compound spring fork, combined luggage carrier and stand.

American F. N. Company, Boston, Mass.

Branch—415 Trumbull St., Hartford, Ct.

JOIN THE F. A. M.

which is the National Organization fostering the interests of motorcyclists along legislative and other lines. Cut this out, mail it, and you will get the reasons.

E. M. ESTABROOK
Chairman Membership Committee Federation
American Motorcyclists,
BANGOR, MAINE.

Please send me the F. A. M. Booklet and all information interesting to prospective members.

Name .....

Address .....

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NEWS OF THE MANUFACTURER AND DEALER.

The following concerns have been incorporated recently to manufacture or deal in automobiles, accessories, supplies, etc.:

Consolidated Gas & Gasoline Engine Company, Wyandanch, N. Y.; $15,000; G. H. Scanlan, F. B. Knowlton, E. J. Forhan.

International Automobile School, San Antonio, Tex.; $4000; T. P. Price, G. Leroy, J. A. Kerr.

Fulton-Post Company, New York City; $1000; R. H. Post, W. H. Fulton, L. M. Dietrich.

D. W. Baldwin & Son, New Haven, Conn.; $20,000; H. D. Baldwin, M. A. Baldwin, C. T. Baldwin.

Motor Compressor Company, New York City; $10,000; to manufacture motors; G. J. Spohrer, C. E. Van Vleck, R. L. Redfield.

Carbon-Oxygen Gas Engine Company, Boston, Mass.; $500,000; A. H. Rhodes, A. P. French, W. Falletly.

Lil's Motors Company, Brooklyn, N. Y.; $4000; T. J. Qualey, E. McDonald, G. H. Wendling.

M-A-Z Concealed Hinge Company, Kenosha, Wis.; $10,000; H. M. Mink, E. Anderson, J. P. Zens.

Shinauto Manufacturing Company, Indianapolis, Ind.; $10,000; to make motor car polishes and soaps; W. L. Bedford, J. C. Sharp, M. A. Seligman.

Buffalo Automobile Spring Company, Buffalo, N. Y.; $10,000; E. Plantz, W. E. Slater, H. Etlinger.

Ferns Motor Delivery, Chicago, Ill.; $50,000; M. M. Franey, A. J. Goldine, H. P. Mumms.

Philippart Motor Car Company, Detroit, Mich.; $2000; to manufacture engines and accessories.

Barber Auto Service Company, Brooklyn, N. Y.; $10,000; William Barber, A. S. Barber, M. F. Barber.

Allen Breed Tractor Company, Cincinnati, O.; $5000; Allen Brede, L. J. Dolle, H. V. Reedy.

E-Z Auto Tire Pump Company, Wilmington, Del.; $20,000; F. D. Buck, G. W. Dillman, B. M. Grawl.

New Idea Tire Company, Philadelphia, Penn.; $500,000; F. R. Hansell, G. H. B. Martin, S. C. Seymour.

Porto Metal House & Garage Company, Milwaukee, Wis.; to manufacture portable steel structures for automobile storage and outing purposes; J. E. Tracy, P. G. Meyer, J. P. Weber.

Oakes Pressed Steel Company, Indianapolis, Ind.; W. H. Oakes, W. D. Oakes, C. G. Swenson.

Dreadnought Tire & Rubber Company, Baltimore, Md.; $1,000,000 A. F. Gilbert, Wilmer Dunbar, W. E. Hill, C. P. Tiplett, W. B. Swindell, Sr., A. A. Adt, R. H. Diggs, H. E. Whitelock, A. B. Whitelock, G. H. Rice.

Holland Flexible Auto Wheel Company, Cleveland, O.; $10,000; J. L. Dunahue, J. E. McKenna.

Grant Motor Company, Detroit, Mich.; $100,000; to manufacture cyclecars; G. D. Grant, C. A. Grant, David Shaw, G. F. Salzman, J. M. Howe.

Haupt Company, Cleveland, O.; $5000; W. D. Haupt, H. A. Couse, R. G. Curren, Mary McManus, Alfred Clum.

Pittsburg Haynes Automobile Company, Pittsburg, Penn.; $10,000; H. S. Morrow, E. K. Morrow, Alva Hughson.

H. G. Borbein & Co., St. Louis, Mo.; $10,000; H. G. Borbein, L. W. Becker, L. B. Borbein.

Service Boat & Engine Company, Syracuse, N. Y.; $10,000; to deal in motors; W. J. Eastman, L. J. Rolfsen, C. L. Ripley.

Electromobile Company, Wilmington, Del.; $100,000; to manufacture electric automobiles; H. E. Latter, W. J. Maloney, O. J. Reichard.

WITH THE MANUFACTURERS.

The Essenkay Products Company, 1125-29 West Thirty-seventh street, Chicago, announces that it has acquired the copyrights, trade marks, patents and good will of the Essenkay Company, as well as the exclusive right to manufacture and sell Essenkay. The plan of establishing general agencies has also been changed, so as to permit all supply houses and garages to sell and install Essenkay. The company is composed of F. D. Mayer, William B. Russell and William L. Weber.

The Fedders Manufacturing Company, Buffalo, N. Y., has been incorporated with $400,000 capital stock and the certificate of incorporation has been filed with the county clerk. The concern will manufacture and sell automobile radiators and other sheet metal specialties. The directors are given as Theodore C. Fedders, Christian W. Fedders, John M. Fedders and Louis F. Fedders, all of Buffalo.

The Knox Automobile Company, Springfield, Mass., maker of Knox machines, is to transform its representation at Boston from an agency to a branch office, which will be in charge of Frank B. Crockett, who was formerly connected with the Underhill Company in that city, the Boston agent for the Knox company since 1901.

W. B. Jameson, who has been with the Maxwell-Briscoe Motor Company since 1904, has resigned his connection with the Maxwell Motor Company, Inc., which succeeded the United States Motor Company, of which corporation the Maxwell-Briscoe Motor Company was a part. Mr. Jameson, who has received a number of excellent offers of positions since it became known he was available, has not yet decided which line of work he will take up.

H. B. Willower, who has for the past two years represented the Gramm Motor Truck Company, Lima, O., maker of Gramm trucks, throughout Illinois, Indiana, Kentucky and Michigan, has joined the sales staff of the Gramm-Bernstein Company, Lima, maker of Gramm-Bernstein trucks. Mr. Willower is one of the most successful salesmen in the motor truck field.

Glenn W. Barden has been appointed secretary and treasurer of the Kelly-Springfield Motor Truck Company, Springfield, O., maker of Kelly trucks. He was formerly auditor of the Warren Motor Car Company, Detroit, maker of Warren cars.

The Palmer-Meyer Motor Car Company, St. Louis, Mo., maker of Palmer trucks, has appointed the following agents: Louis Schnellman, Luxemburg, Mo.; Henry J. Jenneman, Mattese, Mo.; C. J. Siedler, Maxwell, Mo.

The Henderson Motor Car Company, Indianapolis, Ind., maker of Henderson cars, announces the following distributors, recently appointed: J. A. Tucker, Huntington, W. Va.; F. Q. Berdine, Hundred, W. Va.; L. Casselman, Jr., Richmond, Va.; Automobile Repair Company, Charleston, S. C.; W. E. Warters, Cleveland, O.; Frank Burgor, Little Falls, N. Y.; M. Walsh, Niagara Falls, N. Y.; M. H. Callahan, Huntsville, Mo.; A-B Stove Company, Battle Creek, Mich.; W. T. Bradway, Richmond, Ind.; H. L. Beach, Waukegan, Ill.; Amsberry & Hennless, Oskaloosa, Ia.

The Crown Motor Car Company, Louisville, Ky., capitalized at $500,000, has begun the manufacture of automobiles at its factory at 121 North Third street. B. F. Lambert, Anderson, Ky., is president; A. B. Lambert, Louisville, vice president, and C. H. Lambert, Louisville, secretary of the new concern.

GARAGE AND DEALER.

The Pacific KisselKar Branch is having plans drawn and will soon break ground for a new sales and service building to be located on Van Ness avenue, San Francisco, Cal. It is intended to erect a structure that will eclipse in size and completeness the big Kissel service station in Chicago, which contains 70,000 square feet of floor space.

L. S. Crane, Atlanta, Ga., announces the removal of his business to 328 Peachtree street, where will be carried a complete line of Pope-Hartford automobiles, motorcycles, bicycles, lubricants, etc.

J. R. Bradford has taken a position on the sales force of the M-B-M Company, Boston, distributor of the Maxwell line. He resigned recently from another company after five years as its assistant manager.

J. W. Paddon, proprietor of the Paddon Motor Company, 293 Northampton street, Boston, has contracted for a modern concrete garage, which is being erected at Eggleston square, Roxbury district. It will be completed and open for business by July 1 and will contain 28,500 square feet of floor space. In addition to a handsome suite of offices the structure will contain a modern machine and repair shop fully equipped, large stock room and chauffeur's room. There will be two entrances on Washington street, two on Columbus avenue and one on West Walnut park. The new garage is located on the main highways to Providence, R. I., and Cape Cod.

Frederick D. Markee has resigned his position with the Oakland Motor Company, Boston, with which concern he has been identified for the past three years. He

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is now connected with the M-B-M Company, agent for the Maxwell pleasure cars and the Hercules trucks.

F. S. Cheesborough, Augusta, Ga., recently opened a new garage and automobile repair shop at 548 Broad street.

The Co-Operative Garage, Toledo, O., has opened for business at 318 Columbia street. The plant is completely equipped.

Matthew Kacjenhausen, Jr., White Bear, Minn., has opened a new garage and repair shop on Banning avenue.

Kershner & Conn, Richmond, Cal., has opened a new garage on Seventh street, north of Macdonald avenue.

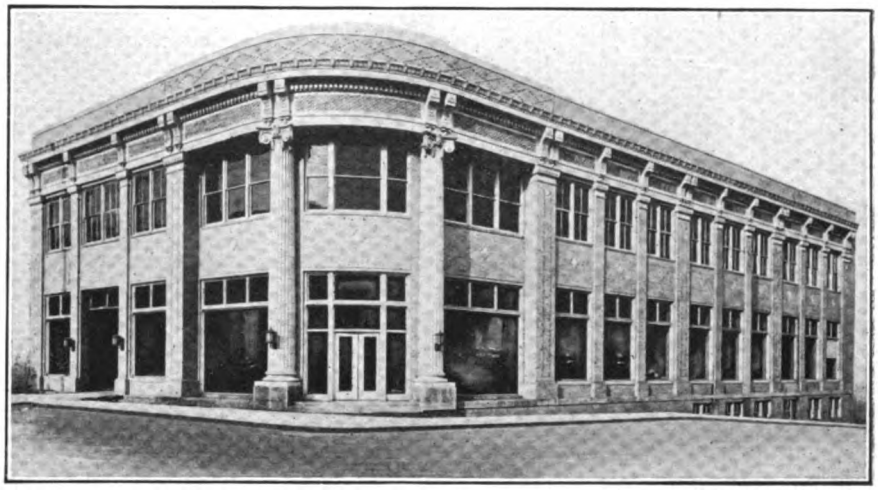
J. J. Laverty, New Haven, Conn., has leased the Bradford garage at 400 Crown street. The plant is modern and well equipped and Mr. Laverty will make a specialty of Moon cars, made by the Moon Motor Car Company, St. Louis, Mo.

The East Nashville Auto Company, East Nashville, Tenn., has opened a large and handsomely equipped garage at 112 Woodland street, with a capacity of housing 200 cars. The Regal cars, made by the Regal Motor Car Company, Detroit, will be carried.

The Co-Operative Used Car Company, New York City, has moved into new and commodious quarters at 1700 Broadway.

The Catskill Automobile Company, Catskill, N. Y., has started work for a large extension to the company's plant, to be used for the storage of automobiles. The entrance will be on Main street.

The White Company, Pittsburg, Penn., a factory branch of the White Company, Cleveland, O., maker of White cars and trucks, has recently completed and occupied its new salesroom and service station at the corner of Craig street and Baum boulevard. The structure is shown in an accompanying illustration and is something of an innovation, in that it is built on the side of a hill and is so designed that vehicles may enter from the street level both in the basement and the main floor. Each floor has 15,000 square feet of space, the basement being devoted to housing heavy trucks and for storage purposes, the first floor to salesroom and offices and the second to the repair department, machine shop and stock rooms. More than $75,000 worth of repair parts are carried in stock and 50 people are employed.



New Salesroom and Service Station of the White Company in Pittsburg, Penn.

The Thomas Motor Company, Lima, agent for the Cole car, made by the Cole Motor Car Company, Indianapolis, Ind., and **E. H. Hawisher,** agent for Studebaker machines, made by the Studebaker Corporation, Detroit, are completing negotiations for the erection of a two-story fireproof building at 302-304 South Main street. They are at present housed at 305 Market street, which building they erected and have occupied the past year. The large growth of their business forces the change. Mr. Hawisher will continue to confine his energies to the sale of Studebaker cars, while J. F. Thomas will operate the garage and service station for the Cole.

The Grady Rousche Motor Car Company, Salt Lake City, Utah, has opened for business at 473-475 South Main street. The company will feature Reo cars, made by the Reo Motor Car Company, Lansing, Mich., and will carry a full line of parts and the necessary shop equipment.

The Klinger Company, Pittsburg, Penn., distributor of Imperial cars, made by the Imperial Automobile Company, Jackson, Mich., is now occupying new quarters at 416 North Craig street.

Loomis McA. Goodwin of the Raleigh Motor Car & Machine Company, Raleigh, N. C., will open a new service department in charge of R. J. Cannon.

The Standard Motor Company, 16 West Mount Royal avenue, Baltimore, Md., has purchased property at 1017 North Eutaw street, where a large and modern garage will be established.

Mrs. J. F. Eames of 159 West One Hundred and Twenty-seventh street, New York City, has plans and a permit for an addition to a garage at One Hundred and Twenty-seventh street and Seventh avenue, to cost $15,000.

J. J. Egan of 118 East Twenty-ninth street, New York City, has plans for a new garage to be erected on Thirty-ninth street, near Third avenue, to cost $35,000.

The United States Garage Company, Toledo, O., is to occupy the ground floor of the Meredith building at Jefferson avenue and Michigan street. A general garage business will be conducted under the firm name of the City garage.

The Chase & Burkett Garage, 728 Commercial street, Emporia, Kan., is to have an addition, to be used as a repair shop.

The New York Sales Company, Binghamton, N. Y., has erected a new garage at 34 State street, costing $35,000. It is modern in every particular.

Frank Fairweather, Chattanooga, Tenn., has purchased the property at 123-125 Main street. He will remodel the building and move his automobile establishment into it from Seventh and Chestnut streets.

The Electric Service Company, Indianapolis, Ind., under the management of T. H. Watts and W. C. Brooks, has opened a new electric service station at Meriden and Walnut streets. It is claimed to be the first exclusive electric garage and service station in the state.

Klemer Bros., Owatonna, Minn., has leased the new garage building on West Bridge street.

J. E. Smith, Clovie, N. M., has purchased a garage on West Grand avenue and will conduct the business under the firm name of the Clovie garage.

Bryden & Shanks, Brewley, Cal., is planning an addition to the firm's garage to care for increasing business.

R. L. Dalzell, San Bernardino, Cal., has purchased the Highland garage of Lavering & True, and is operating the business.

The White Garage Company, Santa Paula, Cal., has changed hands, Spicer & Winsor having taken over the business.

R. W. Rayhill, San Francisco, Cal., is to erect a large garage at 645 Haight street.

J. W. Norcross, Springfield, Mass., is to erect an addition to his garage on Bridge street, to cost about $30,000. This addition will make it one of the largest garages in Western Massachusetts and will afford excellent facilities for handling increased business.

The Riddell Automobile Company, Fourth and Grand streets, Des Moines, Ia., distributor of Overland cars, made by the Willys-Overland Company, Toledo, O., on June 1 changed its name to that of the Clemens Automobile Company. There will be no change in the management and the stockholders will remain the same as for the past four years. A. Clemens is president, R. J. Clemens is secretary and manager and M. M. Hamilton is treasurer.

The Delameter Byrnes Company, New York City, has moved to larger quarters at 1677 Broadway.

The Raabe Bros., Butler, Penn., has opened its new garage and repair shop on North East Diamond square.

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RECENT PATENTS.

Piston Packing Ring, Norbert Danes Hamel, Gardner, Mass., No. 1,062,095. The combination with a split piston ring whose ends are recessed in both edges; of a reinforcing member channelled at one end with the base of the channel fitting inside one ring-end and the flanges thereof fitting in its recesses and adapted to slide into the recesses of the other ring-end, the base of said channel being longitudinally slotted, and a screw inside the other ring-end engaging said slot.

Muffler, Orville Z. Frazier, Elkhart, Ind., No. 1,062,092. A muffler comprising a main casing, a plurality of chambers arranged therein, said chambers being graduated in size and having the upper edges thereof in the same horizontal plane as the upper edges of the side and end walls of said main casing, communicating means between said chambers and the main casing, means to supply exhaust gases to the smallest chamber, and discharge pipes leading from said main casing.

Alarm for Tires, Henry Edward Knies, White Haven, Penn., No. 1,061,184. In a device for indicating tire failure, a supporting structure; a charge holder carried thereby; a firing member in the supporting structure movable toward and away from the charge holder; a latch movable in the firing member transversely of the line of movement of the firing member, the latch and the firing member being provided with interchanging elements, limiting the movement of the latch; means for actuating the latch; a gear movable in the supporting structure, into and out of the path of the latch; and means for advancing the firing member toward the charge holder.

Adjustable Alligator Wrench, Henry Adalbert Smith, Elgin, Ill., No. 1,062,047. In a wrench, the combination of a fixed jaw, a pivoted jaw, a handle having a recess in its forward end back of said pivoted jaw, a spring one end of which engages said pivoted jaw and tends to open the same and the other end of which spring is bent upon itself and sprung into the recess in the handle, means for closing the pivoted jaw against the tension of said spring, means for engaging the spring intermediate its ends during part of the movement of the pivoted jaw whereby said jaw is held under two different tensions during its movement, said means comprising an abutment formed by the extremity of the bent over portion of the spring, and a saddle attached to the fixed jaw and incasing the devices for operating the pivoted jaw.

Inner Tube Valve, John S. Harper, Youngstown, O., No. 1,061,069. An inner tube valve comprising a casing adapted for attachment to a wheel rim, said casing having one end open and provided with a counterbore, the main bore of the casing terminating at a point intermediate of the ends of the casing, and the casing being provided with a reduced bore extending from the inner end of the main bore to the end of the casing, the face of the main bore being provided with a plurality of feed grooves, a valve having a cushion head and a stem slidable in the reduced bore, the inner end of the main bore forming a valve seat, the upper end of the valve stem being slotted, a transverse retaining member engaged in the wall of the casing and passing through said slot and a stop pivoted to the top of the stem to close the slot and thus prevent displacement of the valve when air is forced inwardly through the same.

Silencer for Gas Engines, Hiram Percy Maxim, Hartford, Conn., No. 1,060,925. A silencer for gas engines and the like comprising a reversely directed, eccentrically arranged, nested series of wide cylindro-spiral shells having slightly lapping ends and forming compound series of wide alternately reversing spiral whirl chambers, each gradually expanding radially from its admission end and gradually contracting towards its constricted discharge throat, each discharge throat being angularly advanced in its discharging direction beyond the admission end of the succeeding outer chamber receiving material therefrom, the final outer whirl chambers having corrugated or roughened walls and a progressively greater cross section than the preceding chambers, a casing within which said shells are arranged, grooved supports in which said shells and casings are mounted and provided with admission and discharge connections suitable for exhaust gases and for cooling fluid, said supports comprising an independently adjustable intermediate support within said casing for one end of each said shells and connecting means co-operating with said supports.

COMING EVENTS.

June.

June 10—Reliability run, Columbus, O.
June 14-15—Track meet, San Francisco, Cal.
June 16-18—Reliability run, Columbus, O.
June 19—Algonquin hill climb, Chicago, Ill.
June 21—Stanley avenue hill climb, Cincinnati, O.
June 21-22—Track meet, Portland, Ore.
June 23—Reliability run, Des Moines, Ia.

July.

July 1—Manufacturers' tour, Indianapolis-San Francisco.
July 4—200-mile race, Columbus, O.
July 4—Track meet, Taylor, Tex.
July 4—Panama-Pacific road race, Los Angeles, Cal.
July 4—Track meet, Washington, D. C.
July 4-5—Track meet, Sioux City, Ia.
July 4-6—Road race, Tacoma, Wash.
July 11-19—A. A. A. tour, Minneapolis-Glacier Park.
July 20—Track races, Seattle, Wash.
July 21-25—Tour, Seattle, Wash.
July 27—Tour, Grand Rapids, Mich.
July 27-28—Road races, Tacoma, Wash.
July 28-30—Beach races, Galveston, Tex.

August.

Aug. 12—Reliability run, Kansas State Automobile Association.
Aug. 29—Chicago Trophy race, Elgin, Ill.
Aug. 30—Elgin Trophy race, Elgin, Ill.
Aug. 30-Sept. 6—Reliability tour, Chicago, Ill.

September.

Sept. 1—Fire chiefs' convention, Madison Square Garden, New York.
Sept. 1—Track races, Columbus, O.
Sept. 12—Track races, Youngstown, O.

October.

Oct. 4-11—Around Lake Michigan tour, Chicago Motor Club.

November.

Nov. 24—Vanderbilt Cup race, Savannah, Ga.
Nov. 26—Grand Prize race, Savannah, Ga.

FOREIGN.

June.

June 10-16—Alpine trials, Vienna, Austria.
June 23-28—International road congress, London, England.

July.

July 1-16—Plowing competition, Winnipeg, Manitoba.
July 12—Grand Prix race, Amiens, France.
July 19-20—Grand Prix race, Belgium.

August.

August 10—Hill climb, Mount Ventoux, France.
August 15—Hill climb, Tonale, Italy.

September.

September 28—Hill climb, Mont Verdun, France.

NEW PUBLICATIONS RECEIVED.

Universal Garage Equipment, dealing with turntables, their construction, installation and operation. Canton Foundry & Machine Company, Canton, O.

Luther's Dimo-Grit Grinders, catalogue No. 29, general information on abrasives. Luther Grinder Manufacturing Company, Milwaukee, Wis.

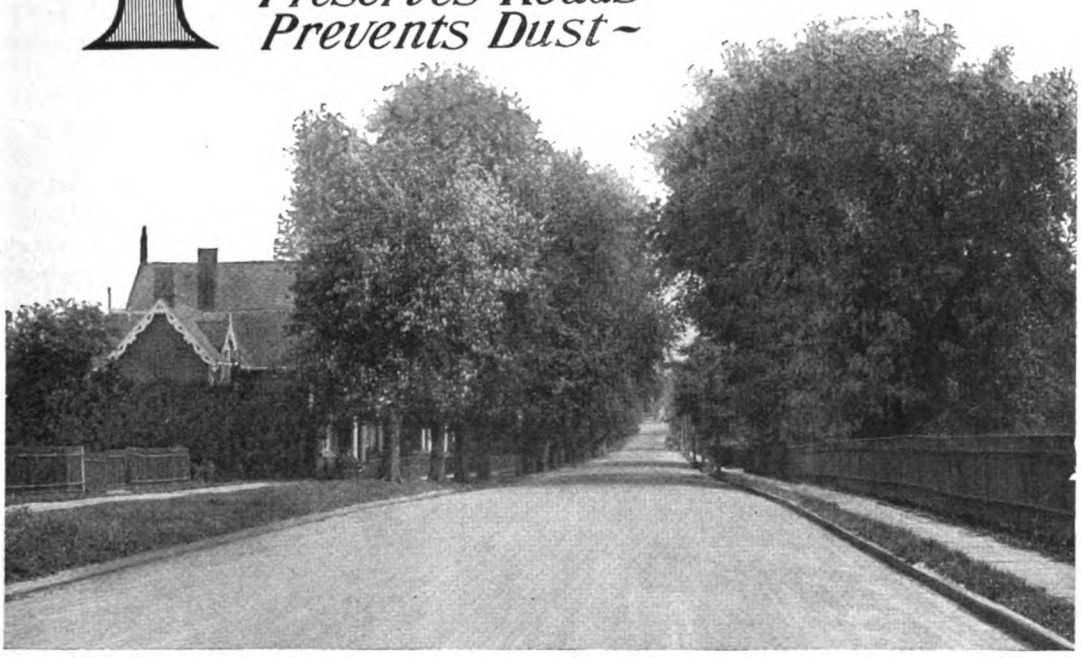
Heinze Low-Tension Magneto, special triple system for two-cylinder, four-cycle opposed motors. Heinze Electric Company, Lowell, Mass.

Maine Automobile Road Book, published by the Maine Automobile Association, touring information bureau, 12 Monument square, Portland, Me. It contains routings compiled by pathfinding cars of the association, covering about 3000 miles in Maine and some 100 miles in New Hampshire. Handsomely illustrated. Copies may be had free at request made to the above address.

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Preserves Roads
Prevents Dust~



Bard Avenue, West Brighton, Staten Island N. Y. Road treated with "Tarvia B".

Of Interest to Taxpayers

A CLOUD of dust behind an automobile means that the road surface is being destroyed—blown away. It also means that the road is unfit for modern traffic—that it has been built in the old way intended for slow-moving, horse-drawn traffic.

The science of MacAdam has been rewritten these last few years. A mineral binder is no longer enough to hold the stone together.

Something stronger is needed, and the use of Tarvia is the logical and necessary answer to a difficult problem.

In the tarviated road, there is a matrix of Tarvia around each stone, holding it firmly to its work and preventing it from shifting. There is no internal movement, and the attrition of traffic is reduced to a minimum.

If the road is built of Tarvia the extra cost of the treatment is more than made up in longer life and reduced maintenance cost.

There are three kinds of Tarvia—"Tarvia X" for road and pavement construction, "Tarvia A" for surface work and "Tarvia B" for dust suppression and road preservation. The first two are very dense and viscid and require heat for application. "Tarvia B" is applied cold.

Booklets on request.

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BECOMES GENERAL MANAGER.

J. C. Manternach Wins Deserved Promotion—Other Standard Welding Company Changes.

J. C. Manternach has been promoted from sales manager to the position of general manager of the Standard Welding Company. He was appointed sales manager in 1910 by the late W. S. Gorton and his present advancement comes as a recognition of the work he has performed in that position. Mr. Manternach began his career with the Pope Manufacturing Company, Hartford, Conn., in 1897, and later joined the forces of the Shelby Steel Tube Company and the National Tube Company, a subsidiary of the United States Steel Corporation.

Mr. Manternach announces the appointment of S. W. Hartley to the position of sales manager, he having been assistant sales manager for the past two years. He formerly was identified with the Peerless Motor Car Company, Cleveland, O.; the Garford Company, Elyria, O., and the A. O. Smith Company of Milwaukee, Wis. R. S. Bryant, who is the originator of the types of rims now being made and sold by the Standard Welding Company, is consulting engineer, and C. C. Gressle is made superintendent. Mr. Gressle has been with the Standard Welding Company since its inception, 15 years ago.

HOPEWELL WINS

Notice to the Trade

We have won our patent suit against the Linscott Supply Company for selling spiral spring tire covers manufactured by the Vehicle Apron & Hood Co. of Columbus, Ohio, who defended the suit. These covers have been held to infringe the Hopewell patents.

We wish to warn the trade against buying, selling or having in stock spiral spring tire covers infringing our patents as we intend to fully protect our rights.

We wish to thank those who have stood by us.

HOPEWELL BROS.
Newton, Mass.



AVOID

INFRINGEMENTS

MULFORD'S BRAENDER TIRES.

How the Shoes That Withstood 500 Miles of Speedway Racing Are Made.

Since it became known that the four Braender tires, made by the Braender Rubber & Tire Company, Rutherford, N. J., and fitted to Ralph Mulford's Mercedes in the 500-mile race on the Indianapolis motor speedway, Memorial Day, went through the entire contest without change, there has been decided interest in this product.

Braender tires are made by the single cure, wrapped tread process, from the highest grade Para rubber and the best combed Sea Island fabric. The single cure tire differs from others in that the mold protrudes only one-third of the distance from the beads, the maker maintaining that this permits the cloth wrapper to compress the tire properly without buckling. The product is manufactured by experienced workmen in a well lighted, modern plant, and each tire is carefully inspected before leaving the factory.

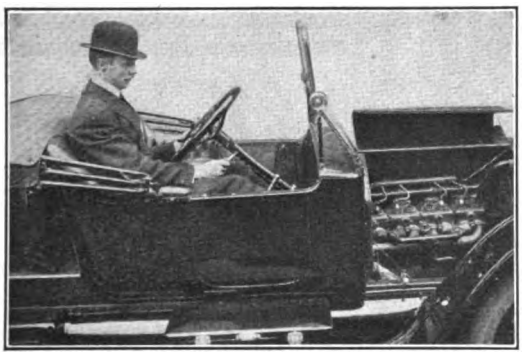
HOPEWELL BROS. WINS.

Result in Action for Alleged Infringement of Tire Case Patent.

Judge Dodge of the United States district court in Boston has decided in favor of the Hopewell Bros., Newton, Mass., in an action brought by C. F. Hopewell against the Linscott Supply Company, involving the determination of the validity of the patent known as the Hopewell tire case patent, and the improvement thereon, or the Kinder tire case patent. The tire cases sold by the Linscott concern were made by the Vehicle Apron & Hood Company, Columbus, O., which defended the suit.

Hopewell Bros. maintained that the first three claims of the Hopewell patent and all the claims of the Kinder patents were infringed. Judge Dodge held that there was no anticipation of the Hopewell patent shown in prior art, although the Vehicle Hood & Apron Company tried to anticipate. He also said that he could not consider such evidence as sufficient and found against the defendant on both these facts.

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Ask the Man Who Owns One.

GET YOUR GASOLINE AT HALF PRICE.

By using the M&M Economizer.

WHAT YOU CAN DO WITH THE M&M ECONOMIZER!

YOU can save from 40 to 50% of gasoline. YOU can obtain 20% more speed and power than you can without it. YOU can develop more power in high altitudes. YOU can keep the cylinders clean and cool your engine at all times. YOU can use the M&M just like the coaster brake on a bicycle. YOU can use it as an air brake in descending grades, at the same time taking off the ignition. YOU can save wear and tear on clutch brakes and tires. YOU can immediately secure the proper mixture for different weather conditions without readjusting your carburetor. YOU can set your throttle at 12 miles per hour, and increase your speed and power to 18 or 20 miles, with the same amount of gasoline, and less carbon, simply by opening the M&M Economizer.

Pat. Europe Pat. America



Showing M&M Attached with ½" Elbow.

The M&M is nickel plated and highly polished. It is made with one ground valve and six portholes, which when open, admit auxiliary air into the manifold. The gas coming from the carburetor is broken up and sprayed by the incoming air, so that when it reaches the cylinders it is a gas of the **greatest explosive power.**

READ WHAT A MITCHELL OWNER SAYS ABOUT THE M&M!

Moller Bros., Philadelphia, Penn. Watertown, S. D., May 29, 1913.

Gentlemen:—I have had the M&M Economizer installed on my 1910 Model T 35 h. p. Mitchell Touring Car, and I am very much pleased with it. It does all you claim for it in saving gasoline, and also gives more speed and power. It also saves clutch and brakes, and, in fact, it is the finest attachment I have ever seen.

Yours very truly, WM. F. UTHE. (Signed)

The automobile attachment requires a ¾" pipe tap to insert into manifold, but same can be reduced to ½" by means of an elbow or a common reducer. It is controlled either by friction foot pedal, or steering post control, which includes flexible shaft and wire. The motorcycle size is ¼".

OUR GUARANTEE.

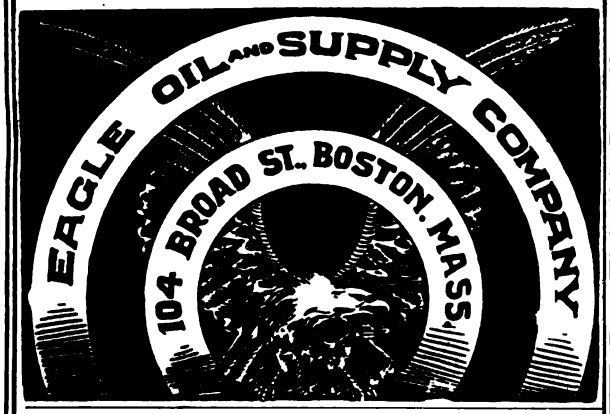
WE POSITIVELY guarantee the M&M to do just what we claim, or money will be refunded in 30 days. (Reference—Citizens National Bank, Lewistown, Penn.) No dealer or jobber is authorized to sell without giving our guarantee.

Price of Automobile size—$3.50 and 17c extra for postage. Price of Motorcycle size—$1.25 prepaid.

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NO KARBON Cylinder Oil

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Oil on a guess or Oil on a guarantee?

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FIRE EXTINGUISHER

THE ONLY SAFE and EFFECTIVE EXTINGUISHER OF GASOLENE FIRES

Pyrene seeks out the seemingly inaccessible flames and smothers them without damage to the engine, car or upholstery.

Pyrene does not freeze at sixty degrees F. below zero, and is good until used as it does not deteriorate.

The Pyrene Extinguisher is small and compact and may be carried on the dashboard of your car.

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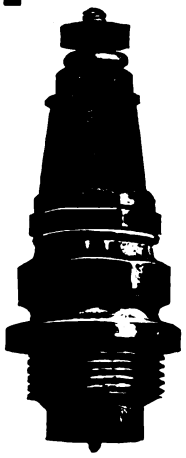
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For automobile, motor truck, motorcycle and motor boat—for any engine at any speed—use SPLITDORF PLUGS.

Remember, all! **"New ignition for old"** is our slogan—we have a SPECIAL EXCHANGE proposition of the greatest interest to every owner of a gasoline motor who would save time and money. Write or call TO-DAY for particulars.

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Speedwell

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Option given of 60 H. P., 6 cylinder poppet valve motor or 60 H. P., 6 cylinder Speedwell Rotary-valve motor.

4 and 5 passenger models $2850. Fully equipped.

135 inch wheelbase, 36x4 1-2 inch tires, Electric starter, Electric lighting and independent Bosch magneto ignition.

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You can't have any—with



You can't have punctures or blowouts with an airless tire—there's nothing to puncture or blowout. And you can have ease and comfort (Dayton Airless Tires are smoother riding than pneumatics).

And you can—and do—have complete freedom from the worry, delay, vexation and expense that go with punctures and blowouts.

You're not only getting rid of tire troubles if you are using Dayton Airless Tires, you're getting longer wear, and saving the expense of extra tires, tubes, etc. We guarantee Dayton Airless Tires for 5000 miles (3000 on a light car like the Ford).

They cost you more when you buy them, but they cost you far less as you use them. Buyers pay big dividends on tire repairs and accidents there's a definite sum of profit to be saved by using Dayton Airless Tires. Add up to show you how.

DAYTON AIRLESS TIRES

To Agents: Write us about territory for this practical sure-selling line of tires.

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1011 Kiser Street, Dayton, Ohio

Dayton Airless Tire Co.,
1878 Broadway, New York City
Dayton Airless Tire Co.,
31 Church St., Buffalo, N. Y.
Dayton Airless Tire Co.,
589 Boylston St., Boston, Mass.
Dayton Airless Tire Co.,
2123 Michigan Ave., Chicago, Ill.
Dayton Airless Tire Co., 332 N. Illinois St., Indianapolis, Ind.

STUTZ

The STUTZ is Made Right---

from the radiator to the rear axle. Every ounce of material---every detail of workmanship, that goes into every Stutz car is absolutely the best.

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STANWELD RIMS

Mechanically correct—easy to operate—perfect in material and workmanship. Used as standard equipment on the better cars.

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MARMON

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THE MARMON SIX **$5000 to $6350**

F. E. WING MOTOR CAR CO. **"Motor Mart"** **12 Columbus Ave., BOSTON** New England Dealers for

NORDYKE & MARMON CO., Indianapolis, Ind.

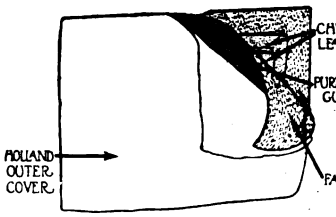
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THE ONE PRACTICAL PATCH MARKETED

No need of a Tire Sleeve with the INVINCIBLE, it's stronger than a new shoe. It "Stays Put." Soft and pliable and is easily fitted. To attach, remove protective cover, moisten gum with gasoline and insert in casing. The INVINCIBLE is self-vulcanizing. If your local dealer does not carry them, send us his name and your order.



Note the INDESTRUCTIBLE Construction of the INVINCIBLE

PRICES

3 and 3 1-2 in. $1.00
4 and 4 1-2 in. $1.20
5 and 5 1-2 in. $1.35

A Good Proposition Is Offered to Live Dealers and Garages

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53 Sabin Street **PROVIDENCE, R. I.**

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The Label



Which is Cheaper—EMCO Automobile OIL—Now, or a New Motor—Later?

WHILE the subject of lubrication may appear insignificant to the average motor car owner, yet in reality it is a subject of vital importance. Unless you *know* that the lubricant you are using is free from destructive ingredients, you'll discover it sooner or later at a great expense.

We make it possible for every car owner to avoid the element of uncertainty by this guarantee.

GUARANTEE

If Emco Oil does not prove satisfactory to YOU in absolutely every respect, we will refund your money in FULL—pay freight (both ways if oil is returned) and make no charge for oil used in trial.

Emco Automobile Oil is refined right where it is produced, in the very heart of the Pennsylvania Oil Field.

It contains absolutely no acids and no animal or vegetable matter to gum the cylinders. It is the purest of mineral oils, light bodied, of high fire test, pale in color and free from carbon. Thousands of pleased users are the best evidence of Emco superiority.

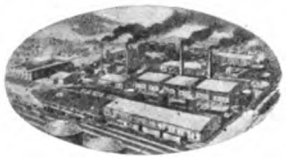
If your dealer cannot supply you, we will ship Emco direct to you in five or ten gallon cans, barrels or half barrels.

Emery Manufacturing Co.
Lewis Emery, Jr., Prop.
Gen. Offices: 45 Main St., Bradford, Pa.

Strictly Independent Refiners, Manufacturing Deodorized Gasoline and Lubricating Oils of Every Description.

New York Branch:
1010 U. S. Rubber Building, 58th and Broadway

References: Dun's, Bradstreet's or any National bank.



The Refinery

SAGER EQUALIZERS

The Shock Absorbers Which Save Your Car and Tires.
Nothing to Wear, Adjust or Require Attention.
They Take The "Sting" Out of Rough Roads.
Try Them At Our Expense For 30 Days.

Seven Years Of Success.

ENDORSED BY:

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Elmore
Olds
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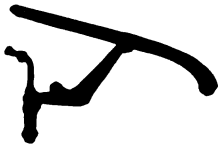


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THOUSANDS OF DOLLARS
Saved Annually by Use of Sager Bumpers.
Don't Wait for a "Smash-up" to Buy Protection.
DO IT NOW.

PRICES $6.00 to $27.50. Liberal Discounts.

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Used Almost Exclusively On High Grade Cars.

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Clamped on Bumpers of Distinction. 30 Models. Attached in 10 Minutes.
FORD SPECIAL, CLAMPED ON, $10.

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THE GRIP
MULTIBESTOS
BRAKE THAT GRIPS LINING

MULTIBESTOS

The Brake Lining of Quality.

BRINGS
Sales to the Dealer
Safety to the Owner
Service all Around

Adopted after test as regular equipment on Quality Cars. Woven of the purest of asbestos and treated by an exclusive formula. Multibestos has the highest co-efficient of friction and wears most uniformly through the longest life.

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PAIGE "36"—$1275 "25"—$ 950

Leaders of popular-priced cars—thoroughly built, completely equipped, backed by a strong organization. Specifications and catalog on request.

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DIXON'S GRAPHITE CUP GREASE

the Ideal Lubricant for Wheel Bearings, Being Permanent and Economical. Write for the Book "Lubricating the Motor," No. 210.

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"Avon" Blow-Out Patches

BUILT LIKE A BRIDGE

12 to 14 INCHES LONG, 7-PLY, EXTRA HEAVY
3 inch, **$1.00**; 3 1-2 inch, **$1.25**; 4 inch, **$1.50**
4 1-2 inch, **$1.75**; 5 inch, **$2.00.**
Prepaid on receipt of price.

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F. SHIRLEY BOYD

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Dorian Demountable Rims.
Supplementary Spiral Springs. R. I. V. Ball Bearings.

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DETROIT, CLEVELAND, BUFFALO, NIAGARA FALLS, TOLEDO, PT. HURON, GODERICH, ALPENA, ST. IGNACE



THE CHARMS OF SUMMER SEAS

Spend your vacation on the Great Lakes, the most economical and enjoyable outing in America.

Daily service is operated between Detroit and Cleveland, Detroit and Buffalo; four trips weekly between Toledo, Detroit, Mackinac Island and way ports; daily service between Toledo, Cleveland and Put-in-Bay.

A Cleveland to Mackinac special steamer will be operated two trips weekly from June 15th to September 10th, stopping only at Detroit every trip and Goderich, Ont., every Monday up-bound, Saturday down-bound.—Special Day Trips Between Detroit and Cleveland, During July and August.—Railroad Tickets Available on Steamers.

Send 2 cent stamp for Illustrated Pamphlet and Great Lakes Map

Address: L. G. LEWIS, G. P. A., Detroit, Mich.

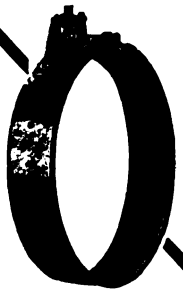
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Detroit & Cleveland Nav. Co.

D&C LAKE LINES



Outwears 12 Ordinary Linings



That—after long use of various kinds—is the report of E. H Sheppard, Supt., Park Square Motor Mart Garage, Boston.

J-M Non-Burn is made of Asbestos Fibre, reinforced with brass wire. And Asbestos is a rock—fireproof, almost indestructible. Unlike organic brake linings, J-M Non-Burn doesn't char under frictional heat, and is impervious to oil, gasoline and water.

J-M Non-Burn Brake Lining

also has the highest friction-coefficient known to the engineering world. In emergencies it acts instantly, thus averting accident; while impartial tests show that most other linings will not bring car to a stop in less than 12 to 25 feet.

Write nearest branch for sample and booklet

H. W. JOHNS-MANVILLE CO.

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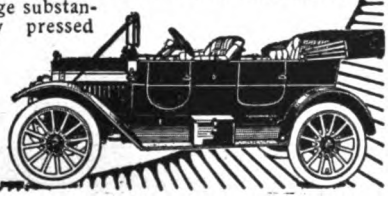
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The LAMBERT

Our Model 66 is a low priced car offering high priced service. It gives a big quality return on little money expended. It efficiently satisfies the requirements of the motorist only because it satisfies the efficiency requirements of the manufacturer. Equipped with 35 H. P. ball bearing motor, top, windshield, large substantial axles, heavy pressed steel frame.

Price, $1100

THE BUCKEYE MFG. CO.
159 Columbus Ave.
Anderson, Ind.



Dover Soap Economizer



Saves over one-third soap consumption

Dover Electric Light Bulb Case

Safe and Very Compact



Send for 1913 Catalogue

DOVER SAVAL MEASURE AND FUNNEL



With Automatic Shut-Off Prevents Overflowing Oil Tank

DOVER STAMPING & MFG. CO., Cambridge, Mass.

JONES SPEEDOMETER

Based on a Principle—Centrifugal Force

JONES SPEEDOMETER
Broadway at 76th Street, NEW YORK

PLANTS { Bush Terminal Brooklyn, N. Y. / New Rochelle, N. Y.

Jackson

No Hill Too Steep
No Sand Too Deep

OLYMPIC - 4 cylinders - $1500
MAJESTIC - 4 cylinders - $1975
SULTANIC - 6 cylinders - $2500

JACKSON AUTOMOBILE CO., 1203 East Main St. Jackson, Mich.

Hoffecker

"The Steady Hand"

Speedometer



Accurate, durable---the one speedometer with a daily trip register that can be set at any mileage at any time.

THE HOFFECKER COMPANY
Motor Mart ——Main Offices——Boston, Mass.

PRICES $25 to $135

BRANCH OFFICES
1779 Broadway . . New York 1217 Huron Road . Cleveland
Sherridan & Palma, Pittsburgh Cor. Broad & Race Sts., Philadelphia

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20 Miles to Gallon

Lawrence, Mass., July 18, 1912.
Gentlemen:—Enclosed find check for carburetor. I feel perfectly satisfied. It does 20 miles and over on a gallon. Can recommend it to anyone. G. A. Schmidt.

19 to Gallon on Cadillac

Planhard Co.—Edgewater, N. J., May 21, 1912.
I am very much pleased with my new Planhard Carburetor. I made a test of gasoline consumption from Edgewater to Hyde Park, N. Y., and return, and got a fraction over nineteen miles to the gallon. This is on my Cadillac.
John H. Hinners.

More Speed—Start Cold

Groton, Conn., Feb. 8, 1913.
Dear Sirs:—I put a Planhard on my single cylinder 6-8 h. p. Goshen engine. It gives 50 R. P. M. more than the ——— I took off. With the Planhard I can start cold or hot without priming, which few others can do.
Yours truly, E. A. Scriven.

3¾ More Miles

When Planhard Carburetors were put on the 6 cylinder, 4 cycle Frisbie motor of the fast boat Delphi II, she increased 230 R. P. M., and 3¾ more miles per hour.

Much More Power

Bath Marine Construction Co.—"The gasoline consumption at normal power was better than others and it would develop much more power when pushed." H. D. Bacon, President.
"Fifty miles without a miss."—Geo. E. Grosvenor, Crescent, Mich.
"To use the vernacular, 'some carburetor.' "—W. R. Fleming, 3311 Broadway, N. Y.

If you own a FORD!

Chicago, Ohio, July 1, 1912.
Gentlemen;—The Planhard Carburetor for my model S Ford Car is very satisfactory. I never bought anything for my car I paid so cheerfully for, as I have a smoother running engine with more power and get *more mileage per gallon* and my engine runs much cooler. H. W. Grandon.

Gallon Less Per Hour!

on semi-speed boat
HARTFORD III
owned by A. N. Smith, Portland, Maine, who gets better control.

Old Glory II

had a Planhard on her Loew-Victor on her famous trip to Nova Scotia.

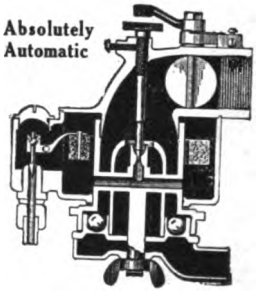
Valient II and Alfred S

took all their prizes with Planhards on their Metropolitan motors.

Emerson III

made a mile in 1 minute 8 seconds over the Washington government course with Planhards.

"Has them all beaten to a frazzle."—A. G. Linden, Cleveland, Ohio.



Absolutely Automatic

New England Distributors

Eisner-Lenk Co.

1074 Boylston St.
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DEALERS Write
Get your profits

Note Simplicity.

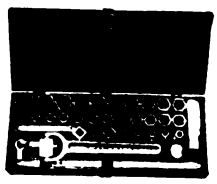
Planhard Carburetor

Other Distributors
Southern N. J. & Eastern Penn., Gustave Muller, Jr., Bourse Bldg., Philadelphia.
Buffalo: Theo. P. Meinhard, 774 Main St.
Hermann Engineering Company, Equitable Building, Detroit, Mich.
Robt. H. Richter, 180 N. Market St., Chicago.
Jas. G. Davis, 1224 Music St., New Orleans, La.

Planhard Mfg. Co., 1790 Broadway, N. Y.
Gentlemen:—Send at once your chart and book concerning Planhard Carburetor.
Name .....St.....
City .....State.....
Engine .....Carburetor....Size....in.
Threaded? Flanged? Horizontal? Vertical?

Abbott-Detroit

"The demand of the day is that an organization shall be judged by its product and not by what it claims for itself." Keep this in mind when you examine the 1913 models of the Abbott-Detroit.
Advance Catalog on Request.
ABBOTT MOTOR CO.
141 Waterloo St. Detroit, Mich.
"Built for Permanence" "Guaranteed for Life"



Bay State Autokit, No. 1, $10
Bay State Autokit, No. 2, $7.50
Bay State Stickit, $3
GEO. A. CUTTER, Sales Agent
Taunton Mass.



GEISZLER NON-SULPHATING STORAGE BATTERIES
Guaranteed perfect satisfaction or money refunded
SIZE 66 - $20.00
GEISZLER BROS. STORAGE BATTERY COMPANY
514 West 57th Street, New York City



UNITED STATES TIRES
ARE GOOD TIRES

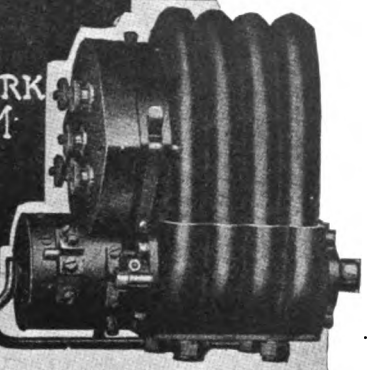
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STOCK CHAMPION
FIVE MODELS - - $2750 to $3400
Electric Starter Electric Lights
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For Perfect Control and Safe, Comfortable Driving use
Weed Anti-Skid Chains
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INSURE A STEADY SPARK AT ANY R·P·M·



HECO MAGNETOS are the product of experts specialized in the electrical business. They embody all that the electrical industry knows about magnetos.

By our special method of winding the secondaries we are able to positively guarantee them against burning out or breaking down.

HECO MAGNETOS supply a spark of equal intensity for any number of revolutions per minute.

We also make the well-known HECO COILS, and HECO COMBINATION PRIMERS and SPARK PLUGS. Let us send you our complete catalog.

HEINZE ELECTRIC COMPANY
Factories and Gen'l Office, Lowell, Mass.
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100% EFFECTIVE

GAULOIS TIRES

GAULOIS TIRE CORP.
1926 BROADWAY NEW YORK
Canadian Agency: 325 St. James Street, Montreal.

"Quality of a Master"

Four Cylinder $2000 Fully Equipped

LENOX

Six Cylinder $2750 Fully Equipped

Electric Lighting and Starting---Long Stroke Motor---Large Tires ---Long Wheel Base---Left Hand Drive---Centre Control.
Write for booklet describing in detail the "Boston-Made" Car.
LENOX MOTOR CAR CO. - - - - - BOSTON, MASS.
Factory: Jamaica Plain. Salesroom: Motor Mart.

A. W. HARRIS OIL CO.

WINS SUIT to protect name

SECURES INJUNCTIONS in Ohio and Indiana against Use Of Name "HARRIS."

THE courts have decided that "HARRIS" means a certain distinct oil, and that other concerns must not attempt to profit by the unlawful use of our name to boom their product.

HARRIS
TRADE MARK REG. U.S. PAT. OFF.
OILS

may no longer be imitated. The public may now rest assured that when HARRIS OIL is asked for, "America's Leading Lubricant" will be received.

Made of the finest Pennsylvania Crude, backed by 28 years of experience.



"A Little Goes a Long Way and Every Drop Counts."

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You Don't Have To See The *AMICO* To Know It's There!



Large Diameter Porcelain, has annular ridge affording protection to asbestos packing from explosion.

Vamped ridge—holds porcelain rigid at uniform pressure.

Asbestos packing set in taper seat—Perfect joint, no leakage, each explosion blows clean the exposed parts in cylinder. Construction allows porcelain to expand on incline.

The **SERVICE PLUG** WITH THE **LONG LIFE** **AMICO**

NON-LEAKABLE——UN-BREAKABLE

Absolutely the only plug made that will give guaranteed service. Try a set—if they are not as good as we claim, we refund your money cheerfully.

Order a set today from your jobber or dealer or order direct. We pay parcel postage. State size of thread.

$1 Each $4 the Set

AMERICAN IGNITION COMPANY, Inc.

OFFICE AND FACTORY:

319 Adams Street - - - - - - Dorchester, Mass.

Studebaker

"The cars that illustrate fully the laws of correct car construction."

"25" $885. "35" $1290. "SIX" $1550

All prices for cars fully equipped F. O. B. Detroit.

STUDEBAKER - - Detroit, Mich.

THE HENDERSON LINE

Includes Roadster and Touring full "Road Comfort" Models on one Standard Chassis with Electric Self Starter, Wire Wheels (if wanted), Left Drive, Center Control and Complete Luxury Equipment. New catalog gives full details. Send for Attractive Agency Proposition.

HENDERSON MOTOR CAR COMPANY

OF INDIANAPOLIS, U. S. A.

Jericho ONE TONE Horn

Jericho (One-Tone) and Jubilee (Chime-Tone) are leaders in sales and popularity. Over 100,000 now in use.

B-Line Guns and McKae Blitz Spark Plugs are best.

THE RANDALL-FAICHNEY CO., Boston, Mass.

Subscribe to The Motor Truck

CATARACT TIRE SERVICE

THE 10% OVERWEIGHT TIRES

Guaranteed for 4000 Miles Service

Measured by Mileage, the Cheapest Shoes Ever Made. Clincher and Quick Detachable, Plain and Break-Skid Treads, Regular and Metric Sizes, for All Standard Rims.

THE CATARACT RUBBER COMPANY

Boston, New York, Providence. Factory: WOOSTER, O.

CAMERON CARS **$975**

All Up-To-Date Features

Four cylinder, water cooled, 30 H. P. Four forward speeds. 112 in. wheelbase. Left hand drive, centre control. Starts from seat. Pointed hood, beautiful lines and finish. Equipment unsurpassed at the price.

Write for full details and terms to agents

THE CAMERON MANUFACTURING CO. Beverly, Mass.

CUTTING MOTOR CARS

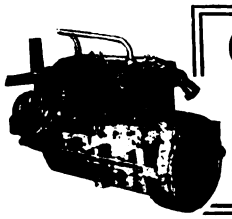
Five-passenger touring car $1475 Two-passenger roadster $1475

The same chassis is used for both models.

Wide-a-wake dealers write or wire for our remarkable dealer's proposition.

CUTTING MOTOR CAR COMPANY

311 Mechanic Street Jackson, Mich.



Continental Motors

THE WORLD'S STANDARD

Carry Prestige and Sales

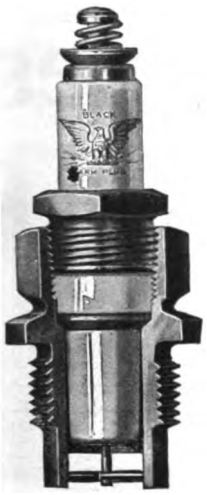
Continental Motor Mfg. Co.

Detroit Michigan

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The "Black Eagle" Spark Plug

PATENTED



50 Cents Is Enough

The "Black Eagle" Spark Plug has made good because it was designed and manufactured with this result in view.

A person in close touch with the supply and manufacturing ends of the trade was a visitor at our factory recently, and was shown the details of construction, including the machinery, testing, and assembling of the "BLACK EAGLE" Spark Plug. What he said we believe will be of interest to you, as it indicates the effort on our part to supply a high grade plug at a reasonable price. We therefore quote below his impressions.

"I am simply amazed at the workmanship, material, and construction of the 'BLACK EAGLE' Spark Plug. When I saw this plug advertised at a price of 50c to the consumer, I naturally supposed it was a cheap, common, plug such as you occasionally find in jobbing houses on the bargain counter. I am convinced, after seeing these plugs tested, and examining minutely the machine parts which enter into their construction, that **no better porcelain spark plug is offered by any one, regardless of the price they ask.**"

We are not **influenced** by what our competitors **charge for spark plugs!** We have **ignored price precedent,** for the reason that a **high grade spark plug** can be manufactured and sold at **50c each, and that is enough.**

Sent prepaid on receipt of price. Made in all standard threads.

THE STANDARD CO. **Torrington, Conn., U. S. A.**

DIVIDEND PAYERS!

FOR DEALERS WHO KNOW

HARRIS GASOLINE GAUGES

WOLF GASOLINE MIXERS

The Specialties with the

LITTLE PRICE

AND

BIG PROFITS

Write To-Day For Yours.

Approved Auto Specialties Co.

DEPT. D.

1731-37 Broadway

NEW YORK

Back of Every Can

is the satisfaction and assurance that you have purchased as good an oil as it is possible to get. Colonial is acknowledged by expert operators as a superior lubricant for Automobiles and Motor Boats.



Use COLONIAL and NOTE the DIFFERENCE

COLO GREASE

A real transmission grease

Will make your gears run smoothly and quietly because it is made especially for gear lubrication.

COLONIAL Timing Gear Oil

overcomes all trouble with your timing gear. Use is and NOTE the DIFFERENCE.

SILEX GREASE

The greasiest grease made

The real test of a grease is not its looks or the feeling but its lubricating properties. SILEX is made to lubricate and last.

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500 Miles Without Change In Indianapolis Race

Braender Tires

Ralph Mulford telegraphs they look good for 500 miles more at finish. Read his wire :

Indianapolis, Ind., May 30, 1913.

Braender Rubber and Tire Co.,
Rutherford, N. J.

Finished seventh place in the five hundred mile Indianapolis Speed Race, using Braender Tires, running the **five hundred miles without single change.** They look good for five hundred miles more. Was in second place at four hundred and forty miles when encountered trouble in gasolene. RALPH MULFORD.

The wonderful service of BRAENDER TIRES demonstrated at Indianapolis is within the reach of every motor car owner.

Look Into This Matter. Investigate Braender Tires. Guaranteed for 4,000 Miles.

BRAENDER RUBBER & TIRE CO.

Main Office and Factory, Rutherford, N. J.

The *Pilot* "The Car Ahead"

Three Great Models. Pilot 40, four-cylinders, 4 1-2x5. Brake test, 53 horse power. 120-in. wheel base. Price, $2000. Pilot 50, four-cylinders, 4 1-2x6. Brake test 59 horse power. 126-in. wheel base. Price, $2250. Pilot 60, six-cylinders, 4x6. Brake test 67 horse power. 132-in. wheel base. Price, $2,500.

The Car Without a Mechanical Defect

Teetor "T" Head Motors, full floating rear axles, Brown-Lipe differential, Warner transmission, Eisemann Magneto, Stromberg Carburetor, handsome jewel bodies with ventilating windshield. Completely equipped with every convenience and comfort. Dynamo electric lighting and electric starter (Gray & Davis system), power tire pump. We have the greatest agency proposition in the United States. Write for our beautiful art book showing cars in detail.

PILOT CAR SALES CO., Richmond, Indiana

New Departure "TWO-IN-ONE" Ball Bearings

The only ball bearing that takes load from any direction with equal efficiency.

Catalog for the asking

THE NEW DEPARTURE MFG. CO.
Bristol, Connecticut

HAVOLINE Automobile Cylinder Oils

INDIAN REFINING CO.
17 Battery Place New York

GASOLENE RULER FOR AUTO TANKS

ADJUSTABLE NUMBERED MARKERS

Price 50 Cents Postpaid

GOODNOW MANUFACTURING COMPANY
714 OLD SOUTH BUILDING, BOSTON, MASS.

AUTOMOBILE TURNTABLES

BOOKLET ON REQUEST
THE T. C. BEACH CO.

REPRESENTATIVES WANTED
106 Ottawa Street, St. Johns, Mich.

K-R-I-T

Five Passenger Touring Car, Fully Equipped	$900
Foredoor Roadster, Fully Equipped	$900
Underslung Roadster, Fully Equipped	$1000

Write for Catalog

K-R-I-T MOTOR CAR CO., Dept. N, DETROIT

EMPIRE Model 31 "The Little Aristocrat"

The Completely Equipped Empire five-passenger touring car $950—

Equipment includes Mohair Top and Top Envelope, Demountable Rims, Tire Irons, Extra Rim, Accelerator, Windshield, Prest-O-Lite Tank, Horn and Speedometer.

Completely Equipped $950 The Empire Automobile Co., Indianapolis, U. S. A.

When Writing to Advertisers, Please Mention The Automobile Journal.

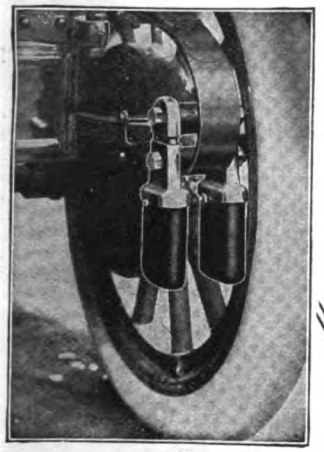
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Don't Accept Anything Else

Insist on having the pioneer, the superior, guaranteed Blackledge Velvet Springs. There are imitations (always are, of every good thing), but don't accept any Shock Absorbing Spring unless you find the name "Velvet" on it. That name means everything to you in the matter of an easy riding motor car. Blackledge "Velvet" Springs are made in the best possible manner of the best possible materials, and are guaranteed to give genuine satisfaction.

"Just eat up rough going; take out the bumps"

Sixteen sensitive, durable coils support the car, and no matter whether it is a commercial truck, seven-passenger touring car or small runabout, they make riding over roughest cobblestones comfortable and pleasant. Save 35% tire wear, insure against breakage and save wear and tear on entire car. Anyone can attach them in 30 minutes.



BLACKLEDGE SHOCK ABSORBING VELVET SPRINGS

Elegant, Small, Strong, Durable

(We own the basic patent)

Desirable, Exclusive Sales Territory Open

LIVE REPRESENTATIVES WANTED

Our big advertising campaign is creating sales in every section of the country. There is a lot of desirable territory still open. Write us today and get in on the profits.

JOHN W. BLACKLEDGE MFG. CO.

2112 Michigan Avenue CHICAGO, ILLINOIS

Infringement Suit

On April 18, 1913, we entered suit in the U. S. District Court, Northern District of Eastern Illinois, against the J. M. Shock Absorber Co. of Philadelphia, account of infringement of our U. S. Patent No. 988,229. Any other infringers will be vigorously prosecuted. Anyone selling or using our infringement device becomes a party to the infringement. We request dealers, the public, to please respect our rights.

Leading Distributors In These Cities

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Providence, R. I.
Philadelphia, Pa.
Buffalo, N. Y.
Baltimore, Md.
Milwaukee, Wis.
Galveston, Tex.
Cincinnati, O.
Detroit, Mich.
Springfield, Mass.

Pacific Coast:
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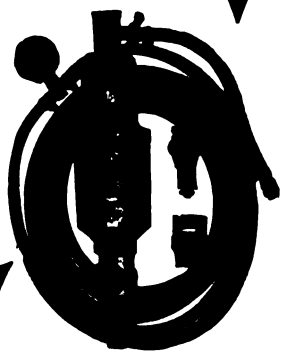
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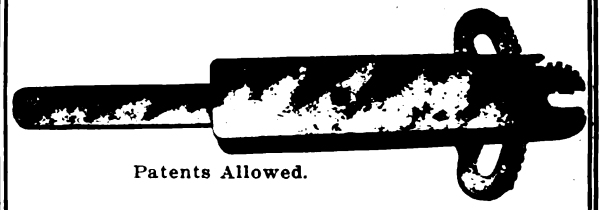
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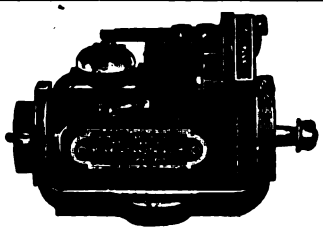


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Texas Company, The, 7 West St., New York.
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Miami Cycle & Manufacturing Co., 320 Hanover St., Middletown, O. (Flying Merkel.)

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National Motor Supply Co., 1911 Euclid Ave., Cleveland.

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International Metal Polish Co., Quill St. and Belt R. R., Indianapolis, Ind. (Blue Ribbon.)
Johns-Manville Co., H. W., Madison Ave. and 41st St., New York City.

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Johns-Manville Co., H. W., Madison Ave. and 41st St., New York City. (Asbestos.)

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Janney, Steinmetz & Co., Philadelphia.
Johns-Manville Co., H. W., Madison Ave. and 41st St., New York City.
Mosler, A. B., & Co., P. O. Box M, Mt Vernon, N. Y. (Spit Fire.)
Randall-Faichney Co., Boston. (Mac-Kae.)
Branches: See Horns.
Splitdorf Electrical Co., 98 Warren St., Newark, N. J.
Branches: See Magnetos and Supplies.
Standard Co., The, Torrington, Conn. (Black Eagle.)

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Interstate Auto Accessory Co., Indianapolis. (Ideal.)

SPEEDOMETERS, RECORDERS, ETC.

Hoffecker Co., The, Motor Mart, Boston. (Hoffecker.)
Jones Speedometer, New Rochelle, N. Y.
Branches: Broadway and 76th St., New York; 109 Massachusetts Ave., Boston; 1416 Vine St., Philadelphia; 1430 Michigan Ave., Chicago; 852 Main St., Buffalo; 253-255 Jefferson Ave., Detroit; 550 Golden Gate Ave., San Francisco; 1229 So. Olive St., Los Angeles, Cal.; 329 Ankeny St., Portland, Ore.; 917 E. Pike St., Seattle, Wash.
Service Recorder Co., 2245 East 105th St., Cleveland. (Servis.)
Stewart-Warner Speedometer Corp., Chicago, Ill. (Auto-Meter.)
Branches: 116 Edgewood Ave., Atlanta, Ga.; 925 Boylston St., Boston; 720 Main St., Buffalo; 2420 Michigan Ave., Chicago; 807 Main St., Cincinnati; 2062 Euclid Ave., Cleveland; 1518 Broadway, Denver; 870 Woodward Ave., Detroit; 230½ North Illinois St., Indianapolis; 1618 Grand Ave., Kansas City; 748 S. Olive St., Los Angeles, Cal.; 1902 Broadway, New York; 302 N. Broad St., Philadelphia; 5040 Kirkwood Ave., Pittsburg; 14 N. Seventh St., Portland, Ore.; 36-38 Van Ness Ave., San Francisco; 611 E. Pike St., Seattle, Wash.; 3923 Olive St., St. Louis; 550 Yonge St., Toronto, Can.

SPRINGS FOR AUTOMOBILE SUSPENSION.

Marburg Bros., Inc., 1700 Broadway, New York. (Marburg-Hagen.)
Perfection Spring Co., No. 1 Plant, 2414 Superior Ave., N. W.; No. 2 Plant, East 65th and Central Ave., Cleveland.

SPROCKETS.

Boyd, F. Shirley, 903 Boylston St., Boston. (Baldwin.)

STEEL PARTS, SEAMLESS.

Standard Welding Co., Cleveland.

STORAGE SYSTEMS—GASOLINE AND OIL.

Janney, Steinmetz & Co., Philadelphia.
Scaife & Sons Co., Wm. B., Pittsburg, Penn.
Branch: New York City.

SWITCHES, LOCK.

Blackburn Specialty Co., 1120 Prospect Ave., S. E., Cleveland. (Autolock.)

TANKS, ACETYLENE GAS.

Prest-O-Lite Company, 271 East South St., Indianapolis. (Prest-O-Lite.)
Branches: See Cylinder Cleaning Compound.

TANKS FOR FUEL AND WATER.

Janney, Steinmetz & Co., Philadelphia.
Scaife & Sons Co., Wm. B., Pittsburg, Penn.
Branch: New York City.

TANKS, TIRE INFLATING.

Prest-O-Lite Co., 271 East South St., Indianapolis. (Baby Tire Filler, The Emancipator.)
Branches: See Cylinder Cleaning Compound.

TAPE, ASBESTOS.

Johns-Manville Co., H. W., Madison Ave. and 41st St., New York City.

THERMOS CASES.

Dover Stamping & Manufacturing Co., Cambridge, Mass.

TIRE ACCESSORIES.

Firestone Tire & Rubber Co., Akron, O.
Branches: See Rims—Removable and Detachable.
Shaler Co., C. A., Waupun, Wis.

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TIRE CASES.

Hopewell Brothers, Newton, Mass. (Hopewell.)
Branch: 1974 Broadway, New York.

TIRE CHAIN GRIPS. (See Chains.)

TIRE PRESERVATIVES AND PROTECTORS.

Approved Auto Specialties Co., 1731-37 Broadway, New York. (Goodman Tire Shield.)
Gray Specialty Co., 148 Avon Ave., Newark, N. J.
National Rubber Co., 4433 Papin St., St. Louis, Mo. (Tirenew.)
Page-Lester Co. 2644 Indiana Ave., Chicago. (Tite-Wad Rubber Putty.)

TIRE REMOVERS.

O-Tak-A Tire Remover, Le Roy, N. Y.

TIRES—CASINGS AND INNER TUBES.

Braender Rubber & Tire Co., Rutherford, N. J. (Braender.)
Dayton Rubber Mfg. Co., Dayton, O. (Dayton Airless.)
Diamond Rubber Co., Akron, O. (Diamond.)
Firestone Tire & Rubber Co., Akron, O. (Firestone.)
Branches: See Rims—Removable and Detachable.
Fisk Rubber Co., Chicopee Falls, Mass. (Fisk.)
Branches: 811-813 Boylston St., Boston; 17½ Dorrance St., Providence.
Frontier Tire & Rubber Co., 1054 Main St., Buffalo, N. Y. (Frontier.)
Gaulois Tire Co., 1926 Broadway, New York. (Gaulois.)
Goodyear Tire & Rubber Co., Madison St., Akron, O. (No-Rim-Cut.)
Branches: In all principal cities.
Hood Rubber Co., Watertown, Mass. (Shawmut.)
United States Tire Co., Broadway and 58th St., New York. (Continental, G & J, Hartford, Morgan & Wright.)
Branches: See Rims—Removable and Detachable.
Walpole Tire & Rubber Co., Walpole, Mass. (Walpole.)

TIRES—CUSHION.

Cataract Rubber Co., Wooster, O. (Cataract.)
Branches: Boston, New York, Providence.
Firestone Tire & Rubber Co., Akron, O. (Firestone.)
Branches: See Rims—Removable and Detachable.
Mots Tire & Rubber Co., The, Akron, O. (Electric Special Mots Cushion.)
Branches: Boston, New York, Philadelphia, Pittsburg, Chicago, Kansas City, Detroit, Cleveland, Los Angeles.

TIRES—MOTORCYCLE.

United States Tire Co., Broadway and 58th St., New York. (Morgan & Wright. G. & J.)
Branches: See Rims—Removable and Detachable.

TIRES—SOLID AND COMMERCIAL.

Diamond Rubber Co., Akron, O. (Diamond.)
Firestone Tire & Rubber Co., Akron, O.
Branches: See Rims—Removable and Detachable.
Fisk Rubber Co., Chicopee Falls, Mass.
Branches: See Tires—Casings and Inner Tubes.
Mots Tire & Rubber Co., The, Akron, O. (Mots.)
Branches: See Tires—Cushion.
Polack Tyre and Rubber Co., 246 W. 59th St., New York City. (Polack.)
Republic Rubber Co., Youngstown, O. (Republic.)
United States Tire Co., Broadway and 58th St., New York.
Branches: See Rims—Removable and Detachable.

TOPS AND ATTACHMENTS.

Springfield Metal Body Co., 20 Medford Ave., Springfield, Mass.

TROUBLE FINDERS.

Hopewell Brothers, Newton, Mass. (Vibrator.)
Branch: 1974 Broadway, New York.

TRUCKS AND TRACTORS—See Cars, Commercial.

TRUNK RACKS.

Connecticut Steel & Wire Co., Hartford, Conn.

TUBING, GAS.

Johns-Manville Co., H. W., Madison Ave. and 41st St., New York City.

TURNTABLES.

Beach Co., T. C., 108 Ottawa St., St. Johns, Mich. (Beach.)

UNIVERSAL JOINTS.

Bretz Co., J. S., 520 W. 54th St., New York. (Hartford.)
Kinsler-Bennett Co., The, P. O. Box 124, Hartford, Conn. (Kant-Break.)

VALVE GRINDERS.

Wall, J. H., 200 Hope St., Bristol, R. I. (Ford.)

VULCANIZERS.

McVey Manufacturing Co., Third and Canal Sts., Dayton, O. (McVey.)
National Motor Supply Co., 1911 Euclid Ave., Cleveland. (Garage and Individual.)
Branches: In all principal cities.
Shaler Co., C. A., Waupun, Wis.
Vanderpool Tire & Rubber Co., Springfield, O.
Williams Foundry & Machine Co., Akron, O.

WELDING OUTFITS.

Prest-O-Lite Co., 309 W. South St., Indianapolis. (Prest-O-Welder.)
Branches: See Cylinder Cleaning Compound.

WELDING, STEEL.

Standard Welding Co., Cleveland.

WHEELS.

Eberly & Orris Mfg. Co., Mechanicsburg, Penn.

WIRES AND CABLES.

Diamond Rubber Co. of N. Y., Akron, O. (Diamond.)

WIRE MECHANISM.

Bretz Co., J. S., 250 W. 54th St. New York. (Bowden.)

WRENCHES AND COMBINATION OUTFITS.

Allen Wrench and Tool Co., Providence, R. I. (Allen Friction Socket Sets.)
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Cutter, George A., Taunton, Mass.
Walworth Manufacturing Co., Boston. (Stillson.)

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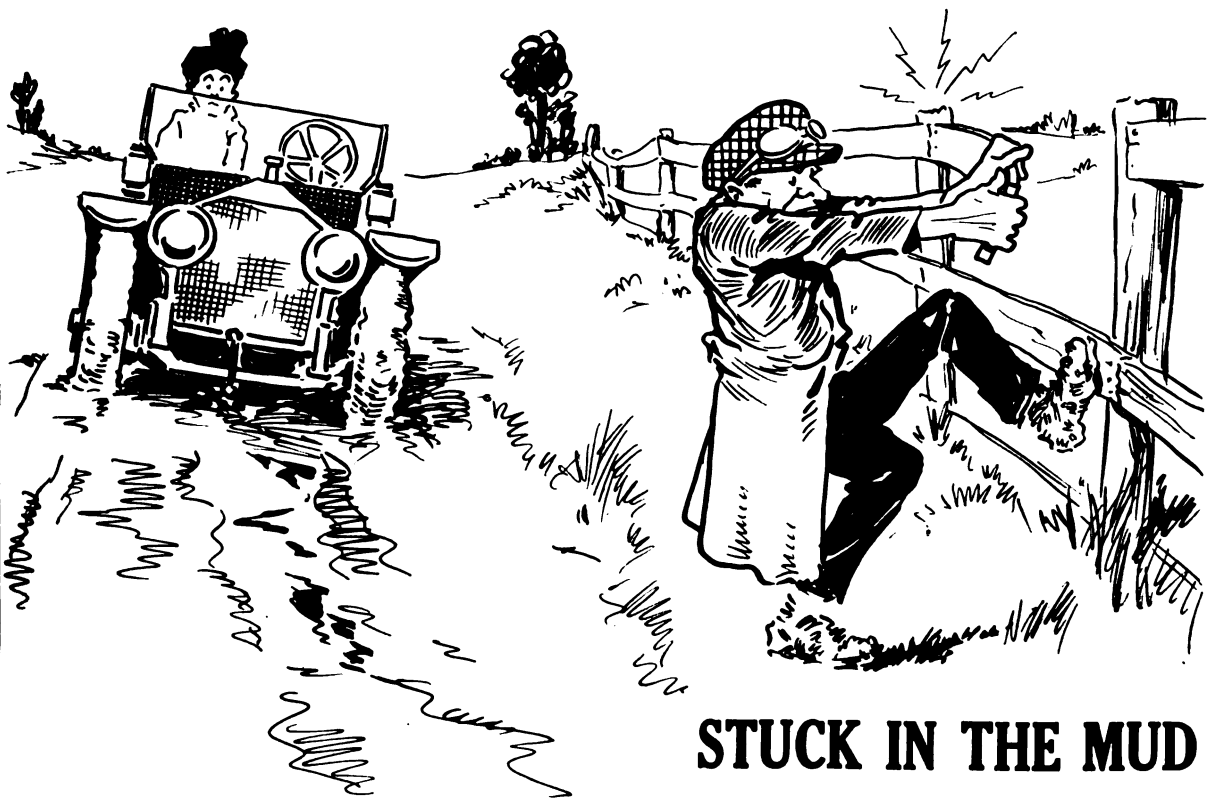
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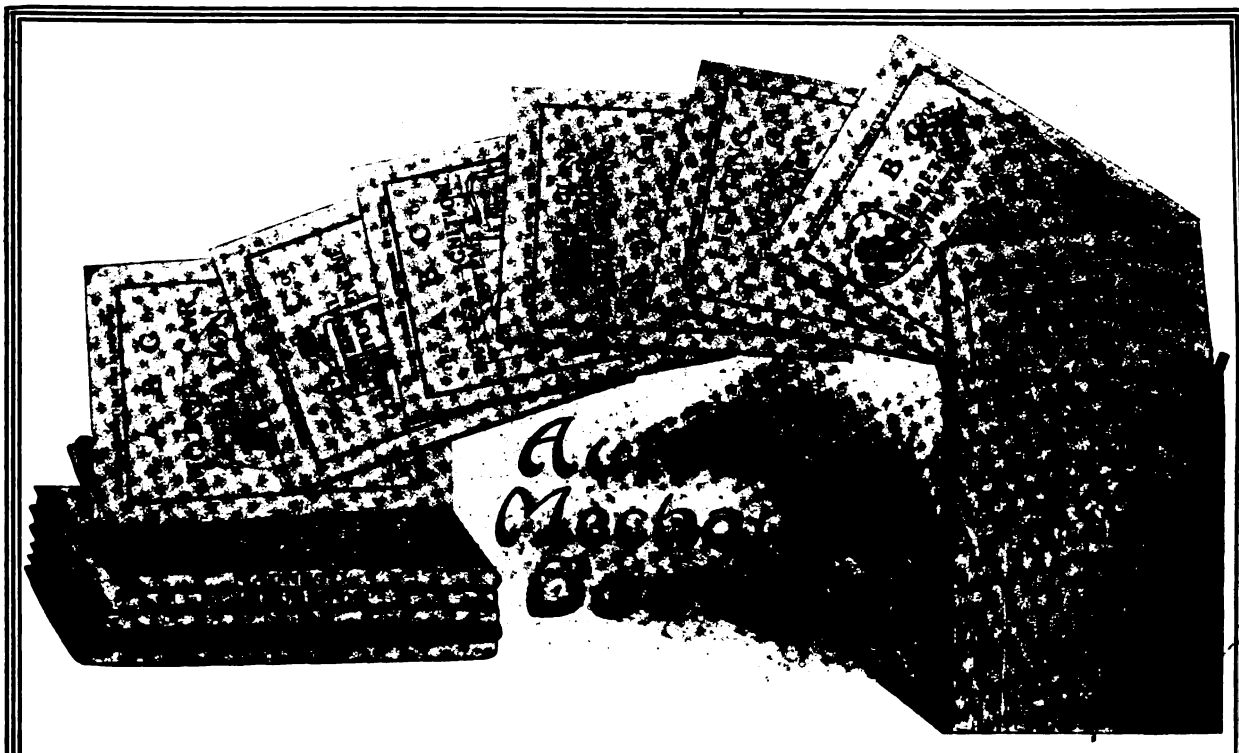
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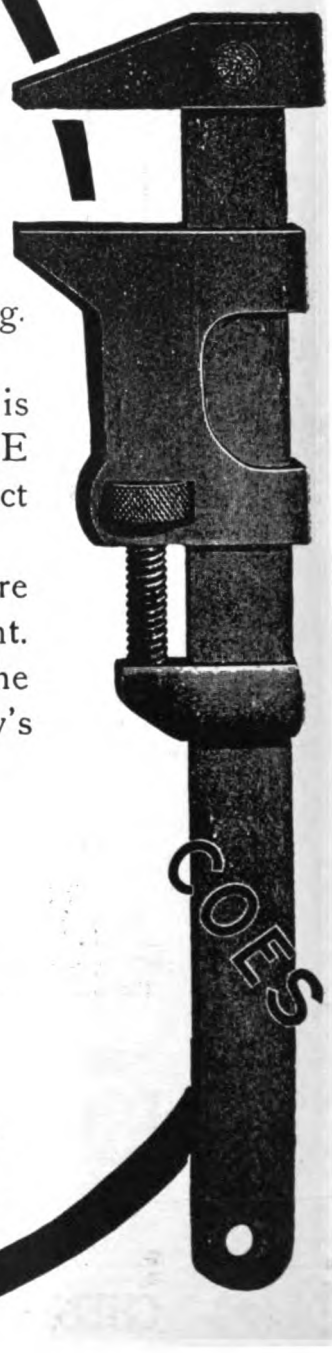
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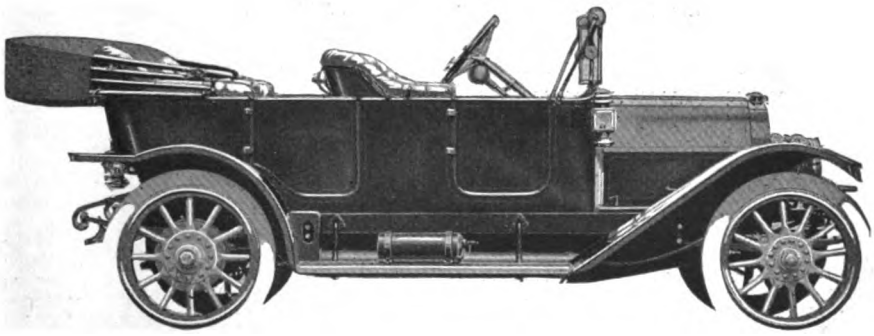
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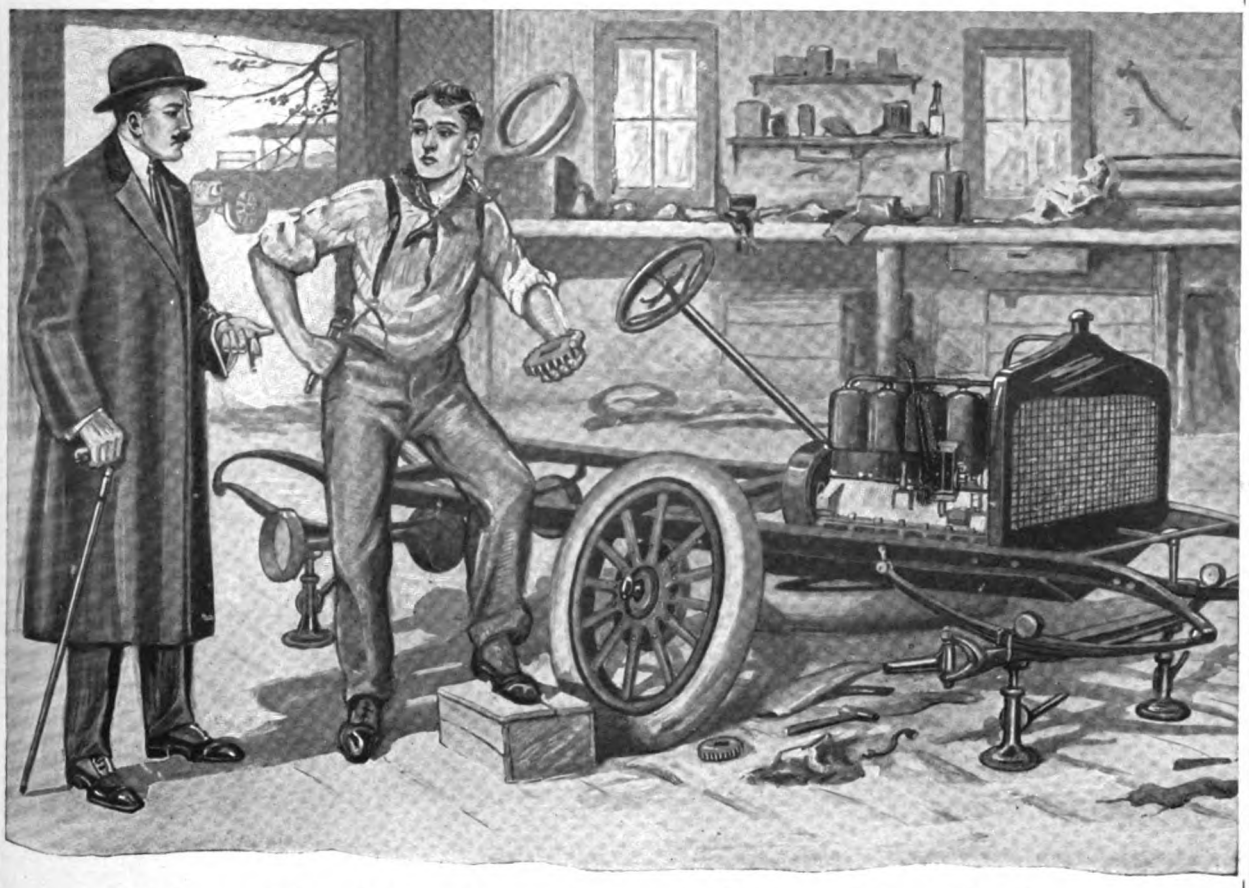
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	Page
*National Good Roads Supervision	15
*Manufacturing Spit Fire Spark Plugs	21
*Firestone Homestead Dinner	23
*The Automobile in the Farmer's Life	27
*General News of the Industry—	
Returns to Pacific Coast	30
Underhill in California	30
Reo Company's Dividends	31
Resigns from Fiat Concern	31
Elected to Directorate	31
Introducing Republic Wagon	31
Revives Old Times	32
Mack Interests Combine	33
Buys Whole Village	33
Cole Increases Capital	33
Form Grant Motor Company	33
New Department Heads	34
Chevrolet Buys Little	34
Two New Havers Men	35
Carriages and Wagons	35
*New and Novel Accessories	36
The Friction Transmission	39
Severe Motor Test	39
Luverne Power Plant	39
R-C-H Transcontinental Tour	39
*Mechanical Notes for Owners—	
Fitting Inexpensive Oil Gauge	40
Missing at Low Speeds	40
Adjusting Cole Oiler	41
Renovating Oil Lamps	41
Care of Shellac	41
*Adjusting Rayfield Carburetors	42
*With the Motoring Interests Abroad—	
Argyll's New World's Records	44
Testing Road Materials	44
American Invasion in France	45
Notes from Foreign Lands	45
*Correspondence with the Reader—	
Dead Axles	46
Planetary Type Motor Starter	46
Jacobson-Brandow Magneto	47
Crankshafts	47
Desires Small Spark Plugs	47
Trouble with the Carburetor	48
Experiences Spark Plug Trouble	48
Single and Double U. & H. Magneto	48
Q D Shoes on Clincher Rims	48
Adjusting Ford Steering Gear	48
Mudlarks' Anniversary Banquet	48
*A Day in the Country	49
Long Branch Show	49
An Unfortunate Backward Step, Editorial	50
The British Engineers, Editorial	50
Necessary Qualities in Lubricating Oils, Harry Tipper	51
Influence of Sales Department upon Design, F. E. Moskovics	53
Inner Tube Bags	54
*Itinerary Is Decided Upon	55
*In the Commercial Vehicle Field—	
Christie Front-Drive Tractor	56
New Street Cleaning Machine	57
White in Lumber Haulage	57
Willet Two-Ton Model	58
Buick Wins Abroad	59
Novel Bridge Construction	59
Motoring Laws and Their Enforcement—	
Mississippi Law Unconstitutional	60
To Help Enforce Laws	60
Roads and Bridges	60
Wants New Regulations	61
Truck Fee Bill Killed	61
Oklahoma's Highway Commission	61
Legislative Briefs	61
*The Repair Shop and the Garage—	
Jig for Remetalling Bearings	62
Verifying Bearings	62
A Hardening Hint	62
Tempering Screw Drivers	62
*Features of Noble Bi-Fuel Carburetor	63
*Garage and Repair Shop Equipment—	
Noil Pump	64
Tape Grip Water Joint	64
Radico	64
Tad's Trouble Finder	64
*British Engineers in New England	65
*Burgess Coast Defense Hydraeroplane	68
Tacoma Road Races	69
National Reliability Tour	69
Twelve Entries for Columbus	69
*In the Realm of the Motorcyclist—	
Elgin Road Race	70
New York and Chicago Show	70
Tourist Trophy Results	70
Thiem Increases Capital	70
Addition to Saddle Plant	71
Indian Wins Century Event	71
Death of W. K. Aurandt	71
Merkel's Road Race Team	71
Spanish Road Race	71
New Mile Board Track	71
Merkel Takes Twin Award	71
New Registered Repair Shops	72
Pope Man Secures Promotion	72
De Luxe Needs More Room	72
Merkel Announces Racing Policy	72
Recent Commissioner Appointments	72
New Cyclecar Company	72
Michaelson in New Building	72
Thor Is Nearly All Moved	73
Long Distance Sidecar Trip	73
Motorcycle Patrols for A. L. A	73
New Members in May	73
Club Notes, Here and There	73
*News of Manufacturers and Dealers	74
Recent Patents	76
Coming Events	76
New Publications Received	76
Roads Congress in Detroit	77
Planning Owners' Event	77
*The New Grant Car	77
*Lights on Mudguards	78
Splitdorf During the Race	78
Those Braender Tires	78
National Reliability Run	79
Boston's Children's Day	79
Imports and Exports	79
Annual Bay State Outing	80
Galveston Beach Races	80
*Wells Lighting Dynamo	80
Annual Touring Number	81
Plans Factory Addition	81
*Red Roll Auto Waste	81
St. Petersburg Exhibition	82
Adds One-Ton Model	82

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Index To Advertisers

	Page
Abbott Motor Co.	88
American F. N. Company	73
Anti-Rust Paint Co.	91
Apple Electric Co.	86
Approved Auto Specialties Co.	92
Austin Automobile Co.	83
Barrett Manufacturing Co.	86
Beach Co., T. C.	90
Borne, Scrymser Company	83
Bosch Magneto Company	83
Boyd, F. Shirley	92
Braender Rubber & Tire Co.	84
Bretz Company, The J. S.	92
Brown Company	86
Cameron Mfg. Co.	92
Cartercar Company	84
Cataract Rubber Co.	3
Chelsea Clock Co.	5
Coes Wrench Company	6
Cole Motor Car Company	84
Continental Motor Mfg. Co.	92
Cutter, Geo. A.	88
Dayton Rubber Mfg. Co.	85
Dean Electric Company	85
Detroit and Cleveland Navigation Co.	84
Dixon Crucible Co., Jos.	85
Dover Stamp. & Mfg. Co.	85
Eagle Oil & Supply Co.	89
Edwards Mfg. Co.	84
Empire Automobile Co.	90
Federation Amer. Motorcyclists.	73
Gaulois Tire Corp.	89
Geiszler Bros. Storage Bat. Co.	88
Goodyear Tire & Rubber Co.	83
Harris Oil Company, A. W.	91
Haynes Automobile Co.	85
Heinze Electric Co.	86
Henderson Motor Car Co.	83
Herreshoff Motor Co.	91
Hoffecker Company, The	85
Hotel Belleclaire	87
Indian Refining Co.	Cover
Invader Oil Co.	84
Invincible Tire Co.	85
Jackson Automobile Co.	85
Johns-Manville Co., H. W.	83
Keeton Motor Car Co.	84
Kissel Motor Car Company	90
Knox Automobile Company	87
K-R-I-T Motor Car Co.	90
Marburg Bros.	84
Mea Magneto	84
Mercer Automobile Company	85
Miami Cycle & Mfg. Co.	71
Michigan Motor Car Co.	88
Miller, Chas. E.	Cover
Moller Brothers Controller & Economizer Co.	87
Mosler & Co., A. R.	11
National Motor Vehicle Co.	88
New Departure Mfg. Co.	90
Nordyke & Marmon Co.	87
N. Y. & N. J. Lubricant Co.	9
Owen & Co., R. M.	85
Paige-Detroit Motor Car Co.	86
Perfection Spring Co.	92
Pierce-Arrow Motor Car Co.	Cover
Pilot Car Sales Co.	90
Planhard Mfg. Co.	88
Pyrene Co. of N. E.	91
Randall-Faichney Co.	92
Remy Electric Company	92
Reo Motor Car Company	85
Royal Equipment Co.	83
Sager Company, J. H.	86
Shaler Co., A. C.	85
Speedwell Motor Car Co.	84
Splitdorf Electrical Co.	82
Springfield Metal Body Co.	13
Standard Co., The	90
Standard Oil Co.	89
Standard Welding Co.	87
Standard Woven Fabric Co.	86
Studebaker Corporation	89
Stutz Motor Car Co.	83
Sumner, George, Inc.	91
Union Wadding Co.	Cover
United States Tire Co.	88
Valvoline Oil Company	91
Waite Auto Supply Co.	84
Walpole Tire & Rubber Co.	83
Warner Speedometer Corp.	90
Weed Chain Tire Grip Co.	14
Willard Storage Battery Co.	1
Willys-Overland Company	7

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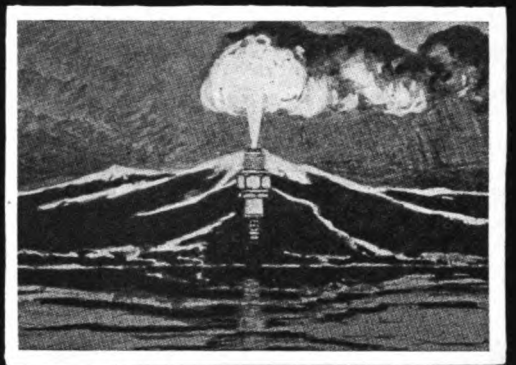
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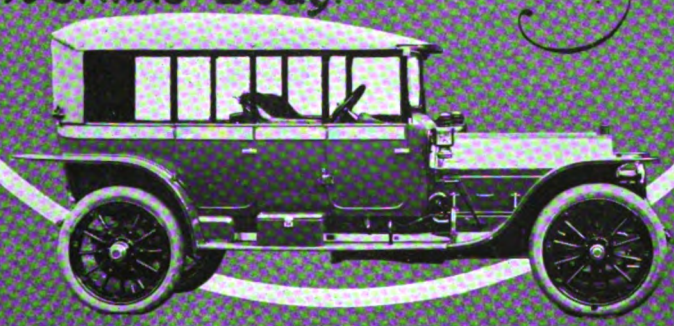
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THE AUTOMOBILE JOURNAL

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NATIONAL GOOD ROADS SUPERVISION.

A Comparison of Construction and Maintenance Methods in America and Abroad—How the Various States Contribute to Secure Improved Highways.

ACCORDING to the United States Department of Agriculture, the average cost of hauling one ton of farm produce one mile in America is 23 cents, while similar service over European roads costs eight cents. It will not be denied that the difference in the original investment, labor and other commodities, enter into the computation, but these by no means account for the wide variation. These figures are a convincing argument of the economic value of good roads.



Street in Lauterbrunnen, Switzerland, Indicating the Character of Roads Built in That Country with Government Aid.

When organized motorists took up the work begun by the bicyclists, they were confronted by persistent opposition, and that public opinion has undergone a decided change is due in no small measure to the educational campaign which has been conducted by organizations formed for that purpose. Among these may be mentioned the American Highway Association, which was formed Nov. 22, 1910, "to harmonize and correlate all efforts for the improvement of public roads, to the end that adequate and efficient systems of road construction, administration and maintenance may be adopted in all the states."

Elsewhere is presented a tabulation indicating in a measure the results accomplished along these lines. This has not been brought about solely by any one agency, but there can be little doubt that the activity of a national body of this

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Brown's River Road from Hobart to Kingston, Tasmania, Built by Convict Labor Under Supervision of Imperial Government.

character has had much to do with the crystallization of public opinion and the direction of effort along the proper channels.

Practically all interests now agree that better ways are essential to the business success and economic welfare of the nation. The above wording of the object of the American Highway Association is particularly timely, since the campaign of education must hereafter be conducted along lines which shall develop the best methods. That the people are liberal in their response whenever called upon to exercise their suffrage with respect to good roads matters seem evident in most instances. The main question to be determined is the proper administration of the funds available for this purpose, that an efficient system of highway construction and maintenance shall result.

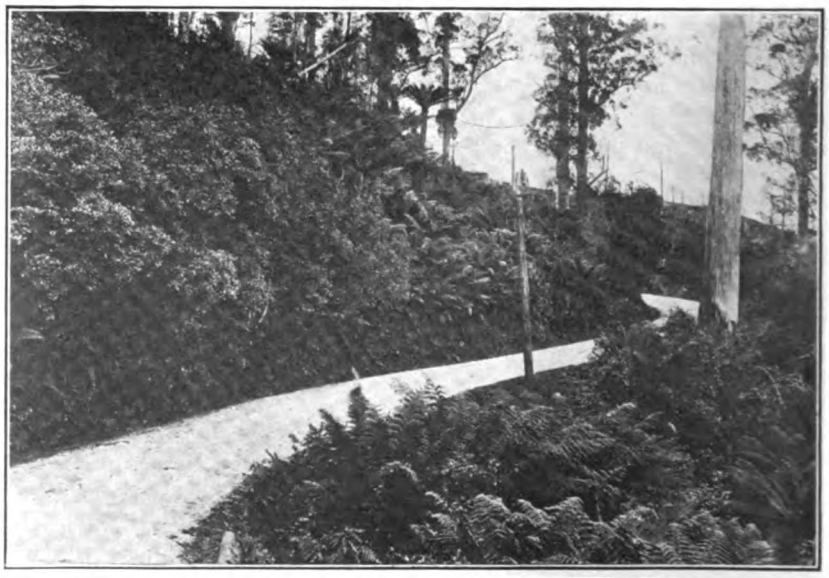
A comparison of the road mileage and the annual amounts expended by some of the leading European nations should prove of interest in this connection. It must be borne in mind that these countries are much older than America and that the percentage of improved roads in most instances is such that comparatively little new work is done each year, so that the cost figures given, which are approximate only, apply very largely to maintenance. The table appears in the next column.

The figures of the United States office of public roads show that America has 3,898,444 miles of public highways, less than five per cent. of which, 187,258.75, were entitled to the designation "improved" at the close of 1911. The tabulation herewith indicates that America is appropriating, in round numbers, $45,000,000 a year for construction and maintenance, although this amount should be augmented by the appropriations made by the counties and towns. It follows that the improved mileage must have been increased materially since 1911, but it is still far below the 70 per cent. in France, for example.

Aside from appropriating $500,000 in 1912 for federal aid in the construction of post roads in the several states, the United States government has as yet done very little toward the construction and maintenance of highways. A bill appropriating $25,000,000 for a similar purpose was introduced in Congress in January of this year. Otherwise, the national government has confined itself solely to the establishment of the

FOREIGN NATIONAL GOOD ROADS EXPENDITURES.

Country	Miles	Expense
France	520,088	$48,000,000
England and Wales	150,908	25,000,000
Prussia	95,076	35,000,000
Italy	92,199	6,500,000
Austria	74,265	3,000,000
Sweden	35,450	2,000,000
Spain	33,873	8,000,000
Hungary	31,800	1,500,000
Russia	11,254	1,000,000
Switzerland	7,426	100,000



Road to Weldborough in the Blue Mountain Mining Country of Tasmania, Australia, Constructed Under Contract by Colonial Government.

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Caretaker on the Road Between Paris and Versailles, France, Over Which It Is Estimated 10,000 Automobiles Pass Daily.

office of public roads, which acts largely in an advisory capacity. It may be added that the American Highway Association was very active in securing the $500,000 appropriation mentioned above.

In France the national government constructs and maintains the national roads, of which there are 23,754 miles, and aids by subsidies in caring for the vicinal roads, of which there are 331,908 miles, divided as follows: Roads of through travel, 107,065; roads of common interest, 47,263, and ordinary vicinal, 177,580. The first two traverse several communes or towns and the last are located within a single commune. The various departments construct and maintain the 9050 miles of departmental roads.

In England and Wales the highways are divided between main roads and roads other than main roads, of which the respective mileage is 27,286 and 123,082. The general government renders aid in construction and maintenance by the assignment of certain national revenues, by loans through the government road board, and by free grants from this board. The assistance is for new roads, or the road board itself may construct and maintain new public highways.

The German imperial government takes no part in the construction and maintenance of public highways, this being left to the several states. The empire has approximately 36,000 miles of state roads, of which Prussia has 20,489 miles, Bavaria 4200, Saxony 2267, Baden 1890, Wurtemburg 1710 and the other states the remainder. In addition there are a large number of county improved roads, of which Prussia has 74,587 miles.

Italy has 5159 miles of national roads, which are constructed and maintained by the national government. In addition there are 27,757 miles of provincial roads in charge of the provinces and 59,283 miles of communal ways. Austria has 10,008 miles of government roads in charge of the imperial government, which also has supervision over all the highways, there being 2288 miles of provincial, 39,212 district and 22,756 town roads. Sweden has 11,850 miles of main roads, connecting with other countries or connecting large cities and ports, for the construction of which the government pays two-thirds and the districts one-third, while on maintenance the government pays 15 per cent.

In Spain the state roads are constructed and



One of the Main Roads of England, in the Vicinity of Warwick, a Typical British Highway.

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maintained by the general government through the department of public works, and it also aids by appropriations in the maintenance of provin-



Slag-Brick Road in the Vicinity of Hilversum, Holland.

cial roads. Hungary constructs and maintains its 5600 miles of national roads and contributes in some cases toward the support of the 17,400 miles of county roads. The provinces aid in the maintenance of the 8100 miles of district ways and 700 miles of parish roads.

While Russia has a large territory it has but 11,254 miles of post roads classed as public ways, of which 8326 miles are under the direct charge of the national government and 2928 are temporarily under the control of district councils with governmental supervision. Switzerland has 350 miles constructed and maintained by the cantons with federal aid, 862 built and maintained solely by the cantons and 6214 in charge of municipalities.

In addition to the countries already mentioned, Norway has 17,550 miles of roads, divided between 6570 miles of main and 10,980 miles of district ways. The national government contributes two-thirds to three-quarters of the construction of main roads, but the maintenance, with but few exceptions, is a local burden. The work is done under county engineers, nominated by county councils and appointed by the national government. Denmark has 4213 miles of main roads and 22,505 miles of local ways. The government does not grant money aid, but the work is under the supervision of a general superintendent of highways for the kingdom.

The reader is referred to the Good Roads Year Book of the American Highway Association for more detailed information concerning the road provisions of the various foreign nations. Accompanying illustrations indicate in a measure the character of highways built abroad. The Australian roads shown are constructed either by the imperial British government or the local colonial government, sometimes by contract and sometimes by convict labor.

In explanation of the tabulation concerning the expenditures by the various states in this country, it may be stated that the figures appearing in the first two columns were supplied by the United States office of public roads and may be regarded as thoroughly dependable in every way. The last column represents the result of correspondence with highway department officials in the several states. In some instances it has been impossible to secure an estimate of the funds available under this classification for the reason that the legislature was still in session and proposed appropriations had not been passed upon, or new state highway commissions had just been created and the officials were unable to make forecast. Where blanks occur it may be taken for granted that there is no provision for state highway funds.

So far as possible, an effort has been made to eliminate from the statement of funds available for 1913 any amount which might have been carried over from previous years, the object being to present the actual sums which have been expended on improved roads or which will be expended this year. The difficulty of reaching a determination of this character is better understood when the provisions of the various state laws are known. The following digest will aid in the proper study of the situation:

Alabama—Annual appropriation of $154,000 for state aid. Counties must raise a like sum. Convict labor may be employed.

Arizona—Law of 1912 provides for an annual tax to create a state road fund of $250,000. All roads and bridges



Section of the Road to Moltrasio, Past Lake Como, Italy.

constructed under this act shall be at the cost of the state. Local poll tax of $2. Convict labor may be employed if it does not interfere with free labor.

Arkansas—County road tax of three mills on the dol-

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lar. Roads divided between first and second class. Former must be worked first and latter as county court shall direct. Convicts may be worked on public highways.

California—State is now expending proceeds of an $18,000,000 bond issue, of which $2,800,000 worth have been sold, for a state highway system. Special appropriations for maintenance of 11 existing state roads. Counties must pay annually a sum equal to four per cent. on the entire sum expended in the county, less such portion as the bonds matured shall bear to the total number sold and outstanding.

Colorado—State road fund apportioned by state highways commission, counties to raise a like sum. Local poll tax of $2. Convicts may be employed. Estimated total expenditure for the year on all roads, $2,000,000.

Connecticut—Balance of $3,000,000 bond issue available. Annual appropriation for care and maintenance. Proceeds from automobile law. Towns must raise from one-eighth to one-fourth of amount expended in state aid.

Delaware—State fund comprises proceeds of bond sales and special appropriation by legislature. Counties must raise a like sum to receive state aid.

Florida—All roads and highways under the supervision of county commissioners. Fund composed of county tax and proceeds from county automobile registration. Convicts may be employed.

Georgia—Provision for working convicts under contract system. County tax of 20 cents on $100.

Idaho—Legislature of 1913 created state highway commission and a state highway fund, comprising proceeds from automobile registration law and such bonds as shall be issued by the state. Now in process of organization.

Illinois—Proposition before legislature includes diverting income from the Illinois Central Railroad, inheritance tax and the automobile license law. These and special appropriations expected to yield at least $2,000,000.

Indiana—No state commission and no state funds. Counties may issue bonds not to exceed two per cent. of assessed valuation, and may levy tax not to exceed one cent on each $100. Convicts may be employed on public highways.

Iowa—Iowa State College of Agriculture and Mechanical Arts acts as state highway commission to devise plans and instruct county supervisors and others who make request. County fund for road work under county direction and township fund for grading and drainage. Both raised by taxation. Legislation pending seeking to establish state aid.

Kansas—Constitution provides that state "shall never be a party to carrying on works of internal improvement." Roads are classified as state, county, mail and township. First named are designated by the state and the second by the counties. Mail roads are those covered by rural free delivery routes. Road funds are raised by taxation. Surplus convicts may be employed.

Kentucky—Annual appropriation of $25,000 for state aid. Automobile license fees included in this fund. County and local road funds raised by taxation. Poll tax of $1.50. Convicts may be employed.

Louisiana—State highway engineer constructs and maintains improved roads and the state is reimbursed by the parish. Tax of one-fourth of a mill. Every male person between the ages of 18 and 50 shall work on roads not exceeding 12 days a year or pay $1 a day for such work required. Convicts may be employed.

Maine—New state highway law provides for state highway system and for state aid in certain instances. Bond issue of $2,000,000 available July 1. Annual appropriation of $250,000.

Maryland—Funds available for state highways comprise balance of $6,000,000 bond issue and $210,000, included in which is the net revenue from the automobile law.

Massachusetts—Available for state highway system by appropriation, $200,000, and from motor vehicle fees, $548,000. Special appropriations for specific roads total $500,000.

Michigan—Appropriation of $250,000 for state aid in 1913 made in 1912. Other appropriations pending. State "rewards" counties and townships at the rate of from $250 to $1000 a mile, according to the type of road built under state supervision. Convicts may be employed in the county in which they are confined.

Minnesota—State aid is granted for work done on roads designated by county commissioner. Funds available for 1913 as follows: State, $436,476.56; counties, $1,530,175; townships, $1,514,931.57.

Mississippi—No state funds. Convicts may be worked under state or county supervision. Every male person between the ages of 18 and 50 shall work 10 days in each year on public roads. Tax not to exceed one mill.

Missouri—General state road fund comprises estimated income of $100,000 from tax on brokerage business and $100,000 from automobile licenses. Additional income from excise tax in certain counties. Local funds by poll tax and levy of between 40 and 50 cents on $100.

Montana—New state highway commission in process of organization. State road fund includes five per cent. of money received from United States government from each forest reserve and the proceeds from the automobile registration law. Local funds by poll tax of $2 and levy of not less than one nor more than three mills on the dollar.

Nebraska—State road fund includes five per cent. of money received from United States government for each forest reserve and the proceeds from the automobile registration law. Inheritance tax goes to county fund. Local fund by taxation.

TABULATION SHOWING AMOUNT OF STATE MONEY APPROPRIATED OR EXPENDED FOR IMPROVED HIGHWAY CONSTRUCTION AND MAINTENANCE.

State.	Total Expenditures to Dec. 31, 1911.	Available in 1912.	Available in 1913.
Alabama	$25,332.64	$270,000.00	$264,000.00
Arizona	.....	.....	250,000.00
Arkansas	.....	.....	.....
California	403,300.00	135,000.00	2,935,000.00
Colorado	1,050,000.00	8,000.00	550,000.00
Connecticut	6,200,572.29	3,652,000.00	652,000.00
Delaware	132,695.35	30,000.00	47,810,62
Florida	.....	.....	.....
Georgia	4,233,800.00	1,543,800.00	?
Idaho	53,000.00	193,000.00	?
Illinois	330,000.00	100,000.00	†2,000,000.00
Indiana	.....	.....	.....
Iowa	.....	10,000.00	*1,010,000.00
Kansas	6,500.00	6,500.00	7,000.00
Kentucky	.....	25,000.00	25,000.00
Louisiana	129,594.16	130,000.00	?
Maine	952,209.75	250,000.00	2,360,000.00
Maryland	7,211,000.00	3,370,000.00	2,170,000.00
Massachusetts	8,494,942.70	716,000.00	2,380,000.00
Michigan	910,000.00	250,000.00	*250,000.00
Minnesota	360,240.00	490,000.00	3,481,583.13
Mississippi	.....	.....	.....
Missouri	*850,000.00	*80,000.00	*200,000.00
Montana	.....	.....	?
Nebraska	.....	.....	?
Nevada	20,000.00	20,000.00	20,000.00
New Hampshire	1,265,483.98	453,000.00	*600,000.00
New Jersey	3,905,000.00	760,000.00	*950,000.00
New Mexico	162,055.50	87,820.21	*580,000.00
New York	47,121,826.14	23,000,000.00	*10,000,000.00
North Carolina	13,750.00	5,000.00	5,000.00
North Dakota	.....	.....	?
Ohio	2,015,952.19	680,000.00	$770,000.00
Oklahoma	5,000.00	5,000.00	5,000.00
Oregon	.....	.....	?
Pennsylvania	12,500,000.00	4,000,000.00	*4,000,000.00
Rhode Island	1,913,933.79	940,000.00	521,000.00
South Carolina	.....	.....	.....
South Dakota	.....	.....	.....
Tennessee	.....	.....	?
Texas	.....	.....	.....
Utah	653,612.33	380,000.00	325,342.66
Vermont	1,812,962.80	350,000.00	*1,080,000.00
Virginia	996,245.80	310,000.00	300,000.00
Washington	2,261,779.65	1,319,018.46	5,086,079.33
West Virginia	.....	.....	.....
Wisconsin	600,000.00	250,000.00	2,500,000.00
Wyoming	10,000.00	.....	.....
Totals	$106,600,789.07	$43,819,138.67	$45,024,815.74

*Estimated or approximated; †proposed; $plus appropriation for repair of flooded roads.

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Nevada—Appropriation of $20,000 as general road fund. Voluntary work by convicts is permitted. County road funds by poll tax and levy not to exceed one-fourth of one per cent.

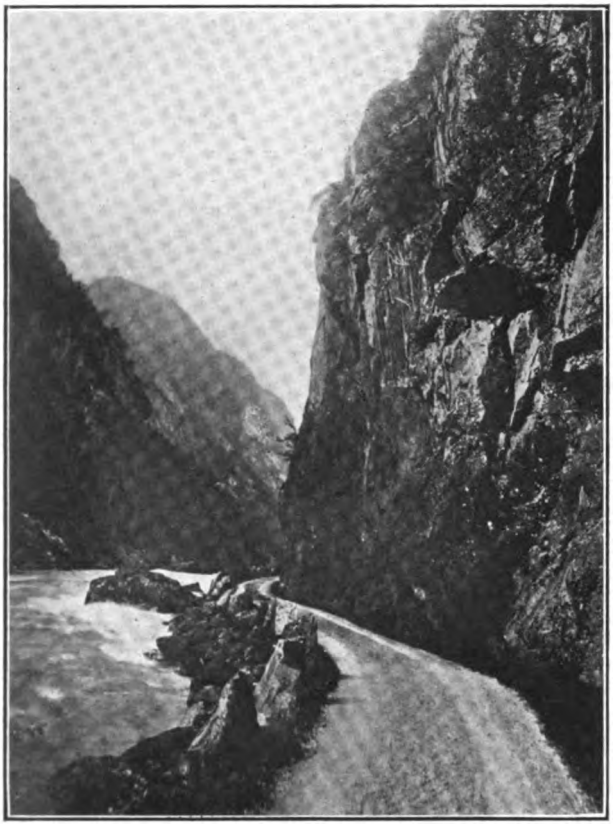
New Hampshire—Anticipated that annual appropriation for trunk lines will be $300,000 and $300,000 for state aid, the state, county and town each to pay one-third.

New Jersey—Annual appropriation of $400,000. County must pay 60 per cent. Also income from automobile law.

New Mexico—Estimated income includes $500,000 bond issue, $50,000 to $60,000 from taxation and $10,000 from automobile law.

New York—Income includes $50,000,000 bond issue, balance of $1,045,000 on old bond issue, appropriations and proceeds from automobile registrations, of which the sum of $10,000,000 is expected to be available during 1913.

North Carolina—State appropriates only $5000 for engineering assistance. Counties are permitted to issue bonds, and such bonds aggregating $1,000,000 have been



The Gorge on the Road to Odde, Norway.

voted. Some counties have proceeds from poll and dog taxes. Total amount available for county work this year is approximately $1,118,942.

North Dakota—New state highway commission in process of organization.

Ohio—Estimated income from appropriations and automobile law. Additional appropriation for repair work on roads damaged by recent floods. Counties are permitted to improve roads and assess benefits against abutting property owners.

Oklahoma—State fund includes revenue from automobile licenses only. Road improvement districts may be created by electors. Districts and towns may issue bonds.

Oregon—New state highway commission now being organized.

Pennsylvania—Legislation pending. Expected that old appropriation of $3,000,000 for trunk highways and $1,000,000 for state aid will be duplicated. Bill calling for $50,000,000 bond issue, if passed, must be ratified by the people. County fund by taxation.

Rhode Island—State fund comprises appropriations and receipts from automobile law. People voted two to one against proposition to issue $700,000 in bonds for state road work.

South Carolina—No state funds. Convicts sentenced to hard labor on public roads in county where convicted. County and local funds by taxation.

South Dakota—No state funds. Local funds by taxation.

Tennessee—Bill to create state highway commission pending.

Texas—No state funds. Convicts may be employed on county roads. All male persons between the ages of 21 and 45 are liable to work on the public roads not more than five days a year or to commute the same at the rate of $1 a day.

Utah—Annual appropriation and receipts from automobile law. Counties must duplicate from one-fourth to the entire amount apportioned by the state highway commission. County funds by poll tax of $2. Prisoners in jail and state prison may be employed.

Vermont—State fund composed of appropriations, maintenance fund and receipts from automobile law. Town funds by five per cent. tax.

Virginia—Annual appropriation, county to add equal amount. Counties have $300,000 in various bond issues, and road tax of 40 cents on each $100. Convicts may be employed.

Washington—Annual appropriations. Counties have bond issues of $3,300,000. Permanent highway fund raised by taxation of one mill, to be expended in counties where raised, 15 per cent. of cost to be assessed against abutting property owners. State convicts employed.

West Virginia—No state funds. County funds by taxation and road poll tax of $1.

Wisconsin—Amount available is about $2,500,000, of which the state, county and town each pay one-third. The initiative rests with the town.

Wyoming—Provision for use of convicts only. County funds by poll tax of $2.

It will be seen that the lack of uniformity is quite as marked in this respect as with the motoring laws, for instance. The American Highway Association has a substantial task before it, but when an examination is made of the new motoring laws passed during the present legislative season it will be found that the efforts of the American Automobile Association along this line have met with much better success than could have been hoped for a few years ago. This has been the result of a persistent educational campaign, and the American Highway Association is equally well equipped to further the interests of good roads legislation.

National—The Unconquered—The National Motor Vehicle Company, Indianapolis, Ind., is issuing a neat little booklet calling attention to the work performed by the National No. 8, winner in the 1912 500-mile race, as compared with that of the Peugeot, which took this year's event. The story is told by an eye witness of both contests and in such manner that the work of the two machines is compared at each critical point throughout. The conclusion presents the following interesting tabulation:

	Elapsed Time		Time for Period	
Miles	National	Peugeot	National	Peugeot
100	74:24	79:23	74:24	79:23
200	150:59	156:07	76:35	76:44
300	228:50	236:59	77:51	80:52
400	304:14	314:35	75:24	77:36
500	381:06	395:05	76:52	80:30

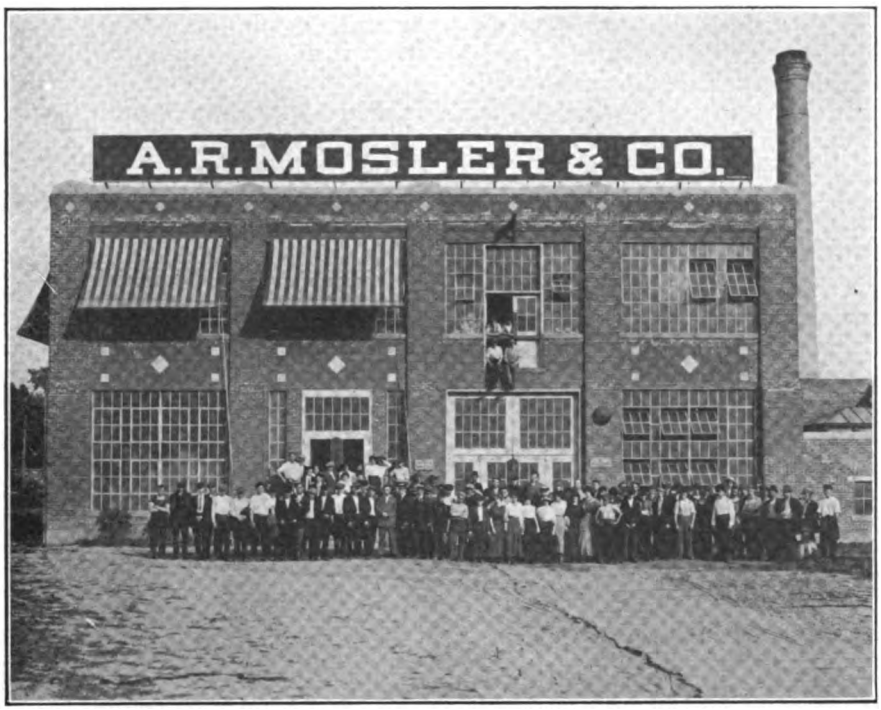
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MANUFACTURING SPITFIRE SPARK PLUGS.

How an Output of Millions Annually, Embracing a Type for Each Motor, Is Handled at the Mount Vernon Factory of A. R. Mosler & Co.

(By C. P. Shattuck.)

THE high degree of efficiency obtained in the modern automobile is largely due to the refinement of details in which the ignition specialist has been an important factor. In the perfection of the magneto with its inexhaustible supply of current, it was generally supposed that maximum efficiency, insofar as ignition was concerned, had been attained. Until a few years ago it was considered sufficient if a spark plug ignited the charge and withstood the severe conditions of service to which it was subjected, such as extreme changes in temperatures, expansion and contraction, carbon, oil, etc., and the burning effect of magneto currents.

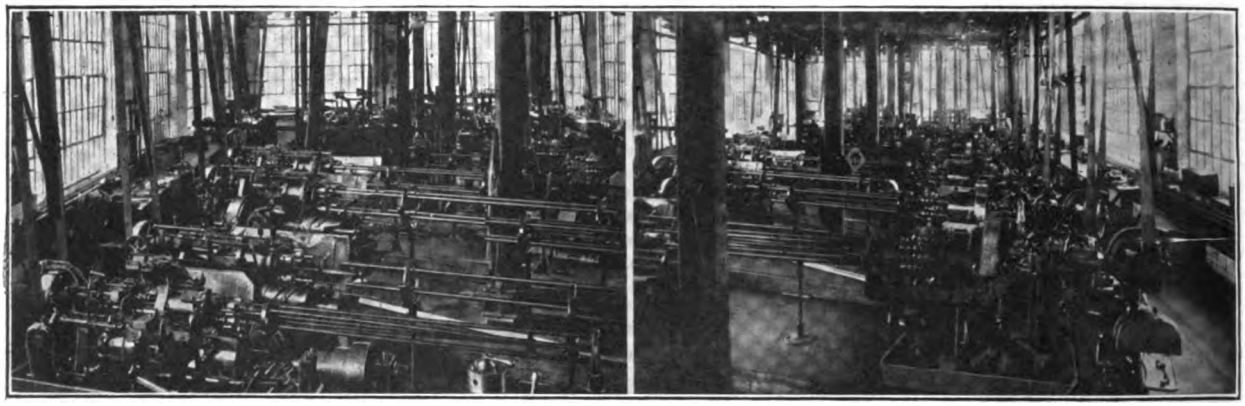


Factory of A. R. Mosler & Co., Mt. Vernon, N. Y., Maker of the Well Known Spitfire Spark Plugs.

Careful, scientific study and experimentation developed the fact that the construction and location of a plug in the cylinder are of vital importance; that the maximum motor efficiency is obtained only when the flame is spread instantly throughout the mixture, insuring complete combustion of the charge and eliminating waste of unexploded gas through the exhaust. Although it is a simple matter to design the length of the base so that the spark comes in direct contact with the fresh mixture, the construction and the material of the electrodes involves problems of manufacture in that the widening and shortening of the spark gap by expansion and contraction must be overcome. Other factors to be considered are: The elimination of carbon deposits, undue heat, the protection of the insulator, and the ability of the plug to provide an intense spark at low motor speeds. These problems have been solved by Arthur R. Mosler, the ignition specialist at the head of A. R. Mosler & Co., Mt. Vernon, N. Y., manufacturer of the well known Spitfire, Triumph, Mosler Junior, etc., spark plugs.

Mr. Mosler's rise to a prominent position in the automobile industry is remarkable. In 1900 he experienced, as did other makers of horizontal motors, plug troubles due to the lubricant fouling the gaps. To prevent the oil short circuiting the points he designed and patented the Spitfire closed end porcelain type with slots in the base to obtain a self-scavenging effect. The first 1000 were turned out in a lathe and fitted with imported porcelains. So successful were the plugs in overcoming ignition troubles and in economy of current, that they attracted attention from users of internal combustion motors, who were experiencing difficulty in obtaining efficient ignition. The demand soon exceeded the supply, leading Mr. Mosler to produce an additional 2000, which also found ready customers. Some

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Illustrating the Batteries of Multiple-Spindle Automatic Screw Machines Which Produce the Blanks or Shells.

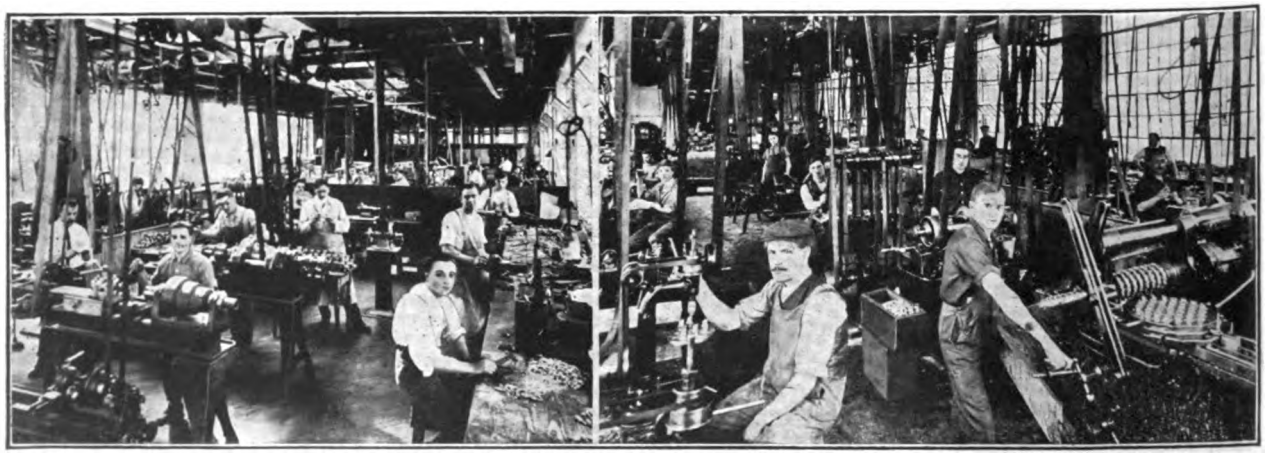
idea of the expansion of the business may be obtained by Mr. Mosler's statement that in 1904 he marketed 20,000 spark plugs, the following year 100,000 and in 1907 500,000. Today the output of the factory at Mt. Vernon, which was erected two years ago to meet the requirements of an increasing demand, runs into the millions annually.

Mr. Mosler attributes his success to the fact that for years he has made an exhaustive study of the requirements of the different motors manufactured and in the production of a spark plug especially suited to each distinct type. Not only are plugs made for pleasure and commercial cars, but for motorcycles and marine engines; in fact, for every type of explosive motor utilizing the jump spark system of ignition. For the past three years the engineers of the factory have compiled annually a booklet listing all makes of cars and motorcycles, showing the plug best adapted to each motor, and the books are distributed free to both the trade and owner.

The Mosler factory is designed and equipped to overcome the many problems of quality production. It exemplifies the value of scientific methods of manufacturing and it is a structure in which the efficiency of the manual worker is developed to a high degree, in that plenty of light and fresh air are provided in the rooms. The sanitary conditions are excellent. The building itself is of mill construction, slow burning, with sprinklers throughout. The entire ground floor is of cement concrete and is occupied by the special machinery employed for the manufacturing of the components of Spitfire spark plugs; by the buffing, polishing, nickel plating departments, and the store, stock and steel rooms.

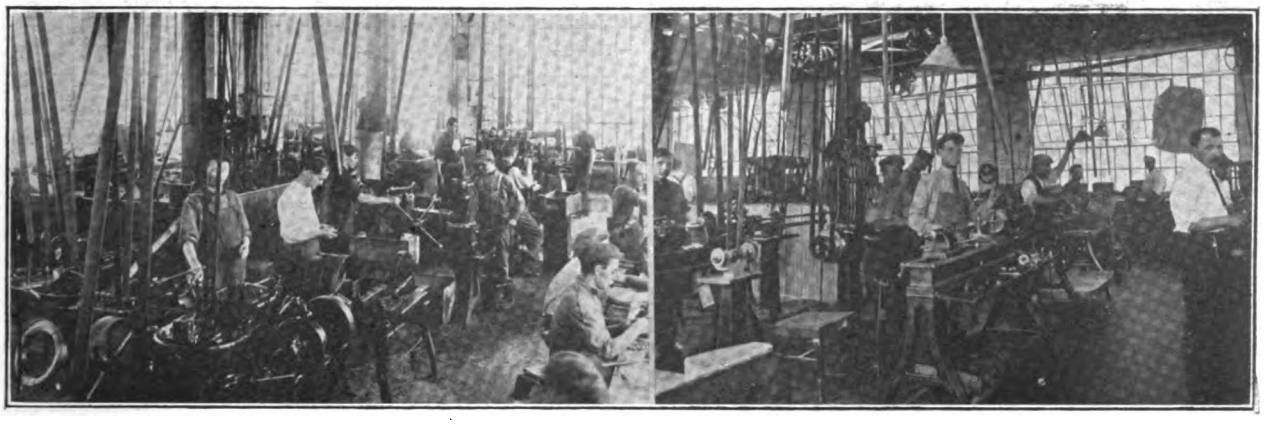
In the second story are the offices and auxiliary store and assembly rooms. The last named are located directly under a large skylight, providing an abundance of light. The side walls are fitted with ample sized windows, as will be noted by an accompanying illustration. Power is supplied by two Nash gas engines and a White & Middleton, the latter being utilized for driving the lighting dynamo and an air compressor, compressed air being used extensively throughout the building.

As is evident the production of a large num-



Section of Mica Plug Department (at Left) and Milling Machines (at Right)—These Machines Cut the Hex Heads.

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Showing the Special Machine for Making Centre Electrodes (at Left) and a Section of the Motorcycle Plug Department (at Right).

ber of different types of spark plugs involves a vast amount of detail, but the Mosler system of manufacture is so perfected that a defective part or faulty assembly can instantly be traced to the workman. It is practically impossible for either condition to be overlooked, as the inspectors are very thorough. The result makes for absolute satisfaction with the ultimate user, as the quality of material and workmanship are consistently maintained.

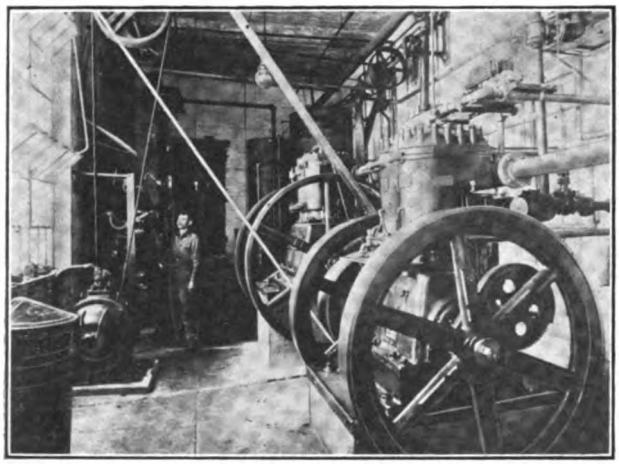
The process of manufacturing Spitfire spark plugs from the time the 12-foot lengths of steel are fed to the batteries of multiple-spindle automatic screw machines until the plugs are boxed ready for shipment, is an interesting one. Cold rolled steel is employed for making the bases or shells, it being purchased in enormous quantities, the dimensions varying in size from .875 to 1.125 inches, and either hexagonal or round stock is utilized, depending on the type of plug being manufactured.

The Acme and Gridley multiple-spindle automatic screw machines are capable of performing eight operations at once, although but five are required to finish the blank for the Spitfire plug, the total including milling, turning, counterboring, drilling, reaming, threading, cutting off, etc. In principle the Acme comprises four work spindles, which are held in a cylinder and rotated by gears, the cylinder being indexed to bring these spindles in front of the side working and end working tools. It requires but one-quarter turn of the cylinder to complete one piece, this being accomplished in the same time as required to complete the longest cut, usually a drilling, forming or box tool turning operation. The 12-foot steel bars are placed in the spindle and the work of completing the blanks is performed automatically. The machines are adjustable to any size and shape of blank desired and turn them out at the rate of 100 an hour. The blanks and scrap fall into a pan from which the contents are removed and are placed in a separator. By the application of the principle of centrifugal force



Illustrating Sections of an Assembly Room, All of Which Have Plenty of Fresh Air and Light—Throughout the Factory the Sanitary Conditions Are Excellent.

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Power Is Supplied by Gas Engines for Operating Machinery, Dynamo and Air Compressor.

all lubricant is removed from the metal, and the oil is filtered and used over again in the automatics.

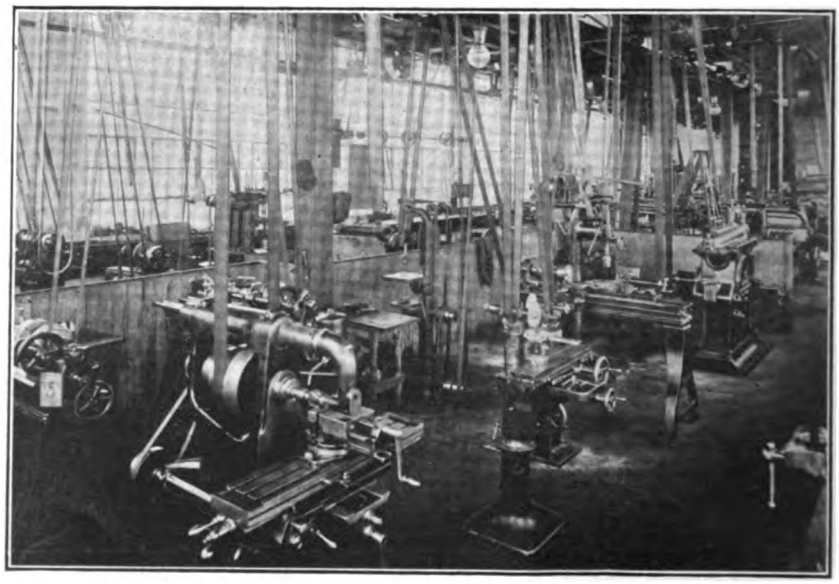
From the separator the blanks go to a threading machine for cutting the threads on the base, after which they are carried to the slotting machine, which cuts two slots in the base of 16 blanks in one operation. Each machine has a capacity of 1000 plugs a day. Although a hex is provided on the blank it is cut to accurate and standard dimensions by the milling machines, which cut 37 in three operations. After being cleaned by compressed air the small hole in the end is bored and countersunk. Following this process the shells are subjected to a rigid inspection both before and after the removal of any burrs that may exist. In the machining and finishing extreme care is taken to remove any sharp points which would become incandescent in service.

Before being nickel plated each shell is highly polished, then cleaned in an electric bath, an invention perfected by Mr. Mosler. The shells are next assembled on special racks, two dozen to a rack, and placed in the plating bath with a capacity of 12 racks every 30 minutes. After plating, the shells are inspected, polished and again examined, before being sent to the assembly rooms.

The centre rod or electrode of the Spitfire closed end type is constructed in a machine into which is led a roll of nickel steel wire. The machine straightens the metal, threads, points and cuts it off into the required lengths. The small hexagon brass nut which determines the position of the point with reference to the aperture in the base, or in other words, the gap, is located accurately by a machine after the nut has been started by hand.

With the Spitfire plug an asbestos cord is utilized as a gasket, being placed on the centre rod before insertion in the porcelain. This is performed by a machine which incures the correct adjustment and gas tight construction. Asbestos is also employed on the centre core, it being wound by hand, and formed and suitably compressed by a machine. The knurled nut, securing the centre rod, is adjusted by hand.

The threaded bushing or cap retaining the porcelain in the shell is fitted by a special machine having a form of friction clutch which interrupts the power when the desired pressure has been attained, the complete operation requiring but a few seconds. The asbestos copper gasket utilized on certain types, which insures a gas tight fitting of the plug in the cylinder, is spun and polished in one operation by another special machine. The plug then passes to a workman, who by one or two deft movements with a tool, accurately sets the gap. Each completed plug is tested by an induction coil, subjected to a final inspection, then tested for gas tight construction. The last named operation is performed in a special machine supplied with compressed air at a pressure exceeding by several pounds that to which the plug would be subjected in service. As



Showing a Section of the Tool Room and the Machines U tilized.

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the plug is immersed in water any leak in the assembly is detected instantly by the bubbles given off.

The above process of manufacture deals with the standard nickel wire electrode Spitfire spark plug, which is but one of many produced. Although the dimensions of the centre rod point are such that it will withstand the burning effect of magneto currents, the platinum iridium pointed plugs are best adapted for both battery and magneto. The centre rod is bored in a high speed drill and the liberal section of platinum inserted and secured by a press machine. The platinum, which is worth about $50 an ounce, is cut into the required lengths by a special cutting machine.

In addition to the closed end types an open end cone end is constructed in several designs and with one or two points. The centre electrodes of the conical type are cemented by a special process and the brass retaining caps are fitted by a machine especially designed for the work. The process of fitting the wire electrode in the base of the shell is similar to that employed with the platinum iridium plugs.

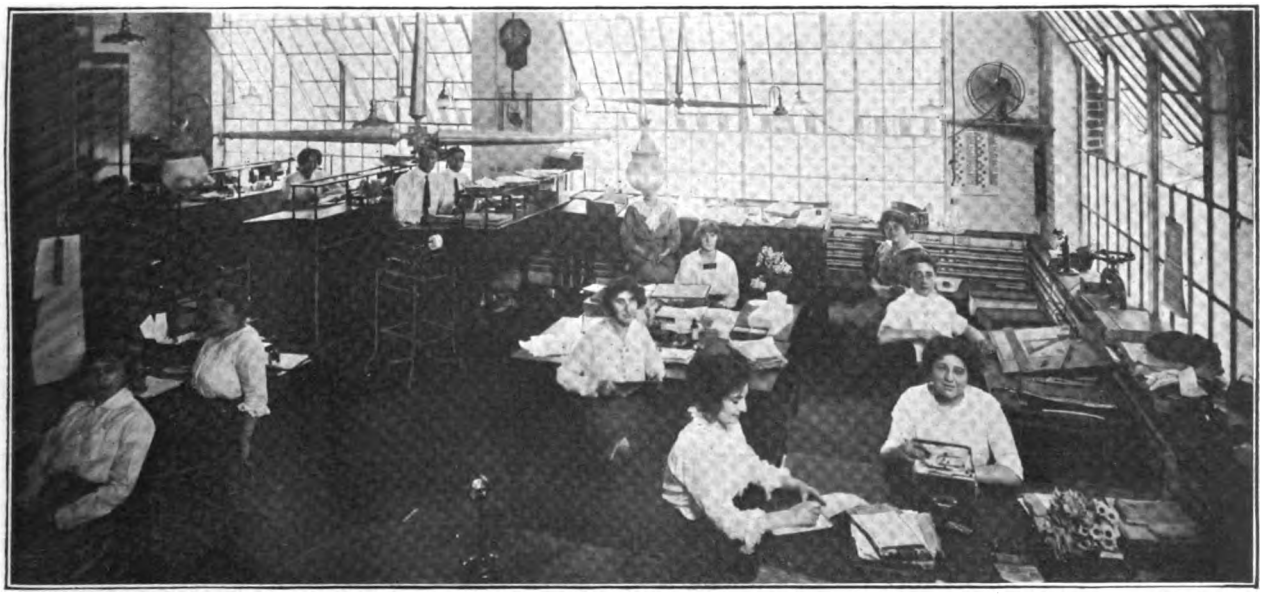
The porcelains utilized are imported and each member is given a severe test to prevent faulty insulation. Each porcelain is also carefully examined and must conform to the standard set by Mr. Mosler. This assures rapid assembly of the parts and a perfect finished product. As several patents have been granted to Mr. Mosler, the dates are stamped on the hex of each shell. This operation is performed by a special machine, taking place before the blanks are sent to the polishing room. After passing the final examination



Arthur R. Mosler, Head of A. R. Mosler & Co., Inventor of the Spitfire Spark Plug.

the plugs are boxed and packed in cartons, the work being performed by girls. Those shipped to the car manufacturers are placed in nests in boxes of 100, and these packed in cases.

A section of the lower floor is set apart for the making of motorcycle plugs which embrace both mica and porcelain types, also combined mica and porcelain, and many of these are produced for motorcycle manufacturers. The mica plug is constructed of the best selected India mica, wound both ways, and is thus considered to be impervious to the action of oil or heat.



The Main Office of the Mosler Factory—Note the Large Windows Providing Good Light and Ventilation.

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As previously stated a number of different types of plugs are produced, including in addition to the Spitfire, the Mosler Vesuvius, Triumph and Mosler Junior, etc. Each type is constructed in varying lengths of bases to so project the spark into the combustion chamber that maximum motor efficiency will be obtained by reason of instantaneous ignition of the charge. The thickness of the cylinder walls, type of valve cap, etc., important factors in spark plug construction, are also taken into consideration as the requirements of different motors vary. All types are based on long study and careful experimentation of the cylinders for which they are designed.

The Mosler spark plug has been adopted by a large number of leading car manufacturers after severe break down tests. Until recently the factory was operated night and day to fulfill 1913 contracts. Although produced in enormous quantities, quality is never sacrificed.



Guests of H. S. Firestone at Recent Firestone Foremen's Homestead Dinner.

Arrangements for a fall automobile show under canvas are being made by the Cleveland Automobile Show Company, in conjunction with the Forest City Fair & Livestock Company. The Cleveland Automobile Club has promised its support to the project, which will be a novel one for the Ohio city. Two of the biggest circus tents in the country will be obtained and they will afford 100,000 square feet of display space.

Quentin D. Curley of Dallas, Tex., county judge, has only the stub of one arm, but he manages to drive an automobile all about the city by a specially contrived arrangement. It consists of a small steel hoop, leather lined, into which he thrusts the stump of his arm. This hoop is attached to the steering wheel. The throttle and spark levers have been removed to the footboard, where is also the push button for the electric horn. The judge has a special strap arrangement passing over his shoulder, by which he cranks the engine.

FIRESTONE HOMESTEAD DINNER.

District Attorney Whitman of New York Was the Guest of Honor.

Saturday, June 14, Akron and Columbiana, O., and all the towns and cities in between, were the scenes of one of the most "exclusive affairs" of the season in automobile circles. It was the occasion of the Firestone Foremen's Homestead dinner, tendered by H. S. Firestone, president of the Firestone Tire & Rubber Company, Akron, O., to the foremen of the company at the old Firestone family homestead in Columbiana. The party made the trip by automobile, 30 cars being needed to take the 145 guests.

The guest of honor was Charles S. Whitman, district attorney of New York City and candidate for mayor. Mr. Whitman is a boyhood friend of Mr. Firestone, so the affair was a pleasant reunion in every particular. The route to the old homestead was selected for its scenic values, and Ohio has never before displayed 70 miles of its spring beauties to better advantage.

The Studebaker Corporation, Detroit, maker of Studebaker cars, has issued a new catalogue showing its complete line in a well chosen assembly of paper, type and color work. Dignity is the keynote of the book, the plan followed being that of giving a general description of each car on one page and facing it with a page plate illustrating several views of the machine. Detailed specifications are condensed in a table in the back pages of the catalogue.

There are 16,000 workmen in the Ford plant and it is pay day five days in each week there. Even then it takes considerable hustle to pay each man once every two weeks.

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THE AUTOMOBILE IN THE FARMER'S LIFE.

UNTIL comparatively recently the automobile, although conceded an exceedingly practical institution, was regarded generally in the nature of a luxury. It is hardly more than a year ago that certain financiers were deploring the lack of business judgment manifested by the American people in purchasing motor cars rather than stocks and bonds.

The so-called back to the farm movement has been encouraged in no small measure by the possibilities of modern transportation facilities. Undoubtedly, this may be applied to the city man who has acquired what might be termed a country residence, still depending upon his business in the city for his income, but it also has a deeper significance in the economic history of the country. Farming is now recognized as a business, which requires the same detailed application of well defined business principles as that of manufacturing, merchandising or any interest which occupies the attention of those who seek their advancement in municipalities.



The Lambert Automobile Finds a Place Beside the Oxen and Horses on J. S. Charles' Farm in Bliss, N. Y.

While the boys and girls were drifting from the farm to the city, the list of abandoned farms grew larger each year. It is only necessary to examine the statistics respecting the New England states during the past few years to discover that the abandoned farms are now being taken up rapidly. Scientific methods of farming, as taught in the agricultural colleges, have had their full share in this rehabilitation, but the automobile has been an important factor. Boys and girls are no longer drifting to the city, because the city offers little that cannot be enjoyed by those who can make the short run in a motor car and because the country life of today presents advantages that appeal alike to the country and the city youth.

And if this applies to the boys and girls, it certainly affects the daily life of the farmer's wife. The possession of an automobile may not make it any the less difficult to secure and retain desirable help in the kitchen, but when the girls of the family are satisfied with the situation presented the problem no longer assumes its former proportions. Time is found to enjoy the car both in the afternoon and evening, and again on Sunday. If it is possible to reside in the country and possess a machine at less expense than to have the home in the city without it, this surely is true of the farmer who already has his country residence and derives his income from his land.

Much of the drudgery of farm life was occasioned by the dull monotony of the daily task, without sufficient relief in the form of social activity. The young folks hesitated to ask father for the use of the horse that had been at work all day that they might enjoy the evening with relatives or friends living at some little distance. The automobile never tires, is instantly available at all times and will take the whole family, including father and mother.

J. S. Charles of Bliss, N. Y., is a progressive farmer, who apparently still finds use for a yoke of oxen as well as a pair of horses in his farm work. But he owns a Lambert automobile, and his wife has learned to operate it. Not only is Mrs. Charles enabled to visit her relatives and friends, but often when her husband is busily engaged with the oxen and horses both find it to advantage in a business way for her to run errands in the car. The telephone is a big factor in modern farming, but the automobile supplements the telephone and completes the transaction.

This is only one instance of many that might be cited, but it serves to illustrate the manner in which a car may be made to fit into the business as well as the social life on the farm. Carrying this a step farther, C. C. Burgess of Greenville, S. C., owns a Reo which he purchased in 1910. He reports that he has driven the car about 7000

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How L. W. Wible of Kendallville, Ind., Makes His Pleasure Car Aid in Making the Farm Pay.

miles a year, carrying an average of 800 pounds of milk each trip. The machine takes the place of three horses, doing the work in half the time and at half the cost. And yet, when the day's work is finished the machine is readily convertible into a two-seated vehicle in which the members of the family may enjoy life to its fullest extent without a suggestion of its being tired.

Charles Piper of Farragut, Ia., finds his Reo invaluable in the management of his large estate. Mr. Piper is a German by birth, but has been exceedingly successful in acquiring property in the land of his adoption. His estate really embraces a number of farms, all of which are operated along strictly modern lines. Mr. Piper personally superintends all of the work, making the rounds in his machine. Hundreds of similar installations are to be found throughout the entire country, from Maine to California, and in each instance the automobile has been a decided agency for efficiency, economy, comfort and progress.

It is needless to say that the use of a car as a rapid means of reaching the different points on the farm or for carrying produce to market does not in any manner interfere with its service as a social factor. Jacob Klassen of Goessel, Kan., purchased his machine that his wife and children might have full opportunity to secure the most out of life. Perhaps he had in mind those numerous Oldsmobiles of the 1902 model which have been for years engaged in sawing wood, churning butter and threshing grain, when he connected a jackshaft to the motor on his Reo and utilized the power for blowing hay into the barn loft. His seven-year-old son thus accomplished the work of a full grown man. There can be little doubt as to the resultant economy, and the car was still available for Mrs. Klassen's needs as soon as the job was finished.



Jacob Klassen, Goessel, Kan., Simplifies the Work of Storing Hay by Utilizing the Automobile's Motor.

L. W. Wible of Kendallville, Ind., uses his Lambert for plowing, but he has another of more modern design which he utilizes solely for pleasure purposes. He purchased this first machine for the social betterment of his family, but he found so many uses for it in his business, and that the economy effected was so marked,



C. C. Burgess, Greenville, S. C., Uses His Reo as a Milk Wagon, Converting It for Pleasure Drives on Sunday.

he felt he could afford the second as well. Mr. Wible is a large onion grower, and not only is the older Lambert employed in preparing the soil and cultivating and harvesting the crop, but the rear has been reconstructed so as to take a large box in which the onions are carted to market.

Louis M. Megee is another Hoosier farmer who has found that the automobile is a paying proposition. He has the agency for Cole cars and has been successful in interesting nearly all of his neighbors. Recently he enlarged his operations to cover the entire county. All of which serves to indicate that the farmers of Indiana are not slow to appreciate the advantages offered by the modern transport.

When it comes to the matter of conservatism, the American farmer has the reputation of not spending his money foolishly. What is true in Indiana is equally true in all other sections of the country. The results are a saving in time, labor and money for the farmer himself, and

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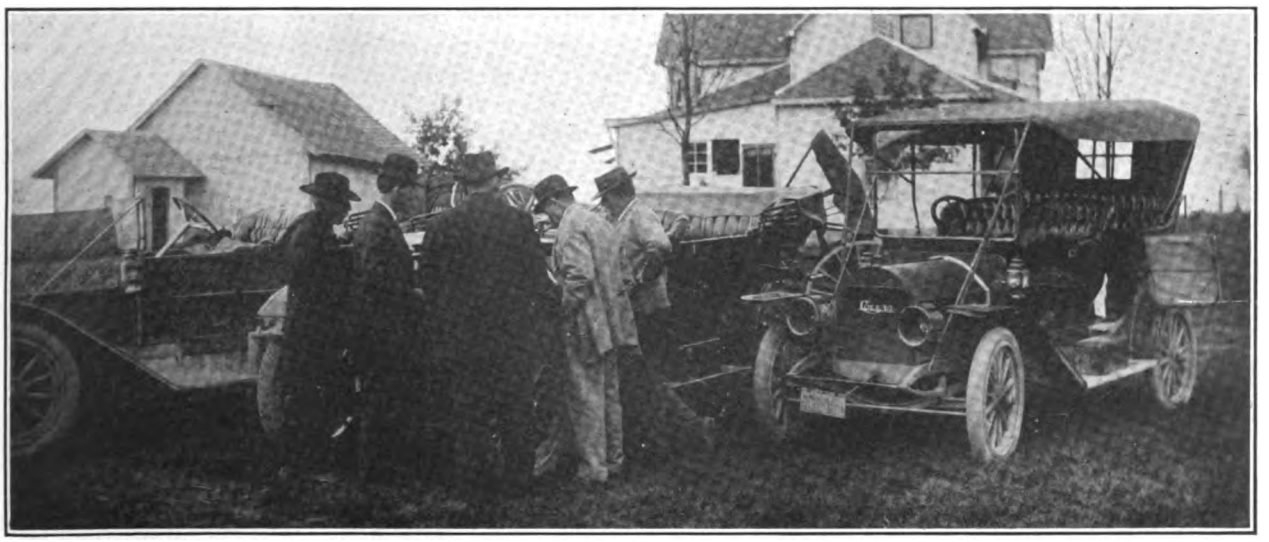
Charles Piper of Farragut, Ia., Finds His Car Invaluable in Superintending the Work on His Large Acreage.

pleasure, comfort and satisfaction for his family.

But that is not all. The influence of the automobile in farm life does not end with its benefit to the farmer. When organized motorists began their agitation for good roads, they met with decided opposition from this source. Today good roads have no more energetic advocate than the farmer motorist. And while the original agitators may have had a somewhat selfish motive, the latest recruit argues for better highways on the basis of their economic value.

The pleasure car has done much to change the viewpoint, as well as the social and financial condition, of the farmer. On the large tracts in the Middle and Far West, and in Canada, agricultural tractors have been doing the heavy farm work for some years. The farmer of the future also will find a place in his scientific management for the motor truck, so that in the last analysis the entire public will benefit in the increased efficiency and productiveness of the individual investment.

According to an announcement made by the Abbott Motor Company, Detroit, maker of Abbott-Detroit cars, a complete reorganization of the company has just been effected, a new financial plan has been worked out, and the conduct of the concern's affairs has been vested in a board of directors and general manager who have had wide and successful experience in the automobile field and other high grade merchandizing. The new officials are: President and general manager, A. E. Schafer; first vice president and treasurer, A. H. Zimmerman; secretary, Wade Millis; directors, the officers and H. W. Lewis, H. J. Mallery, G. H. Rogers and H. M. Preston. Work on the 1914 models is progressing rapidly.



Louis M. Megee, Agent for the Cole Line, Has Little Trouble in Interesting His Neighbor Agriculturists.

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GENERAL NEWS OF THE INDUSTRY.

Barkman Leaves Maxwell Company to Return to the Pacific Coast with Hupmobile Interests—Boston's Pioneer Dealer Leaves to Engage in Railroad Business.

IN ANNOUNCING his resignation as assistant commercial manager of the Maxwell Motor Company, Detroit, A. B. Barkman, who has been closely identified with the Maxwell interests since 1906, has occasioned much surprise. Mr. Barkman becomes western sales manager for the Hupp Motor Car Company, Detroit, maker of the Hupmobile, and will make San Francisco, Cal., his headquarters. In returning to that city he again enters the territory of his adoption, as he became western sales manager of the United States Motor Company in 1911 and spent two years on the Pacific Coast, during which time he became very enthusiastic concerning the country.



A. B. Barkman, Western Sales Manager, Hupp Motor Car Company.

During 27 years of business life Mr. Barkman has made in reality but three changes. He started in the bicycle business and naturally gravitated into the motor car industry in its early days. It was in 1886 that he became sales manager of the bicycle department of A. G. Spaulding & Bros., at the factory Chicopee, Mass. In 1898, when the American Bicycle Company was formed, he became sales manager of the Spaulding division of that concern, remaining until late in 1899.

Early in 1900 he saw the possibilities of the motor car business and became treasurer and general manager of the Bridgeport Motor Company, which he formed at Bridgeport, Conn. In 1906 he gave up this business to become sales manager of the Maxwell-Briscoe Motor Company at Tarrytown, N. Y. After five years at Tarrytown, Mr. Barkman became western sales manager for the United States Motor Company, which controlled the Maxwell-Briscoe company, and when that concern was merged with the Flanders interests into the Maxwell Motor Company he was called East to become assistant commercial manager.

UNDERHILL IN CALIFORNIA.

Boston's Pioneer Dealer Handled Knox Cars for Over 12 Years.

When it was announced that the Knox Automobile Company, Springfield, Mass., had established a factory branch in Boston, it was but natural that the automobile industry should be more than usually interested in the reason for the move, inasmuch as A. P. Underhill of the Underhill Company has been handling the Knox agency in that city since 1900. In this respect Mr. Underhill holds a unique record in the industry. Besides being practically the rst automobile dealer in Boston, and therefore in America, he has the distinction of representing one line of cars continuously from the beginning.

A. P. Underhill became interested in automobiles about the time that Kenneth Skinner imported his first De Dion tricycle, and it was shortly thereafter that he began business as a dealer in the old Automobile Headquarters on Stanhope street. It was at this establishment that Harry Fosdick and some others assisted him in interesting the people of Boston in the new method of transportation. Mr. Underhill was the first agent the Knox Automobile Company had, and perhaps it is not too much to say that it was largely through his efforts that the Knox concern was enabled to get its first machines upon the market.

Some time later the Underhill Company was organized and located at 222 Columbus avenue, where Frank B. Crockett, the manager of the new Knox Boston branch, became identified with the institution. Two years ago, the present quarters at 885 Boylston street were acquired. and this is the establishment which has been taken over by the new branch.

Mr. Underhill took a short vacation from the automobile business in 1910, going to Lake Tahoe, Cal., where he became intimately associated with the project of which he is now to be the business head. The property not only includes a

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large hotel at the lake, but a steam railroad line leading thereto and a steamboat transportation company on the lake itself.

Mr. Crockett, who becomes manager of the Knox Automobile Company, Boston branch, also has had long experience in the industry. He formerly was associated with the sale of the Crest cars. and became connected with the Underhill Company in 1905. Two years ago he left that concern to go with the Boston branch of the Locomobile Company of America, which position he left to assume his new duties.

REO COMPANY'S DIVIDENDS.

Directors Place Stock on 10 Per Cent. Basis with Quarterly Payments.

At a recent meeting of the board of directors of the Reo Motor Car Company, Lansing, Mich., maker of Reo cars, it was unanimously voted to place the stock of the company on a 10 per cent. annual dividend basis, payable quarterly.

The dates upon which the quarterly dividends will be payable were fixed as the first of July, October. January and April, to stockholders of record at the close of business on the 20th of the month preceding the above mentioned dates. All additional dividends earned and paid by the company will be treated as extra dividends. The Reo concern is capitalized at $2,000,000 and has a surplus amounting to about the same figure.

RESIGNS FROM FIAT CONCERN.

Willard Disposes of His Holdings and Future Plans Are Awaited with Interest.

Richard D. Willard, secretary of the Fiat Motor Sales Company, and manager of the New York City branch of that company, has resigned, having disposed of all his interests in the concern. Mr. Willard has not yet announced his new connection and it is expected he will take a brief vacation trip before taking up with any of the several offers that have been made to him.

He has been connected with the automobile business for 12 years, starting in 1901 with the Autocar Company at Ardmore, Penn., and remaining there three years. With C. A. Duerr he introduced the Ford car to New York in 1904. He passed a year with the Richard-Brasier agency and then went with the Harrolds Motor Car Company, agent for the Pierce-Arrow cars. After remaining there three years he was associated for a time with Harry S. Houpt in handling the Thomas, Houpt-Rockwell and Herreshoff lines. Since 1910 he has been with the Fiat company.

ELECTED TO DIRECTORATE.

Sales Manager of Lenox Motor Car Company Wins Deserved Promotion.

At the semi-annual meeting of the board of directors of the Lenox Motor Car Company, Boston and Hyde Park, Mass., William Blanchard of Boston, sales manager of the company during the past three years, was elected a member of the board. This move was made necessary through the resignation of one of the members and was a fitting tribute to the value of Mr. Blanchard's services to the company.



William Blanchard, Director, Lenox Motor Car Company.

Mr. Blanchard has been connected with the industry for the past six years. He gained his first knowledge of motor cars with the Easton Machine Company, South Easton, Mass., maker of the Morse line, where he worked in every department, serving his full time at the bench and in the shop. It was while acting as salesman for Morse cars that the Lenox company induced him to undertake the exploitation of its line. His first connection with this company was in 1911 and early in 1912 he was promoted to become sales manager, in which position he has contributed much to the success of the Lenox company.

INTRODUCING REPUBLIC WAGON.

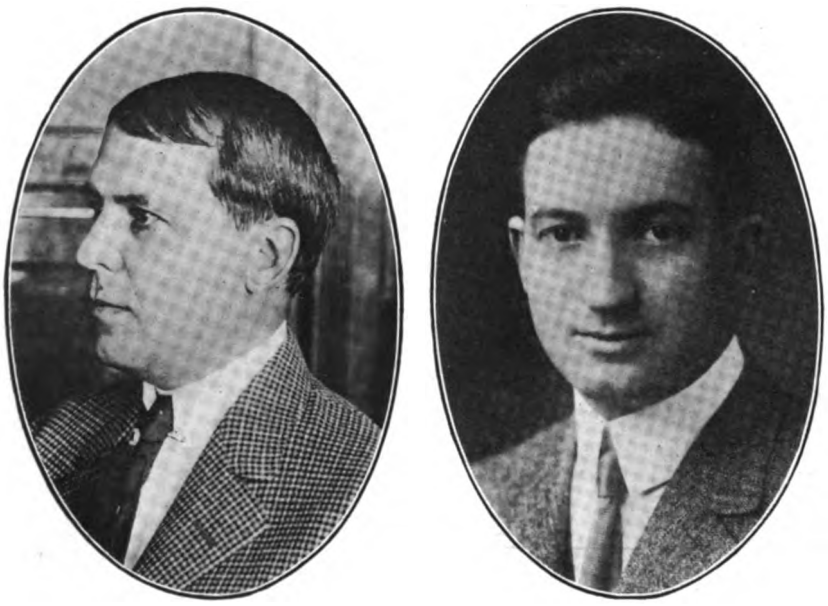
Alma Motor Truck Company Organized to Produce and Market New Vehicle.

The Alma Motor Truck Company has been formed to take over the motor truck manufacturing business of the Alma Manufacturing Com-

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pany, Alma, Mich., and W. M. Hogle has been appointed sales manager with a general sales office at Detroit. Mr. Hogle entered the automobile business with the Olds Motor Works, Detroit, 11 years ago, and later joined the Pope-Toledo Company. He was with the Sheldon Axle Company for three years and for two years was connected with the Alden Sampson Motor Truck Company at Detroit.

F. W. Ruggles, factory manager and superintendent of the company, with Mr. Hogle, brought out the design for the new truck, which will be known as the Republic. Mr. Ruggles was for seven years with the Knox Automobile Company, Springfield, Mass., maker of Knox trucks, and has been with the Alma concern for the past four years. The new Republic truck will be manufactured in one model only, rated at 1500 pounds, with either stake or express body. It is composed of standard parts throughout, with Continental motor, rated at 28 horsepower and regulated by a governor which takes the speed entirely out of the hands of the driver.



Harry S. Houpt, President, and L. A. Van Patten, Vice President, H. S. Houpt Company.

Immediate arrangements will be made to market the Republic wagon from the Detroit offices throughout the entire United States, contracts already having been entered into for much territory. The Star-Tribune Motor Sales Company, Detroit, of which J. E. Hannon and George C. Hupp are at the head, will handle the truck in the State of Michigan and will open service stations in the large centres, the first outside of Detroit being at Grand Rapids.

REVIVES OLD TIMES.

Organization of H. S. Houpt Company Recalls Concern of Similar Name.

Those familiar with the history of automobile selling organizations of the earlier days of the industry recognize in the recent formation of the H. S. Houpt Company of New York City a return to old times. Incidentally, it may be remarked that the Harry S. Houpt Company, which was the name selected by Harry S. Houpt in his former venture, was a decidedly important factor in the sales end of the business, not only in New York, but in Philadelphia and Newark, where branches were maintained.

Mr. Houpt was president of the old organization and holds the same position with the new. The concern was established for the purpose of handling Thomas cars and speedily built up a large trade. The New York garage had capacity for 150 machines, which was considered of substantial size in those days. Besides, there was one of the best equipped repair shops to be found anywhere. Mr. Houpt was prominent in race, contest and tour work, when not actually engaged in selling cars.

Until recently Mr. Houpt was sales manager for the American Locomotive Company, but before that connection he was engaged in the manufacturing end for a time. His varied experience made him an exceedingly valuable man for the Alco interests, and when it was announced that he had resigned to accept the vice presidency of an elevator concern in New York City it was with some little regret that the automobile industry felt it was losing him. It appears, however, that the sale of motor cars proved to have such an irresistable attraction for him that he was unable to give it up for long.

Associated with Mr. Houpt in the new company, which has taken over the Lozier agency, heretofore conducted by the Lozier Motor Company as a factory branch, is L. A. Van Patten, who becomes vice president of the Houpt company. Mr. Van Patten formerly was advertising manager for the American Locomotive Company and as such was in close touch with Mr. Houpt and his methods.

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MACK INTERESTS COMBINE.

Lansden, Webb and Maccarr Companies Merge with Factory at Allentown, Penn.

As predicted some time ago, The Lansden Company, Newark, N. J., the Webb and Maccarr companies of Allentown, Penn., have been consolidated and the Lansden factory will be moved to Allentown. The control of the Webb company was acquired by John M. Mack, founder of the Mack Bros. Motor Car Company, at Allentown. When the latter company was merged with the Saurer and Hewitt companies as the International Motor Company, Mr. Mack was prominent in the affairs of that organization. He retired last year and purchased control of the Webb Motor Fire Apparatus Company of St. Louis, Mo., moving it to Allentown and changing its name to the Webb Company.

The Maccarr Company was organized by Mr. Mack late in the autumn to build delivery wagons of 1500 to 2000 pounds. He also acquired a large interest in the Lansden Company and a short time ago W. L. Case, who had been general manager of the concern for more than a year, retired. It was at that time predicted that a merger of the Mack interests was contemplated. The Lansden Company manufactures electric trucks and wagons from 1000 pounds to five tons capacities, and the Webb company produces fire apparatus of every type, with both gasoline and electric equipment, having obtained the rights to the Couple-Gear wheels.

BUYS WHOLE VILLAGE.

Williamsville, Conn., Becomes Property of Goodyear Tire & Rubber Company.

The Goodyear Tire & Rubber Company, Akron, O., maker of Goodyear tires, has announced, through C. W. Seiberling, vice president of the company, the purchase of a large tract of land, known as Williamsville, in the town of Killingly, Conn. On the property is a large cotton mill, four stories high, where will be made a large part of the tire fabrics, hose and belting ducks so extensively used by the company. There also are sufficient houses to care for 350 employees, a church, schoolhouse, a farm to be operated by the company for the benefit of the employees, a store, large boarding house and an assembly hall, together with Lake Alexandria, the local water supply, and the Williamsville Water Company.

The factory will be equipped with the most modern machinery and will be run steadily at a uniform output on fabric for the exclusive use of the Goodyear Tire & Rubber Company, thereby insuring maximum efficiency in production and entire elimination of selling expense.

COLE INCREASES CAPITAL.

Output Will Be Doubled and Addition to Factory Is Contemplated.

The Cole Motor Car Company, Indianapolis, Ind., maker of Cole cars, has announced an increase in its capital stock from $500,000 to $1,000,000. This increase is due to the volume of business which has been gaining steadily the past three years, making it impossible for the company to meet orders.

The stockholders also approved the plans of President J. J. Cole to double the output and to build a large addition to the Cole factory. The stockholders present were: President J. J. Cole, Vice President S. J. Kuqua, Secretary and Treasurer J. F. Morrison, H. C. Lathrop of Indianapolis, W. L. Colt of New York City and E. C. Frady of Chicago.

FORM GRANT MOTOR COMPANY.

Men Well Known in Detroit Retail Circles to Manufacture New Line.

George D. Grant and Charles A. Grant, who as the Grant Bros. have long been identified with the retail sales branch of the industry in Detroit, have turned their attention to manufacturing, having been instrumental in the organization of the Grant Motor Company, which will produce a new line of small cars under that name. The officers of the concern are: President, George D. Grant; vice president and sales manager, Charles A. Grant; secretary and treasurer, David Shaw; factory manager, George F. Salzman; chief engineer, J. M. Howe.

The car is not new in the strict sense of the word, since the first vehicle of this design was produced something like a year ago in Mishawaka, Ind. The designer is Mr. Salzman, who formerly was identified with the E. R. Thomas Motor Car Company of Buffalo, N. Y. After testing the machine over the roads in Indiana and southern Michigan Mr. Salzman drove it overland to Detroit, where he succeeded in interesting the Grant brothers in the possibilities of its manufacture in the future.

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NEW DEPARTMENT HEADS.

Something Concerning the Men Who Direct Policy of Standard Welding Company.

The recent changes in the official personnel of the Standard Welding Company, Cleveland, O., maker of Stanweld rims, etc., as announced in a recent issue, place at the head of the various departments men who are well known throughout the industry. J. G. Manternach, the new general manager, has been sales manager since 1910. He began his automobile experience with the Pope Manufacturing Company, Hartford, Conn., in 1897, and subsequently joined the forces of the Shelby Steel Tube Company and the National Tube Company. With the last named organization his promotion was so markedly rapid that it brought him to the attention of a number of concerns, among which was the Standard Welding Company. He succeeds Tracy W. Guthrie, resigned, formerly president of the Republic Iron & Steel Company, Youngstown, O.

S. W. Hartley, the new sales manager, has been prominently identified with the engineering end of the automobile industry since its inception in the United States. He is a graduate of Cornell University and has held responsible positions with the Peerless Motor Car Company, Cleveland, O.; the Garford Company, Elyria, O., and the A. O. Smith Company, Milwaukee, Wis.

H. S. Bryant, who becomes consulting engineer, claims to have designed the first quick detachable rim in America. He has been with the Standard Welding Company for the past two years. He formerly was the founder of the Bryant Rim Company, Columbus, O., which was purchased outright by the Diamond Rubber interests some years ago.

F. R. Wilhelmy remains as auditor and credit manager, to which position he has arisen by successive steps through 14 years of service with the company. C. C. Gressel is made superintendent. He has held high positions with the factory organization of the company since its inception some 15 years ago. H. E. Butcher remains in charge of the tube department.



Department Heads with the Standard Welding Company: Left to Right, J. C. Manternach, General Manager; S. W. Hartley, Sales Manager; R. S. Bryant, Consulting Engineer; F. R. Wilhelmy, Auditor and Credit Manager.

CHEVROLET BUYS LITTLE.

Detroit Advices Indicate Complete Adjustment of Plans for Two Concerns.

According to information from Detroit, the Chevrolet Motor Company, Detroit, maker of Chevrolet cars, has purchased the entire business of the Little Motor Car Company, Flint, Mich., maker of Little automobiles, and the complete line of cars formerly made by both companies will hereafter be known as Chevrolet machines. Two large factories will be in operation by August and will start production on 8500 cars for the 1914 season. The plant formerly operated by the Imperial Wheel Company and recently purchased by the Chevrolet Motor Company, will be devoted exclusively to the production of a roadster.

It is understood that A. B. C. Hardy has been made general manager of the enlarged company, and the operations will be centralized at Flint with the sales force and executive offices at Detroit. E. S. Johnston will remain sales manager. The Chevrolet Motor Company has an authorized capital of $2,500,000, with the following officers: President, C. M. Begole; vice president, W. C. Durant; second vice president and general manager, A. B. C. Hardy; secretary, C. R. Hathaway; treasurer, W. S. Ballenger.

The Republic Motor Company of Michigan, organized to conduct the sale of both Chevrolet

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and Little cars, is expected to remain in charge of the sales until the expiration of its contract, when it will be merged with the Chevrolet Motor Company under the same name.

TWO NEW HAVERS MEN.

W. K. Hadley and George Blaitwaite Join Forces of Port Huron Concern.

Two important additions have been made to the organization of the Havers Motor Car Company, Port Huron, Mich., maker of Havers cars. W. K. Hadley, who for seven years has been associated with the Maxwell Motor Company and more recently with the Marion Motor Car Company, Indianapolis, Ind., maker of Marion machines, becomes manager of the eastern district, with headquarters in the company's New York City offices at 64th street and Broadway. He is a man of much experience in the motor car field.

The second addition is George Blaitwaite, one of the foremost men in the production branch of the industry. He has been building high grade cars for the past nine years, having been identified during that time with the Stevens-Duryea Company, Chicopee Falls, Mass., maker of Stevens-Duryea cars. He has held the position of factory superintendent and is admittedly one of the country's best builders. The Havers company has received many congratulations since it became known that Mr Blaitwaite had been secured as an addition to its organization.

CARRIAGES AND WAGONS.

Census Figures Indicate Manner in Which Automobiles Affect Industry.

According to the figures of the United States census of 1909 for the carriage and wagon industry, detailed statistics of which will be published in bulletin form shortly, the number of complete vehicles of all classes manufactured by the establishments in the industry increased from 1,594,465 in 1899 to 1,711,529 in 1904, but decreased to 1,519,782 in 1909. It thus will be seen that the decrease for the decade was 4.7 per cent. and for the last five-year period, 11.2. The value of the vehicles produced, however, was somewhat greater in 1909 than in 1899.

The 5492 establishments in both branches of the industry in the United States gave employment in 1909 to an average of 82,944 persons. The total value of products was $77,941,259, but it is explained that a considerable part of the value reported represents receipts for repair work. The report says in part:

> The carriage and wagon industry has existed in this country since early colonial times, and its growth up to the census of 1904 about kept pace with the increase of population. The advent of the automobile, and later of the motor truck, has had a decidedly retarding influence on the industry. Many establishments reported at censuses prior to 1909 or 1904 as manufacturing carriages and wagons have since turned wholly or in part to the manufacture of automobiles and have been classified under the automobile industry.

The business is well distributed throughout the country, establishments being reported from every state except Nevada. In 1909, as well as in 1904, Ohio ranked first in respect to both value of products and value added by manufacture, while in 1904 it ranked first in number of wage earners also. Indiana ranked second as to value of products in both years, and first as to number of wage earners in 1909. The accompanying table gives the figures in detail as applied to the number of people employed, capital invested and other important factors of the industry.

CENSUS FIGURES FOR CARRIAGES AND WAGONS.

	Number or Amount			Per Cent. of Increase*	
	1909	1904	1899	1899-1909	1904-1909
No. of establishments	5,492	5,588	6,792	-19.1	-1.7
Av. No. persons employed	82,944	90,751	†	....	-8.6
Av. No. wage earners	69,928	77,882	73,812	-5.3	-10.2
Capital	$175,473,728	$152,344,657	$128,961,660	36.1	15.2
Wages	37,594,919	38,362,679	33,565,313	12.0	-2.0
Value of products	159,892,547	155,868,849	138,261,763	15.6	2.6

*A minus sign (-) denotes decrease. Where percentages are omitted, comparable figures cannot be given. †Comparable figures not available.

Since the advent of electric cars in the automobile field it has been quite generally thought that they were of little use for country driving, but this idea is being gradually dispelled by the performances that are now of frequent occurrence, which prove the electric machines are road cars of ability. Recently J. L. Hill, who handles the electric department for the Archey-Atkins Company, Detroit, delivered to Mrs. J. E. P. Holland at Bloomington, Ind., a four-passenger, forward drive Detroit electric, made by the Anderson Electric Car Company, Detroit. The machine covered the entire distance of 75 miles over bad roads in six hours, which is considered of great importance in proving the stability, efficiency and worth of the product of the Anderson company.

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NEW AND NOVEL ACCESSORIES THAT APPEAL TO MOTORISTS

Apco Master Vibrator No. 3.

The Auto Parts Company, Providence, R. I., manufacturer of Ford specialties, has augmented its extensive list by a new master vibrator termed the No. 3. The company has had considerable experience with master vibrators, having previously marketed two designs, and states that the new instrument is superior in every respect to former models in that it is not only more compact, but produces a hotter spark with less consumption of current. The last named feature will appeal to Ford owners whose cars are fitted with electric lighting as a better light is obtained at low speeds. The new master vibrator is but 1.5 inches thick, 3.5 wide and five high, dimensions permitting of installation under the hood if desired, thereby eliminating possible obstructions from the dash. The case is of mahogany, highly finished, and the removable cover is accurately fitted, excluding dirt and moisture. All exterior components, such as locking parts, terminals, etc., are heavily nickel plated. The adjusting screw of the vibrator includes a special locking device, and the contact points are unusually large, assuring long life with minimum care. Particular attention has been paid to the windings and these are designed to withstand the high voltages generated by the flywheel magneto. Although constructed especially for model T Ford automobiles the master vibrator may be utilized with any coil system of ignition where the source of current is a battery or a low-tension magneto. Not only does it synchronize the spark, making for more power and flexibility, but starting is made easy, as each cylinder is assured a hot spark. Although the Apco vibrator is the lowest priced instrument marketed, the best of material and workmanship are incorporated, and it is guaranteed.

Economy Spring Truss.

The Economy spring truss is manufactured by J. C. Moore & Co., Racine, Wis., and is designed to be carried in the car for emergency when a spring breaks. It is slightly arched in the centre and carries a clamp and bolts at each end, the former being provided with a number of openings to fit different sized springs. In practise the centre of the truss is placed over the break and the bolts of the clamps tightened.

Tobin Whichway Signal.

A large number of rear-end collisions take place because of the inability of the operator of the leading car to notify the approaching vehicle when a stop is to be made. This is especially true in the evening when driving in congested traffic. The Tobin Whichway Signal Company, 50 Walker street, New York City, is marketing the Tobin Whichway signal, which presents practical features in that whenever the machine is slowed down or stopped the word "Stop" is automatically illuminated. It is a combination license tag holder and rear light operated by electricity, and includes the usual red semaphore. The word "Stop" is ground in red glass and the lamp is made of brass reinforced with a heavy piece of steel. Inside the lamp, which is constructed to withstand severe service, are two electric bulbs, one illuminating the semaphore and number plate continuously, and the other the signal. Control of the latter is by an automatic switch which may be attached to either the clutch or brake.

Ideal Speeder.

The high price of gasoline has resulted in the marketing of a number of devices for controlling the mixture by introducing auxiliary air into the intake manifold. One of this type is the Ideal speeder, marketed by the Interstate Auto Accessory Company, 2124 East Washington street, Indianapolis, Ind. It comprises a valve device which is screwed into the intake manifold and the opening is controlled by a dash adjustment. Heated air is utilized to break up any particles of raw gasoline as well as to correct the mixture, a tube being placed in proximity to the exhaust pipe. The speeder is constructed to be utilized in combination with a primer which is mounted on the dash and manually operated.

Revivo Storage Battery.

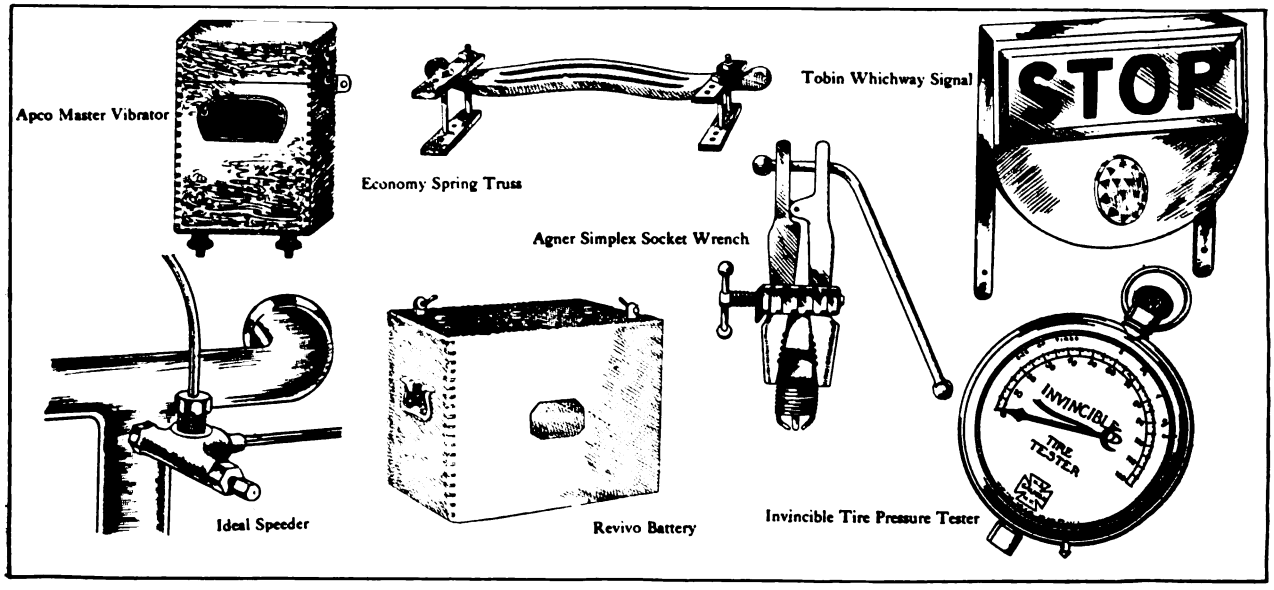
The Revivo storage battery is the product of the Cook Railway Signal Company, Denver, Col., and differs from the usual types of lead batteries in that it is a dry member, no fluids being utilized for an electrolyte. It is claimed by the maker that the battery may be entirely discharged and that recharging will bring it back to its initial efficiency. It is charged in the same manner as wet batteries and it is maintained that overcharging is not injurious. It is made in several sizes and capacities.

Agner Simplex Socket Wrench.

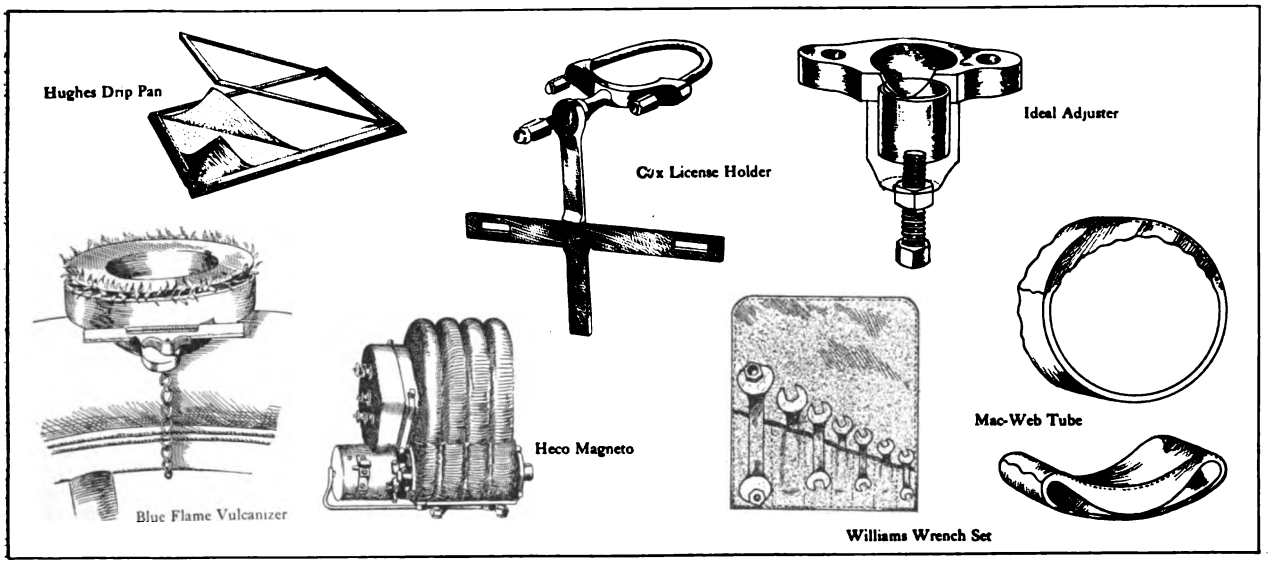
The R. C. Agner Company, Burlington, Wis., is manufacturing the Agner Simplex adjustable socket wrench, which presents interesting features in that it may be utilized for a number of purposes. It is especially adapted for removing and replacing spark plugs, having as it does a pair of movable jaws which are locked by a small clamp. It may also be utilized on square or hexagonal nuts and bolts, or as a tap wrench. Another feature of the device is that it can be employed as a small hand vise. It is constructed of high grade material.

Invincible Tire Pressure Tester.

Lack of proper inflation is the greatest abuse of tires and to secure maximum efficiency from the casings the air pressure should be tested from time to time. The United States Gauge Company, 67 Wall street, New York City, is marketing the Invincible tire pressure tester, which is a self-recording instrument and one easily oper-



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ated. It is similar in size and shape to a watch and may be carried easily in the pocket if desired. The dial is calibrated, registering in pounds from one to 120, and the proper inflation values for different sized casings are included. When taking a reading the hand remains at the maximum pressure until released by pressing a button. This is of convenience when inflating tires at night as the instrument can be carried to the nearest lamp and read.

Hughes Drip Pan.

The Foss-Hughes Company, Philadelphia, is marketing the Hughes drip pan, which was designed by A. E. Hughes for service in the salesrooms of the concern. It differs from the conventional pans in that an oiled paper is utilized to catch any lubricant that may drip from the motor, etc. The invention comprises a number of individual sheets of paper formed into a pad and held in a wooden frame by an iron member. Upon a sheet becoming soiled it is removed, exposing a clean one. It is especially designed for service in salesrooms, although equally applicable to the private garage.

Cox License Number Holder.

The Cox Brass Manufacturing Company, Albany, N. Y., is marketing what is known as the bracket A, a license number plate holder, arranged to retain two tags if desired, as when travelling in two states. The plate may be attached to either side of the front bracket, which by removing a nut on the top of the shank can be reversed easily. The holder is made of brass.

Ideal Ford Adjusters.

John A. Vansickle, 2122 East Washington street, Indianapolis, Ind., is manufacturing the Ideal adjusters, which are constructed in two sizes and designed especially for model T Ford automobiles. They are practically adjustable ball and socket joints and when fitted to a car permit of taking up all play, thereby preventing lost motion as well as eliminating annoying rattles. The larger size is used for adjusting the front end of the radius rod, while the smaller is employed on the steering gear connecting rod. The device is provided with a set screw and lock nut and by turning the former a very fine adjustment may be made. The Ideal adjusters are constructed of a high grade material and are guaranteed indefinitely. They do not require any special tool for attachment and may be applied by the most inexperienced.

Blue Flame Vulcanizer.

The Blue Flame vulcanizer is the product of the C. M. Beardsley Manufacturing Company, 1911 Euclid avenue, Cleveland, O., and differs from the conventional types of portable devices burning gasoline in that a thermometer is incorporated, enabling the operator to control the temperature of the heat. The vulcanizer is cup shaped and the fuel receptacle is provided with a wick to absorb the greater part of gasoline which when ignited gives off a blue, smokeless flame. Control of the heat is by a cover holding the temperature to the proper vulcanizing point, which is noted by the mercury in the thermometer. The vulcanizer is constructed in two parts, secured together by thumb screws, and is also equipped with a chain for vulcanizing tires on rims. The ouft includes, in addition to the vulcanizer, a specially prepared quick curing cement and rubber.

Heco Magneto.

The Heco magneto is manufactured by the Heinze Electric Company, Lowell, Mass., and is distinguished easily from other makes by the shape of the magnets, these being round instead of rectangular. The company maintains that the round magnet provides a more perfect contact with the pole pieces and that the end of each magnet is ground and fitted to reamed holes in the pole members. The best tungsten magnet steel is utilized and the armature is of high grade magnetic iron, carefully annealed. The bearings are of the annular ball type and the make and break case is constructed of steel tubing with fibre insulation, the latter being shrunk onto the outside. The points are ample in size, of platinum iridium, and the cam is chrome nickel steel, carefully ground and hardened. The make and break cover is removable without the use of tools. The distributor case is of hard vulcanized rubber and the terminals are of the detachable type and are covered with hard rubber. The advance lever is located on the breaker box and is furnished either on the right or left hand side. The provision for lubrication is such that the magneto will run for months without attention. The magneto is termed a low-tension instrument because it produces a low voltage from the armature, which is stepped up by means of a coil having primary and secondary windings. The high-tension current is distributed to the different plugs by the magneto. The dash coil furnished with the magneto is of mahogany, nicely finished, and the coil is equipped with a small kick switch and push button for starting under compression. A coil for mounting under the hood is also manufactured. When the independent dual ignition system is required, a four-cylinder coil is supplied, it having a switch so that either batteries or a magneto may be utilized independently or together. The Heco is constructed for one, two, four and six-cylinder motors. Owing to the special method of winding the secondaries the product of the company is guaranteed against burning out or breaking down.

Williams Wrench Set.

The Waite Auto Supply Company, Providence, R. I., is marketing the Williams wrench set, which is made in two numbers, eight and nine respectively, these differing only in that a spark plug wrench is omitted with the smaller numbered outfit. The wrenches are drop forged and are designed to fit bolts and cap screws of varying standard measurements. There are seven wrenches to each set and these have milled openings of different sizes and are sufficient to meet every requirement that may be encountered in motor car work.

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Mac-Web Pneumatic Tube.

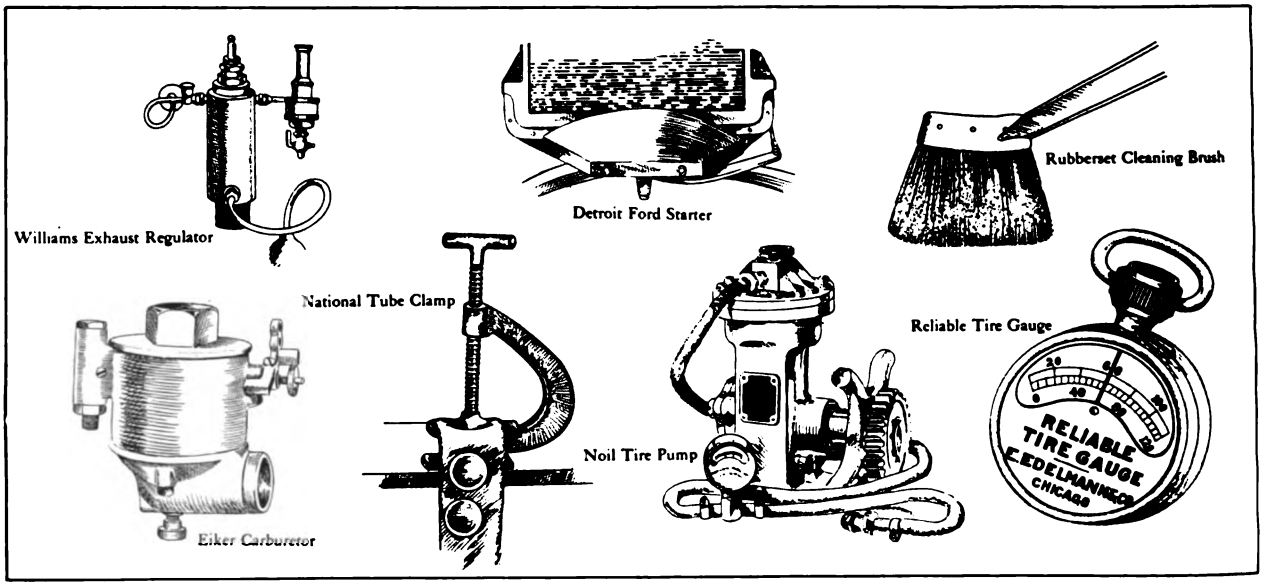
The Mac-Web pneumatic inner tube is manufactured by the Webster-Macdonnell Company, Haverhill, Mass., and it is held that it is not only puncture proof, but that it provides all the advantages of the conventional types of tubes. It is constructed with a strip of fabric running its entire length and a thickness of rubber over the fabric. When removed from the mandrel it is turned inside out and spliced. When punctured it is stated that the rubber tread will compress, sealing the opening.

Rubberset Cleaning Brush.

The Rubberset Company, Newark, N. J., is manufacturing a brush called Rubberset, which is made especially for removing oils, greases and dirt from the power plant and other components of the motor car. The brush proper is hatchet shaped and the bristles are extra stiff, making it possible to displace hard deposits. The bristles are gripped in hard vulcanized rubber.

Williams Exhaust Pressure Regulator.

The D. T. Williams Valve Company, Cincinnati, O., is manufacturing the Williams exhaust pressure regulator, which is designed for use on cars equipped with pressure fuel feed systems. Its function is to catch all dirt, moisture, etc., and to cool the exhaust gas before the latter passes to the tank. The device is provided with an adjustable valve which relieves the system of any excess pressure and assures a uniform feed at all times.



The regulator is attached to the dash under the hood in a vertical position and the gas is led to it by a tube. The gas enters the regulator through a lower connection, passes upward, then downward over a series of ribs inside the casing, and all foreign elements are separated, falling to the bottom cap, which is removable. The exhaust in its course passes upward through a very fine mesh screen, where it is again filtered.

Detroit Ford Starter.

The Detroit Mechanical Starter Company, Detroit, is manufacturing a mechanical motor starter for model T Ford cars. It is operated from the seat by a nickeled lever located beside the emergency brake member, the former being connected with a sector and pinion gear just in front of the dash. The starter mechanism proper replaces the usual crank and does not detract from the appearance of the machine, it projecting but six inches. When the lever is moved connection is made between the crankshaft and a shaft of the starter, and a further movement of the hand lever turns over the motor by the application of considerable leverage through a gearing. The device weighs but 20 pounds and not only is it easily installed, but it is claimed that but little effort is required to crank the motor.

Eiker Carburetor.

The Eiker carburetor, manufactured by the Eiker Carburetor Company, 1790 Broadway, New York City, differs from the conventional types of vaporizers in that the spray nozzle is located in the middle of the throttle disc and a tapered adjustable needle moves backward and forward, automatically increasing or decreasing the supply of fuel with the opening and closing respectively of the throttle. The maker holds that the construction eliminates the necessity of a venturi tube or extra jets. It has but one air inlet, the air passing upward across the spray nozzle, and as the latter is located in the centre of the mixing chamber it is pointed out that its efficiency is not affected by grades, etc. It is also stated that water and sediment in the fuel cannot clog the spraying nozzle, as the inlet port of the feed pipe is .5 inch below the level of the gasoline. The base, which includes the auxiliary air valve, air intake and hot air connection, adapts itself to four different positions making for convenience in installation. There are but two adjustments, the fuel and air, and it is said that the carburetor is set easily and is applicable to all types of motors. Easy starting qualities, economy of fuel and flexibility are emphasized with the Eiker.

National Tube Patching Clamp.

The National Cement & Rubber Company, Toledo, O., is marketing an inner tube patching clamp which is stated to mend a puncture in four minutes at a slight cost. The clamp requires no heat, acid, etc., as it welds the self-curing rubber cement to the tube by the cold process. The equipment includes in addition to the clamp which makes a neat repair, a can of self-curing rubber cement.

Reliable Tire Gauge.

E. Edelmann & Co., 225 West Illinois street, Chicago, is marketing the Reliable tire gauge, which is very compact and in watch form. It registers the air pressure from zero to 120 pounds and is provided with an indicator hand which stops when the maximum pressure is registered. The hand can be reset to zero.

Taylor Noil Tire Pump.

The Taylor Manufacturing Company, box 485, Chicago, is marketing the Noil pump, so named because all lubricant or oily vapors are eliminated, nothing but pure, fresh air being forced to the shoe. It is a mechanical pump of the stationary type and is secured to the power plant of the car by a simple little bracket, this and the necessary gears being supplied as regular equipment and to meet the requirements of installation. The pump works on the plunger-diaphragm principle and the air chamber is independent of the crankcase, being separated from it by an air-tight rubber diaphragm. The pump is but 7.5 inches high, weighs but 6.5 pounds and is constructed of aluminum and bronze. It is held it will deliver from 90 to 150 pounds of air when operated at low speed on the average motor and that it may be fitted in from 15 to 40 minutes, depending on the design of the power plant. The equipment includes suitable length of hose and pressure gauge.

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THE FRICTION TRANSMISSION.

A Cartercar Owner Gives Some of the Reasons Why He Favors This Type.

Many manufacturers of automobiles are free to admit that much of the success attained by their product has been the result of intelligent criticism and discussion on the part of owners. H. R. Radford, vice president and general manager of the Cartercar Company, Pontiac, Mich., credits one of the Cartercar owners with having submitted one of the best technical articles ever written about this make of machine. The argument is in part as follows:

The chief criticism offered and the basis of all argument against the Cartercar is the fact that "It has a friction transmission." This is the only "true" indictment ever brought against the Cartercar by its competitors and the ground over which the fight for supremacy is being waged.

Every fair minded person, whether he be familiar with the details of automobile construction or not, will admit that in any piece of machinery designed to do work, the more direct it is in the principle of its operation and the more simple it is in its mechanical construction, the more certain it is to be reliable. Out of reliability we must expect a maximum of service and service in its fullest sense is what is embodied and realized in the Cartercar friction transmission. It is a transmission of innumerable speed ratios and through each and every one of them the very maximum of power and efficiency is delivered to the rear axle.

Methods and principles in mechanical construction used and handed down from one era to another have always been difficult to cast aside and it has always required some mechanical Martin Luther to break away from the tenets of the faith before more advanced and efficient methods could be established and come into practise. Those who are championing the cause of gear transmission will tell the prospective buyer that friction transmission is a new and unreliable method and that it has not proved a success, either not possessing the knowledge, or purposely evading the fact that friction is now being successfully used in transmission of power in some of the heaviest machinery, it being more flexible and more efficient than any method ever used.

As a convincing example of the thorough practicability of friction transmission and its wonderful efficiency, just consider for a moment the operation of the great railways of the country. How many stop to consider how the billions and billions of tons of heavy freight are moved and how our lightning passenger service is accomplished? It is all done by friction transmission of power through the great driving wheels against the rails.

SEVERE MOTOR TEST.

Chicago Man Runs Continental Engine Over 160,000 Miles in His Car.

Edward B. Ellicott of Chicago seven years ago purchased a Continental motor, made by the Continental Motor Manufacturing Company, Detroit, and sufficient other parts to assemble a touring car which would fulfill his ideas of what a real automobile should be like. Mr. Ellicott has used this car continuously winter and summer in and around Chicago. It has never been laid up for any purpose save for painting.

During the last seven years Mr. Ellicott has travelled over 160,000 miles, or more than six times around the world, without motor trouble of any description. The motor has never had any repairs save a few simple replacements which excessive use will wear out on any motor. This large total of running miles is an interesting testimonial to the endurance of the modern gasoline engine and to the Continental product in particular.

LUVERNE POWER PLANT.

Company Placing Fully Equipped Four-Cylinder Unit in the Market.

The Luverne Automobile Manufacturing Company, Luverne, Minn., has placed in the market a four-cylinder unit power plant, completely equipped, comprising a motor with carburetor and high-tension magneto attached, multiple disc dry plate clutch, selective type transmission with control levers and pedals attached and connected, ready for installation in any style of motor vehicle.

The company also equips this motor with electric generator and motor starter, if such is desired. The outfit is accompanied by a written guarantee for one year.

R-C-H TRANSCONTINENTAL TOUR.

Three Young Men on the Way from Los Angeles to New York.

Driving the second R-C-H car built by the R-C-H Corporation, Detroit, three young men of California, Eldon Rookledge, William West and Catine Corella, are making what is probably the first West-to-East transcontinental tour of the season. With New York City as the objective point they left Los Angeles, Cal., May 9, taking the southwest route.

The party has passed through Kansas City, Mo., and reported that no mechanical difficulty of any kind had been encountered. From Kansas City the tourists drive to Detroit, by way of St. Louis and Indianapolis, and then will travel East through Canada to New York. No attempt at records is being made and the trip is expected to take about a month.

William J. Bryan, Secretary of State, has taken delivery of a Studebaker touring car. This is Mr. Bryan's second Studebaker machine.

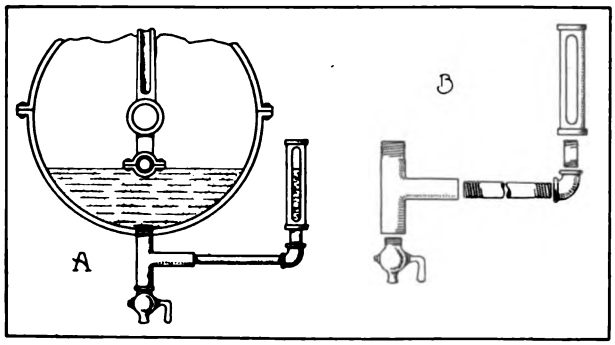
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MECHANICAL NOTES FOR OWNERS.

Suggestion from Reader for Fitting Inexpensive Oil Gauge to Motor—Instructions for Adjusting Cole Lubricator—Novel Cause for Missing at Low Speeds.

EXCESS oil in the crankcase causes smoking and carbon deposits, while a lack of lubricant invites trouble in the shape of burned-out connecting rods, main bearings, etc. The fear of burning out connecting rods leads many motorists to use too much oil, and this is especially true if provision is not made for noting easily the amount of lubricant in the crankcase or sump. Even when petcocks are incorporated to show the level of the oil, some owners do not take the trouble to keep these members clean so as to be utilized as intended.

The maker of the modern motor fits a gauge and calibrates it so that it is a simple matter to ascertain at a glance the height of the lubricant, and to prevent flooding, which results in smoking, etc. There are, however, a number of old types of machines not thus equipped and the following communication from a reader is of interest in that he solved the problem of fitting a gauge to an old model power plant.



Suggestion for Home-Made Oil Gauge Contributed by a Reader: A, Showing Device in Position; B, the Parts and Method of Assembly.

Noting that you published a suggestion from a reader in your last issue, I am enclosing a sketch of an oil gauge which I fitted to my engine and trust that you will find it of sufficient merit to print same, as it may be of service to some fellow automobilist. The motor is a four-cylinder and is lubricated entirely by splash, the lubricant being fed by a pressure system to the crankcase. The only way I had of determining the height of the oil was to use a rod, which was inserted through a plug in the upper crankcase. As the hole was on a slant it was sometimes difficult to get a correct measurement.

The lower half of the crankcase had a petcock for draining off the old oil and I used the opening to fit the attachment as shown in the drawing. I fitted a T to this opening and screwed in the petcock at the bottom so that I could drain off the old oil as formerly. Into the T I screwed a short piece of pipe and to the free end of the tube attached an elbow. The gauge proper I made out of a piece of brass and glass tubing. The brass member was threaded to both ends and to the top was screwed a cap carrying a cork washer. The bottom cap was drilled and tapped to take a short piece of tubing, connecting the gauge to the elbow. The brass tube I filed as shown in the sketch and by using suitable thicknesses of cork washers on the ends of the glass tube secured an oil tight gauge.

Of course I had to ascertain the proper height of the oil in the crankcase before assembling the parts and this was done by removing the lower half of the crankcase, measuring from the centre of the crankshaft to the end of the connecting rod and allowing for the dip of the ends. I then had my pipe cut so that when the gauge was put together the oil would show within an inch of the top of the tube. By watching the exhaust and experimenting I ascertained the correct height in the crankcase, after which I cut a mark on the gauge with a file.

The gauge works fine and I am not troubled with smoking as formerly. It is a simple matter to raise the hood and see just how much oil is in the crankcase. After cleaning out the crankcase the gauge is a great help in refilling. The cost of the pipe, glass, etc., is slight and by having the threads cut all one has to do to fit it is to put the parts together. I also found that I am using considerably less oil than formerly and do not have to scrape out carbon as frequently as I did.

Suggestions from readers for simplifying repairs, adjustments, etc., as well as hints for constructing devices aiding in the maintenance of the motor car will be published in this department. The name of the contributor will not be used unless desired, but the name and address should accompany each article so that another reader may ascertain specific measurements when taking advantage of a mechanical suggestion. When possible the subject should be illustrated by a rough sketch and when necessary measurements should be given.

MISSING AT LOW SPEEDS.

Missing of the motor at low speeds is due to a number of causes, including auxiliary air, improper adjustment of the carburetor, etc. A case of skipping which bothered an owner was noted recently in a car that had been in service but one season and the cause was not discovered for some little time as the high-tension cables appeared to be in first class condition. The engine ran erratically at slow speeds and changing the gap of the plugs and mixture failed to correct the trouble. The intake pipe and connections were tested for auxiliary air, but none was noted.

The ignition system comprised a magneto with the usual transformer and dry cells for starting. The miss was noticeable on both the batteries and magneto and the cells tested 18 amperes each. The distributor and breaker box were examined and cleaned, platinum points readjusted, but the missing was not eliminated. Driving into the garage one evening and when the lights were out, the owner on lifting the hood to make an adjustment to the carburetor, noticed a number of sparks playing about the magneto. An examination showed that the cables, which

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ran very close to the magnets, were leaking high-tension current. The wires were wrapped with tape until new ones could be fitted and the troublesome skip disappeared.

ADJUSTING COLE OILER.

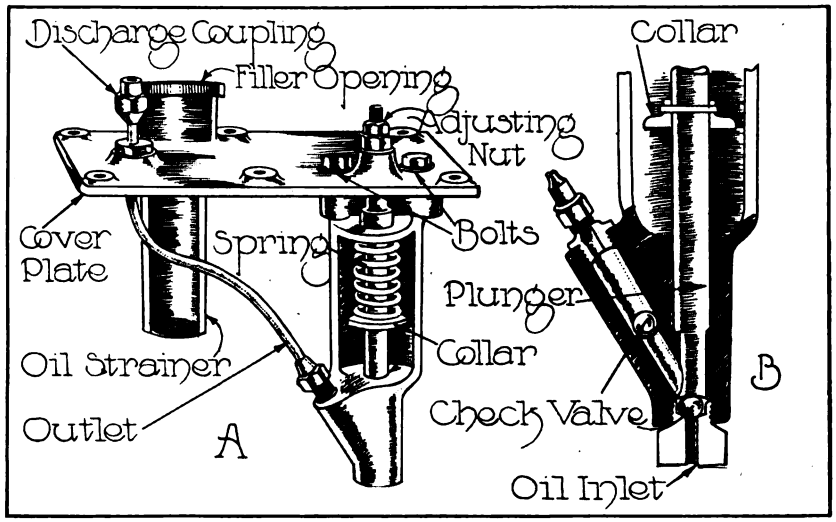
A knowledge of the components of the lubricating system and their operation will simplify the work of cleaning and adjusting. Although properly set at the factory the motorist may neglect to follow the instructions of the maker as to care and maintenance, resulting in inefficiency. Then again a different grade of lubricant may be used or conditions may arise when the amount of oil fed to the working parts requires augmenting. Dirt or lint may clog the filter member and pipes, necessitating cleaning of these parts.

In an accompanying illustration is shown the working parts of the lubricating system utilized on the Series Eight Cole cars and the adjusting mechanism is very simple, comprising a nut which is raised or lowered, increasing or diminishing the quantity of oil pumped. As will be noted the assembly is a unit and is removable. The pump member shown in detail at B is also removable, being secured to the cover plate by three bolts.

The fresh oil is poured into the reservoir through the filler opening and passes through a strainer, thence to the sump. The lower end of the pump body extends approximately to the bottom of the reservoir, oil entering by an inlet. The plunger of the pump has a collar secured to it, and also carries a spring. The collar serves a double purpose: First, to transmit the downward pressure of the spring, and second, to lift the pump piston when the eccentric which bears against its lower side rotates to the proper position. Thus it will be seen that the pump is raised by a cam and returned by a spring. Drive is by means of a worm gear from the camshaft, the reduction being 25:1, so that the pump eccentric cam makes only one revolution to 25 of the camshaft. The supply of lubricant is, therefore, proportional to motor speeds.

The operation of the system is simple. Upon the raising of the plunger oil is drawn in through the inlet and past the check valve. The latter is utilized to prevent the escape of the lubricant back into the sump when the plunger descends. On the down-stroke the oil is forced up past another check through a tube to the discharge coupling, thence to a sight feed on the dash. From the dash member it flows back to the crankcase, the circulation being maintained when the motor is operating.

To increase the amount of lubricant the adjusting nut is backed off or raised, permitting the plunger to make a longer stroke. To decrease the supply the nut is lowered.



Oiling System of Series Eight Cole Cars: A, Showing Adjusting Nut Controlling Stroke of Plunger; B, Plunger in Detail, Including Check Valves.

RENOVATING OIL LAMPS.

Unless the wicks are given attention and care is exercised not to turn them up too high, the interior of oil lamps will become smoked, especially the metal. If the finish is silver and it has become discolored, sometimes it is possible to restore it with a silver polish. If this treatment fails the finish may be made as good as new by utilizing a silver plating preparation, such as U-Kan Plate described in these columns a short time ago. When applied according to directions a brilliant surface is possible. The material is not expensive and a small bottle will keep the lamps in first class condition for some time.

CARE OF SHELLAC.

Shellac is useful in the garage and as it dries up very quickly it should not be exposed to the air. Place it in a bottle and fit a wooden stopper. The latter may be utilized for smearing the liquid when its service is required.

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ADJUSTING RAYFIELD CARBURETORS.

RAYFIELD carburetors are produced in two models, D and H, by the Findeisen & Kropf Manufacturing Company, Chicago, and they differ only in that the former is water jacketed. An exterior view of model D is shown at Fig. 3, while a sectional view is presented at Fig. 1, with its components lettered. A little study of the construction and a brief description of its operation should enable one to clean and make adjustments.

A feature of the Rayfield construction and operation is the combination of its variable needle valve, automatic air valve and mechanical valve, the last named being connected to the throttle valve as shown in the drawing. The fuel enters through an inlet E and after being filtered at F passes the needle valve H and enters the float chamber A. When the predetermined level is reached the float D rises, and the needle valve descends, perventing further entrance of fuel.

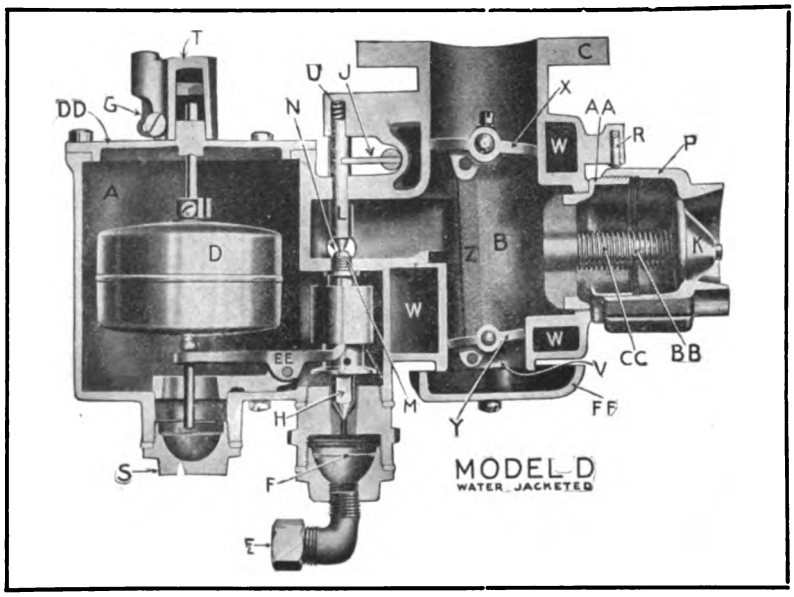


Fig. 1—Sectional View of Model D Rayfield Carburetor: A, Float Chamber; B, Mixing Chamber; C, Flange Connection; D, Float; F, Gasoline Intake Connection; G, Priming Lever; H, Gasoline Intake Valve; J, Needle Valve Lift; K, Automatic Air Valve; L, Needle Valve; M, Spray Nozzle; N, Constant Air Intake; P, Automatic Air Adjustment; R, Adjustment Lock; S, Drain Plug; T, Priming Cap; U, Needle Valve Spring; V, Mechanical Air Intake; W, Water Jacket; X, Throttle Valve; Y, Mechanical Air Valve; Z, Connecting Link; A A, Automatic Air Valve Cage; B B, Automatic Air Valve Spring; C C, Bumper Spring; D D, Float Cover; E E, Regulating Lever; F F, Regulating Lever Fulcrum; G G, Flushing Pan.

The gasoline enters the spraying nozzle M through openings, while the constant or fixed air enters at N, which is so constructed and arranged that the air currents pass directly over the spraying nozzle, drawing fuel therefrom. The flow of the fuel is controlled by the needle, which is actuated mechanically by the throttle valve X, and the opening and closing of the latter increases or diminishes the supply of gasoline proportionately. As the throttle is opened the mechanical air valve Y is also opened, as it is connected by a link Z to the member X. The mixing of the vapor with the air takes place in B. The automatic air valve is shown at K, it being adjusted by the member P and actuated by the spring B B.

The height of the float is set at the factory and should not require attention, but it may be that the adjustments have been tampered with or dirty fuel has been used. Under these conditions one is warranted in correcting the adjustments and eliminating the dirt. It should be remembered that many cars are equipped with the dash push button and this member should be pushed down.

The low speed is set first by turning the low speed screw (Fig. 3) to the left until the arm member above it and slightly to the right just breaks contact with the cam above that. Next turn the low speed screw 1.5 turns to the right, open the throttle about one-quarter, prime the carburetor and start the motor. In priming do not jerk on the primer member, but pull or press gently. Close the throttle until the motor runs slowly without stopping, then turn the slow speed screw to the left, cutting down the fuel, and do this one notch at a time until the engine idles smoothly. If it does not throttle or run slowly enough turn the screw in the top arm to the left, using a screw driver.

Open the throttle slowly until wide open. If the motor backfires turn the high speed adjusting screw to the right, a half-turn at a time, until the engine hits four cylinders and evenly. Should the motor not backfire, turn the high speed screw to the left until it does, then to the right until the engine runs smoothly. The low speed should not be touched after being set if the motor backfires with the throttle about one-quarter open, but the automatic air adjustment should be turned to the right a turn or two, increasing the tension of the

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spring and decreasing the amount of air slightly. The air supply should not be tampered with unless the adjustment of the fuel members fails.

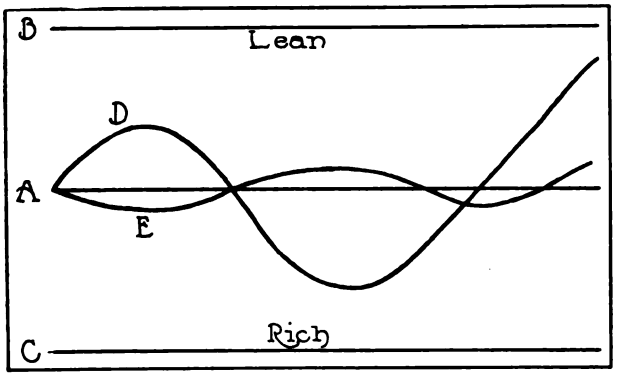


Fig. 2—Chart Showing Variation in Mixture with Minimum and Maximum Throttle—Curve A Represents Perfect Mixture; D, Effect of Climatic Changes, and E, That of Rayfield.

It is seldom necessary to change the nozzles in the Rayfield, but should it be necessary to turn the high speed cam adjustment to the extreme right to secure the best results, the nozzle is too small. If to the left, it is too large. A change to a nozzle two drill sizes larger or smaller will correct the trouble. Nozzles are numbered by all drill sizes, the No. 44 being larger than the No. 45, for example.

To remove the nozzle, displace the cover D D (Fig. 1) from the float chamber A and take out the float D. Remove the small screw in the bottom of the float chamber and take out the fulcrum lever E E through the float chamber. Unscrew the large plug at the gasoline inlet, being careful not to lose the copper gasket. The inlet needle valve can now be removed. Unscrew the nozzle M with a heavy screw driver and replace with the desired size. Reassemble in a similar manner, making sure to insert the round guide in the hole at the bottom of the float chamber before tightening the screw holding the fulcrum lever. Be certain that the latter moves freely before inserting the float.

If one is careful to determine that all fuel utilized is strained and to open the filter in the main line occasionally, one should not experience any trouble with the Rayfield provided it has been set properly. The maker states that many persons make the mistake of adjusting the Rayfield with too lean a mixture, an error made easily because of the simplicity to the adjusting members. The best results, insofar as efficiency and economy are concerned, are obtained when the mixture is rich enough to give all around good results. On the other hand, too lean a mixture makes the carburetor more sensitive to climatic changes resulting in a loss of power, etc.

It is further maintained that the Rayfield is not affected by high altitudes, provided, however, the nozzle is of the right size and the vaporizer set properly. For very high altitudes it may be necessary to set the automatic air valve so that it seats a trifle lighter and to cut down slightly on the low and high speed fuel adjustments. It is important, however, that the automatic air valve be seated when the motor is idling at low speed.

It is stated that the Rayfield has been driven from coast to coast, reaching altitudes as high as 10,000 feet without changing the adjustment. Its ability to withstand climatic changes is indicated in the sketch at Fig. 2. A represents the throttle opening from a closed to a full open position. It also shows a perfect mixture. B represents the point where the mixture is so lean that the motor will lose power and backfire. C shows a mixture so rich that not only will the motor miss, but operate erratically. The curve D shows a mixture first lean, then rich and again lean. The maker of the Rayfield claims that this is eliminated in its product as it follows the line shown at E, and that a considerable change in atmospheric conditions can be encountered before it will pass the limits C and B.

It is held that the best results are obtained in starting by not moving the throttle more than one-quarter way open. In extremely warm weather the use of hot water may be discontinued. The hot air connection may also be eliminated in warm weather.

Frederick H. Elliott, formerly secretary of the American Automobile Association and the Tour-

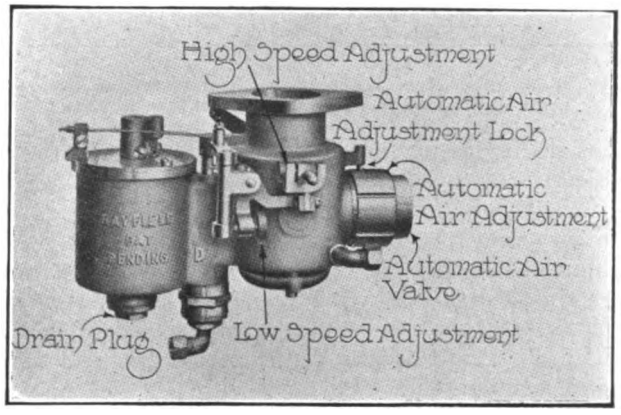


Fig. 3—Showing the Components Utilized in Adjusting Model D Rayfield Carburetors.

ing Club of America, has been elected to the board of governors and also general secretary of the International Travel Club.

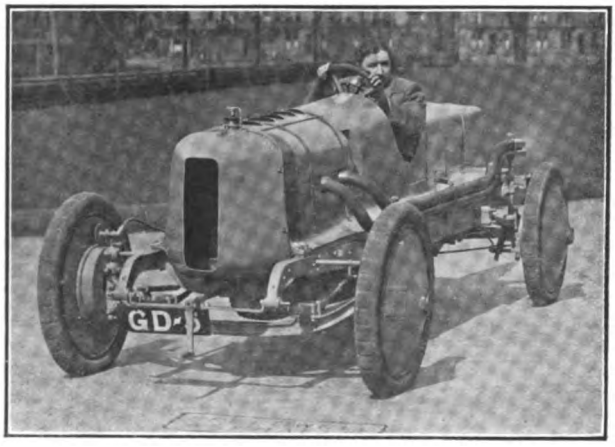
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WITH THE MOTORING INTERESTS ABROAD.

Single-Sleeve Valve Argyll Creates Many New World's Records on Brooklands Track ---British Apparatus for Testing Road Building Materials---Other Notes.

DETAILS of the world's record performance of the 15-30 horsepower Argyll car, made by Argylls, Ltd., Alexandria, Dumbartonshire, Scotland, on the Brooklands track, Weybridge, England, last month, which have reached this country within the past week or two, are of sufficient interest under any circumstances, but when it is remembered that the Scotch machine utilizes a single-sleeve valve engine, the event becomes all the more important. It is the first time that a sleeve valve engine of any type has secured world's records of this character.

In the first trials the Argyll set out to create new marks in the British class D, for machines with a piston displacement of 2868 cubic centimeters (approximately 177 cubic inches) or less,



W. H. Scott at the Wheel of the Argyll, Which Created New World's Records on Brooklands Track.

in which class there were no previous marks for a distance greater than 10 laps of the Brooklands track, about 27.5 miles. It not only created a new world's record, regardless of class, for 14 hours' running, but exceeded many of the marks in the British class E, for machines of not more than 2996 cubic centimeters (approximately 182 inches). Later it was determined to make a second attempt, in which all world's records above 500 miles of distance and from seven to 14 hours in time were exceeded.

It has been stated before in these columns that the British and American classes are so divided that it is not always possible to make definite comparison of the work done by machines in the two countries. The Argyll in question was fitted with a motor having a bore of 80 mm and a stroke of 130. These figures compare approximately with 3.15 and 5.125 inches respectively. This would just force the Scotch machine into the smallest American class, for cars with less than 161 cubic inches piston displacement.

There are no American records for longer distances, than 20 miles in this class. The mark for 50 miles in the 161-230 class is held by William Endicott in a Cole at 43:49.69. Under the stock chassis qualification Nelson holds the record for 50 miles at 50:36, and Knipper in a Chalmers for 100 miles at 1:40:46.81. By the accompanying table it will be seen that the Argyll exceeded all of these.

Class hour records are not claimed in America. The world's straightaway record for one hour is held by Ray Harroun in a Marmon at 74 miles, and the two-hour mark at 148. The marks exceeded by the Argyll from three to 12 hours were set by a Sunbeam last year. Those for 13 and 14 hours were held by S. F. Edge, who made them in a Napier in 1907.

It will be noted as well, that the Argyll's time for 500 miles was faster than that made by Jules Goux in the winning Peugeot during the recent 500-mile race at Indianapolis. While it will be admitted that the Brooklands track is in some respects faster than the Indianapolis speedway, it is of interest to compare Goux's 6:35:05 with the Argyll's 6:26:22.74, and Joseph Dawson's 6:21:06 in the National during last year's 500-mile race.

The Argyll was driven by W. H. Scott and L. C. Hornsted.

TESTING ROAD MATERIALS.

First Apparatus of Its Kind Now in Operation in Great Britain.

Just as in this country stationary testing machines for chassis and tires are taking the place of roadwork for automobiles, there is a British device for trying out road making materials without laying them where traffic actually is. The road board of Great Britain has sanctioned the construction of a road testing apparatus at the National Physical Laboratory, this being held to

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be the first of its kind in the world. It is a building containing a circular track on which experimental lengths of roads can be laid readily and tested to destruction by the passage over them of wheels driven by motors which are guided and steered in a circular track by a revolving framework.

The machine, which took a year to design and construct, is now at work. The track has been filled with four lengths of water bound macadam, made up in four different ways, and each of these will be tested until it is broken up. The designers hope to be able to arrive rapidly at conclusions which otherwise would take years to reach on the actual roads themselves. The roadway is under cover and protected from weather influences, but it is possible to introduce certain of these conditions at will. For instance, the track can be heated by hot air blown onto it; rain can be imitated by spraying devices; it can be artificially cooled to the freezing point. Various machines and types of wheels will be employed in making the tests.

AMERICAN INVASION IN FRANCE.

Petit Journal of Paris Warns Local Manufacturers of Impending Danger.

That the so-called American invasion is a formidable danger was the main point in a recent editorial article presented in the Petit Journal of Paris, France, and local manufacturers were warned that it was necessary to combat American competition at once. The extent of the increasing popularity of the American product was evidenced by the statement that during the past two years the number of machines imported from this country had quadrupled.

The Petit Journal is of the opinion that the American automobile is becoming a formidable competitor of the French machine only because it is cheap. The article in question made extended reference to the fact that France was the home of the motor car and the country in which the automobile industry has attained large proportions. An appeal was made to local pride in an effort to stimulate active measures for the prompt meeting of competition from this side.

This situation has been uppermost in the minds of French manufacturers for at least a year. Early in 1912 representatives of these factories were sent to America with instructions to obtain information as to the methods utilized by the industry in this country, and only recently French makers began including in their advertisements that they were prepared to produce machines on the American plan.

NOTES FROM FOREIGN LANDS.

According to statistics recently made public in Paris, France, the number of horses in use in that city had dwindled from about 98,000 in 1900 to approximately 60,000 at the beginning of 1913.

As a mark of its appreciation of his services in the interests of motoring the German Society of Motor Manufacturers presented Prince Henry of Prussia with a handsome painting upon the occasion of his silver wedding recently.

Shortly after the running of the French Grand Prix event in July, the maker of the Sunbeam in England contemplates a series of trials on the Brooklands track utilizing a car fitted with a 12-cylinder V engine. It is understood that this motor has been produced primarily for use in aeroplane and motor boat work, but the track test has been decided upon as the best method of determining its value in every respect.

The Austrian Alpine contest which was originally scheduled for June 10-17, was postponed until June 22-29, in order that several German competitors might take part in the jubilee parade of cars before the Kaiser in Berlin during the first named week.

The success of the proposed standard car race on the Isle of Man in September is by no means assured, although the Society of Motor Manufacturers & Traders of Great Britain has removed its ban, insofar as this applies to privately owned machines. The Royal Automobile Club has explained its reason for fixing the rating at a low figure, on the ground that the course is dangerous for high powered machines.

While two years ago there were but two or three American cars owned in Switzerland, it is of interest to note that during 1912 about 50 medium priced American machines were sold in that country. According to the consular representatives in that country the time is opportune and the popularity of the cars already introduced is evidence of the fact that Switzerland offers a good field for the exploitation of American automobiles.

THE ARGYLL'S RECORD MARKS.

Time for Distance.

Miles	Time	M.P.H.
50	38:22.03	78.19
100	1:16:32.78	78.38
150	1:54:36.42	78.53
200	2:34:23.15	77.73
300	3:48:46.75	78.68
400	5:08:31.59	77.79
500	6:26:22.74	77.64
600	7:40:49.63	78.12
700	9:06:53.76	76.80
800	10:23:14.67	76.40
900	11:49:18.61	76.13
1000	13:05:45.68	76.36

Distance for Time.

Hours	Miles	Yards	M.P.H.
1	78	5	78.29
2	157	2	78.56
3	234	6	78.12
4	315	37	78.76
5	388	12	77.93
6	466	16	77.82
7	544	12	77.81
8	622	5	77.79
9	690	13	76.74
10	766	15	76.69
11	837	60	76.12
12	914	6	76.20
13	992	48	76.33
14	1070	57	76.43

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CORRESPONDENCE WITH THE READER.

Dead Axles.

(1598)—Is there any other car made besides the Metz that has a dead axle? I had an argument with a friend who says there are several pleasure cars made this way. Who is right? A. J. D.

San Diego, Cal., June 12.

The specifications of the 1913 pleasure cars published in the March 10th issue give four makes fitted with dead rear axles, these being in addition to the Metz, the Morse, Duryea and Mason A, B and C.

Planetary Type Motor Starter.

(1599)—Being very much interested in electric motor starters and having read the descriptions of the various makes published in your book and elsewhere, I would like to know if there is any system in which the power of the electric motor is applied on the principle of the planetary transmission. I believe that one of this kind would prove more satisfactory than the flywheel and timing gear methods. Kindly give complete details if such a system exists. SELF-STARTER.

New York City, June 12.

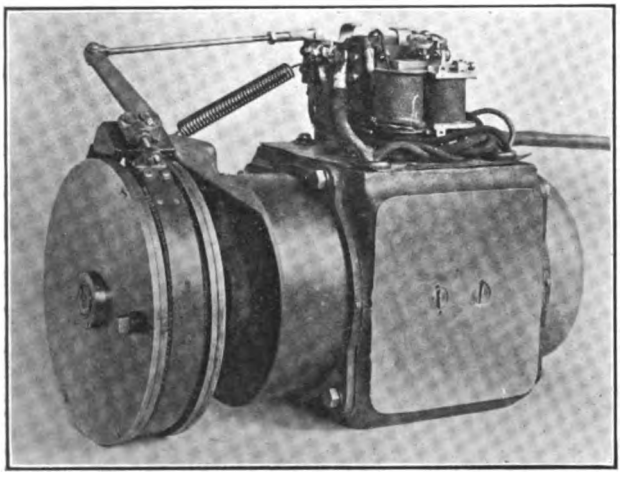


Fig. 1—Wagner Starter-Generator, Employing a Planetary Gearbox When Unit Is Utilized as a Motor Starter—It Operates on Much the Same Principle as the Planetary Transmission.

The Wagner Electric & Manufacturing Company, St. Louis, Mo., makes a combined lighting and motor starting system in which the energy of the motor starter is applied through a planetary type of gearing. The unit is shown at Fig. 1 and comprises four parts, namely: The starter-generator; the controlling mechanism, which changes the electrical connections of the apparatus from a motor to a generator; a gearbox and a storage battery.

The starter-generator consists of a four-pole field, each pole comprising two parts; a field coil of heavy copper strap, called the series field, and lying adjacent to it a field of finer wire, which may be termed the shunt field. The heavy copper windings are utilized when the unit is operating as a motor and the finer wire when employed as a generator.

Revolving in the four-pole field is a laminated toothed armature. This armature has a commutator at each end and is similar to the type utilized in street cars with the exception that two are fitted with the Wagner apparatus. The controlling mechanism consists of two parts, a cylindrical switch, resembling the drum switch employed in the street car controller and a small circuit breaker. The drum switch is of heavy construction and consists of a drum of high insulating properties on which are mounted contact segments. The contact fingers bear on these segments and the fingers are mounted on a condensite carrying board.

The switch is manually operated, either by the foot or hand, and its function is to change the electrical connections of the starter-generator from a motor to a dynamo at the proper time. The handle of the shaft of the drum controller usually works against a spring so that one has to hold against the spring to keep the controller in the starting position. When the actuating lever is released the spring pulls the drum switch back to the charging position. The drum switch has two points, starting and generating.

Mounted on this switch and forming an integral part of it is a small circuit breaker. It is of the automatic type and is so designed that when the generator attains a predetermined speed and the voltage is above that of the battery, the armature on the circuit breaker will be attracted, and, making contact, the current from the dynamo will flow to the battery. Similarly the connection is broken when the output of the generator falls below that of the cells.

A gearbox operating on the planetary type is mounted on the shaft of the generator-starter, and provides a high gear ratio between the engine shaft and the unit. The gear is locked to the shaft and runs freely with it and without speed reduction when the engine is running normal. When the controlling lever connected to the drum switch is pulled into the starting position, this lever tightens the brake band on the outside member of the planetary gear, causing the latter to operate, as the unit is then working as a motor, supplying energy to the engine shaft. Upon releasing the lever the unit becomes a dynamo.

The Wagner will run in either direction and the gearbox is so designed that it will not lock. This permits the engine to rock when coming to

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a stop. It may also be run backward, and if the car be reversed with the starter connected, the gears will not be locked. The wiring is simple, there being but two leads, these connecting the unit to the battery.

Jacobson-Brandow Magneto.

(1600)—Will you kindly give me the wiring plan of a Jacobson-Brandow high-tension magneto on a Buick car? It has been wired to fire 1, 3, 4, 2. Why should it not fire, 1, 2, 3, 4? G. W.

Albany, N. Y., June 10.

The wiring plans of types J H and J L D Jacobson-Brandow magnetos are shown at Figs. 2 and 3 respectively, the former being of the true high-tension design, while the J L D is the dual system.

The true high-tension system eliminates batteries, coils and extra wires, but five leads being employed, these being one to each of the four spark plugs and another from the terminal on the breaker box of the instrument to switch and ground. The last named wire is a primary lead and is employed to divert the primary current from the secondary wires on the armature. When the switch is closed the current flows from the terminal through the primary wire to the switch, thence to the frame. The wiring plan is very simple, the heavy lines denoting the secondary leads and the fine the primary. The dotted lines represent the completion of the circuit through grounds.

The dual system shown at Fig. 3 differs from that illustrated at Fig. 2 in that a set of batteries and a transformer coil are utilized. When the source of supply is the battery the primary current is interrupted by the circuit breaker of the magneto and carried to the coil, where it is transformed into a high-tension. From the coil the converted current flows to the centre terminal on the distributor housing of the magneto, passing to each spark plug in proper sequence. When the magneto is supplying current the electricity flows from it to the coil, thence to the distributor. As with the other wiring diagram the high-tension cables are shown by heavy lines and the primary by light lines.

It would not be practical to have a four-cylinder motor fire 1, 2, 3, 4 as suggested because of a lack of balance of the crank arms, which would tend to create undesirable stresses and vibration. It should be borne in mind that with the four-cycle, four-cylinder engine each cylinder at all times is one stroke behind its predecessor. For example, when the first cylinder is firing the next to be utilized is compressing, while another is intaking and the fourth exhausting.

In the four-cylinder engine two pistons, connecting rods and cranks are always moving up at the same time the other two are moving down, which prevents shock from the movement of these parts. Four-cylinder motors fire either 1, 2, 4, 3 or 1, 3, 4, 2, and it will be seen that the force of the explosion or "kick" is more evenly distributed than it would be if the engine fired 1, 2, 3, 4, as suggested. Furthermore, it requires one complete revolution of the crankshaft to obtain two strokes and two revolutions before one firing or power stroke is obtained.

Crankshafts.

(1601)—Is there a concern in the New England States that makes crankshafts to order for automobile engines? L. F. W.

Keene, N. H., June 18.

Three concerns in Worcester, Mass., W. H. Leland & Co., 1025 Southbridge street; Norton Grinding Company and Wyman & Gordon Company handle finished and machined crankshafts. The Billings & Spencer Company, Hartford, Conn., manufactures crankshafts.

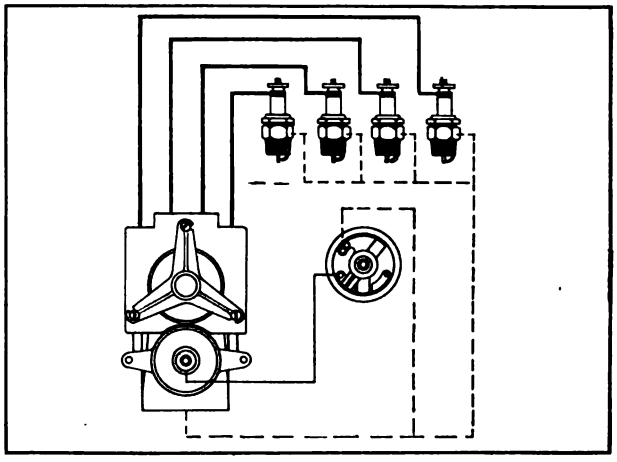


Fig. 2—Wiring Diagram of Jacobson-Brandow True High-Tension Magneto.

Desires Small Spark Plugs.

(1602)—Will you be kind enough to inform me where I can buy very small spark plugs? I want them of as small a diameter as is possible in a practical plug. I want them for experimental purposes in small cylinders. They must be smaller than .5 inch or .625 inch. SUSCRIBER.

Milwaukee, Wis., June 15.

There are a number of makers of spark plugs who will supply you with the information desired. A list of these will be found in the Classified Buyers' Guide, published elsewhere in this issue. The writer recalls a very small plug which he noted at the New York show and believes that it was a souvenir plug which was presented by A. R. Mosler & Co.

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Trouble with Carburetor.

(1603)—I would like your advice on carburetion. I have a six-cylinder Apperson car on which I have an 1.5-inch Stromberg A 3 carburetor. All I can get is 6.25 miles to a gallon, although the carburetor is set as lean as possible without sacrificing power. Would you advise me to change it and try some other make?
SUBSCRIBER.

Elmhurst, L. I., N. Y., June 20.

If the mileage is not satisfactory and all other components of the car are in proper condition a different make could be tried out, but before going to the expense it would be advisable to take the matter up with the Stromberg Motor Devices Company, Chicago. It is possible that it may be able to offer some suggestions as to the cause of trouble.

Experiences Spark Plug Trouble.

(1604)—I have a model T Ford which has given excellent satisfaction up to the present time. Now I am bothered by the spark plugs of the first and second cylinders becoming fouled with oil. I changed the grade of oil but the trouble continues. A repairman tells me I need new rings and possibly pistons. Is there any way of remedying the trouble without going to this expense?
READER.

Westerly, R. I., June 16.

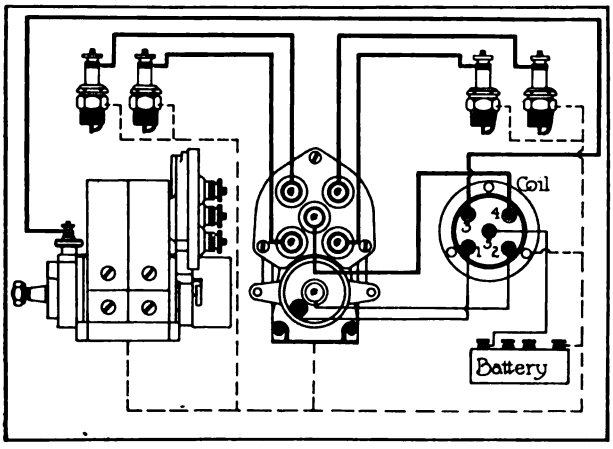


Fig. 3—Wiring Plan of Jacobson-Brandow Type J L D Magneto Providing a Dual System.

The presence of oil on the plugs denotes that too much lubricant is being used, or that it works past the rings. Fitting new members and pistons might cure the trouble, but this is not necessary according to the A. C. Danver Company, Borden street, Providence, R. I., which concern claims to eliminate it without new rings and pistons or altering the power plant.

Single and Double U & H Magneto.

(1605)—Can you inform me if the U & H magneto is made in any other form than the true high-tension type?
REPAIRMAN.

Boston, Mass., June 11.

The U & H magneto is made in two forms, single and double. Both are of the true high-tension type and the double instrument is practically two magnetos coupled tandem. It is designed to deliver two simultaneous sparks.

Q D Shoes on Clincher Rims.

(1606)—Is it possible to use quick detachable types of shoes on clincher rims? One party informs me that the Q D tire cannot be fitted because of the stiff bead. Another says that it can. Is it possible?
ARGUMENT.

Austin, Tex., June 19.

Q D tires are not designed for service on clincher rims, but may be fitted. It will require more or less muscle to force the bead over the rim and it is doubtful if one is warranted in trying the experiment owing to the trouble in replacing the shoe after a puncture, etc.

Adjusting Ford Steering Gear.

(1607)—I have an early model Ford car and after overhauling it find that I cannot turn the steering wheel to the left as far as to the right. This bothers me when turning around as the left wheel does not turn as much as the right. The arm carrying the ball joint of the rod connecting it with the steering arm on the wheel touches the right spring when moved to the extreme right position. What is the cause and how can it be fixed? The gear is a cup shaped bronze member in which fits half a gear.
PUZZLED.

Rockford, Ill., June 11.

Although the model of car was not mentioned it is presumed that the steering gear is of the worm and gear type, the ball end referred to being secured to the gear. The arm carrying the ball is too close to the spring, or in other words, the gear was replaced in the internal worm with the arm too far to the right. Remove the gear, rotate the steering column and remesh the gear until the arm is parallel with the side frame. It may be necessary to so mesh the gear that the arm will be a trifle to the left to obtain the desired equal movement in either direction.

MUDLARKS' ANNIVERSARY BANQUET.

Planning Reunion of Those Who Participated in New York-Pittsburg Run.

R. H. Johnston, New York manager of the White Company, is taking the initiative in organizing a reunion of all those who took part in the memorable New York-Pittsburg endurance contest in 1903. The 10th anniversary of the event will occur in October and it is planned to bring together at a banquet the entire number of those who participated under the title of Mudlarks.

The Mudlarks' mileage medal will be awarded to the one who travels the greatest distance to attend the banquet; the Mudlarks' musical medal to the one who composes the best song relating to the run, and the Mudlarks' mirthmaker medal will be given to the one who is voted to have told the best anecdote.

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The following Mudlarks are those who will serve on the committee of arrangements: H. W. Perry, Harry Unwin, John C. Wetmore, New York City; Howard G. Reynolds, John C. Kerrison, Boston; Webb Jay, Chicago; Windsor T. White, Frank B. Stearns, Cleveland; F. Ed. Spooner, Detroit.

A DAY IN THE COUNTRY.

Motoring in Westchester County, New York, in a 1913 Reo the Fifth.

Motorists in New York City are fast learning to appreciate the beauties of a drive through Westchester county in the spring and early summer. There are few sections in the immediate vicinity of the metropolis which offer such pleasant country drives. An accompanying illustration presents a party of women and children on a day's outing in a 1913 model Reo the Fifth, made by the Reo Motor Car Company, Lansing, Mich., and sold through R. M. Owen & Co., 19 West 62nd street, New York City.

The photograph from which this reproduction was made was taken early in June, when the dogwoods, oaks, maples and balsams of this region were at their best, and the party had little trouble in bringing back numerous souvenirs of the trip. It also indicates the possibilities for many a pleasant afternoon ramble through the country or into the woods, over little frequented roads.



Party of Women and Children Enjoying a Day in Westchester County with a Reo the Fifth.

LONG BRANCH SHOW.

Month of July to Be Devoted to Display in Ocean Park Casino.

A. D. V. Storey, general manager of the Ocean Park Casino, Long Branch, N. J., announces that an automobile and accessory show will be held in that building June 30-July 1. During the progress of the display it is planned to hold meetings of the Automobile Dealers & Garage Owners' Association of Monmouth county, the Automobile Owners' Association and chauffeurs organizations.

Mr. Storey has had several years' experience as general or publicity manager of trade shows and exhibitions in New York City and elsewhere, and he is confident that the proposed event will prove a success as well as a decidedly novel innovation in the way of an automobile display.

J. D. Fulrath, dealer at Savanna, Ill., for the Buick car, made by the Buick Motor Company, Flint, Mich., recently was told by a lawyer of that city that he would pay him $15 for a rush trip from Savanna to Morrison, Ill., a distance of 38 miles, and also $1 a minute for every minute he arrived before 10. The order was given at 8:30 in the morning and at 8:45 they were on the road. At 9:43 they arrived at the Morrison court house and Mr. Fulrath received $32 for the trip. The route was over hilly roads and the time made is considered a fine record for the Buick car.

Miss Adine Buck of Fort Worth, Tex., won the silver cup in a recent endurance contest of 108 miles. She had previously driven only 20 miles in a car and that on the morning of the race. The machine was a Detroiter, made by the Briggs-Detroiter Company, Detroit.

The National Old Trails Association, Kansas City, Mo., has issued a map and a booklet covering the association's proposed system of national highways. The project has been formulated in a bill introduced in Congress by Representatives Borland of Missouri and Francis of Ohio, calling for a yearly appropriation of $20,000,000.

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AN UNFORTUNATE BACKWARD STEP.

In view of the rapid extension of the good roads movement and the increased appropriations being devoted to this purpose in various sections of the country, it is somewhat surprising that the people of Rhode Island should have refused to authorize the bond issue for highway improvement. An analysis of the vote indicates that the cities, which derive no direct benefit from state highways, determined that the country towns should not profit in this manner.

The result is particularly unfortunate when taken in connection with the comment of the British engineers that the Rhode Island roads were the first they had seen which compared favorably with those in Great Britain, since it cannot help but mean that Rhode Island must suffer a relapse in the construction and maintenance of better ways. At the same time it indicates the necessity for a more systematic education of the people to the advantages of good roads.

There has been some suggestion that the voters took this means of entering a protest against the conduct of the state highway department in the past. There is reason for feeling that highway funds might be expended much more advantageously, and Rhode Island may or may not be different from other commonwealths in this respect. Obviously, if there is to be improvement in this regard, the proper remedy lies in eliminating the defects rather than in abandoning the proposition.

THE BRITISH ENGINEERS.

Now that the members of the Institution of Automobile Engineers of Great Britain have come and gone, the American motor car industry cannot help but be impressed with the ability of the men representing the United Kingdom on this trip. Many of them must be regarded as specialists in their particular lines. Each took keen interest in what was presented for their inspection while in this country.

The visit has been of decided value, not alone because American engineers and manufacturers have been able to learn something of the methods employed abroad, but because of the opportunity to become more intimately acquainted with the men who represent the industry in Great Britain.

Elsewhere is presented a somewhat novel statement coming from the chairman of the good roads board of the American Automobile Association, in which that official apparently takes definite issue not only with other interests in the industry, but with many students of economics with respect to the limitation of the weight of vehicles using the highways. The question is not one of the expense involved in the strengthening of bridges, but rather that of impeding progress, since it is recognized generally that the future wealth of the country is dependent in no small measure upon the extension of modern transportation methods. There are other factors involved, chief among which may be mentioned the expense to individual owners in changing vehicles already in use to conform to new regulations, and that of enforcing the proposed new law.

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NECESSARY QUALITIES IN LUBRICATING OILS.

(Extract from paper read by Harry Tipper before the midsummer meeting of the Society of Automobile Engineers.)

Lubrication, of course, has for its one general object the conservation of power, or to put it another way, the reduction of frictional waste. The amount of lubricating oil used in the running of any machinery is so small that it has probably been neglected in favor of operations which involve much larger sums in the aggregate. A little study of the losses due to friction which occur in the moving equipment of any plant is sufficient, however, to show the enormous possibilities for the conservation of power and the reduction of waste, which lie in the examination of the conditions affecting lubrication and the quality necessary to meet it.

The efficiency of lubricating oil depends largely upon its ability to maintain a film between the metal surfaces, the extent of fluid friction in the oil film itself as against the friction of metal surfaces, and the amount of oil which is required to maintain the conditions of lowest temperature between the moving surfaces, and as a consequence, the saving of power due to the less absorption of such power in overcoming the friction.

In practical use the oil must vary according to the speed, pressure and heat conditions in the equipment, the amount of moisture, the mechanical arrangements for oiling, together with the question of settlement and filtration. Innumerable modifications may be necessary in the grade of oil required; for instance, the question of dry and wet steam in the cylinders of a steam engine, superheated steam, character of circulating systems, the fit and finish of bearings, etc., all exercise a modifying influence upon the oils which can be used. The accuracy with which the mechanical conditions are determined and the extent to which the manufacturer and his engineering corps are experienced, in the consequent requirements of oils to meet such conditions, are the basis for the successful solution of lubricating problems.

Specifications.

The common method of specifying lubricating oil which has been in use for a great many years is to stipulate a certain gravity, flash, fire, viscosity and cold test, under the assumption, of course, that such limitations of the tests mentioned will have the effect of obliging the manufacturer to submit an oil which will do the work to the best advantage. A thorough examination of these tests, however, shows that they are not by any means conclusive of the value of an oil for lubricating purposes. In regard to some of them, the results are entirely misleading.

The reason, of course, is easily determined. Some 20 years ago when practically all the oil which was in general use for lubricating purposes was drawn from Pennsylvania and adjacent fields, and was composed of practically the same hydrocarbon compounds with the same arrangements and was refined under much the same conditions, it was possible to compare two lubricating oils produced under these conditions by the arbitrary tests mentioned above, which were used by the refiner for his own convenience in measuring the uniformity and character of his runs. But the situation is entirely different. The fields from which the oil was drawn principally in those days supply only a very small percentage of the oil which is used today. The newer fields do not always deliver crude oil of the same characteristics either in a chemical or a physical way, and as a consequence these arbitrary tests no longer answer the purpose, as the different chemical and physical construction of the oils is sufficient to make any comparison on the same basis impossible.

Gravity.

Taking these tests in detail, let us examine the question of gravity in respect of the present day conditions. Gravity is simply the weight of the liquid in terms of weight of water. On the Baume scale, which is the scale in practically universal use in the oil business, the gravity is expressed in arbitrary figures, with the lowest number on the scale representing water and the numbers increasing as the liquid becomes lighter in weight. Gravity was first introduced in lubricating oil specifications because in comparing oils made from the character of crude which was used at the time, it bore a relation to the viscosity or body of the oil. This is not true, however, of some of the other crudes which are now supplying a considerable proportion of the lubricating oil used, as in some of these crudes the viscosity or body may change from 200 seconds to 2000 seconds, while the gravity reading will remain the same. I have lately seen a sample of a crude oil which was heavier than most of the crude oil found and possessed at the same time no viscosity greater than water.

Further, gravity bears no relation to viscosity whatever when comparing lubricating oil made from two different crudes. In one case a 28 to 30 gravity oil may run 180 to 200 viscosity, and in another case the same viscosity may be secured with a reading of 19 on the Baume scale. The gravity reading is practically of no value to anybody but the refiner, who can and must use it in comparing the uniformity of his runs from the same crude. It has been proved through the gasolines, naphthas and burning oils that it has no relation to their value for use, and in the last two or three years the same feature has been thoroughly investigated and proved in respect to lubricating oils.

Flash and Fire.

The flash and fire tests are represented respectively by the temperature at which oil, being heated at a standard rate, with a standard flame, passed over it at a standard distance, will show a flash or flame from the gases arising from its surface, and the point at which the oil under the same conditions begins to burn. From the standpoint of lubrication the only bearing which the flash and fire tests have upon the oil under service is to insure against the presence of volatile constituents which might begin to vaporize at the temperatures reached in ordinary work.

Viscosity.

The viscosity test is represented by the length of time which is required for a specified quantity of the material to pass through a specified orifice at certain temperatures, and the viscosity reading is always expressed as the number of seconds it takes the above-named conditions to be fulfilled. The viscosity of an oil has a considerable bearing upon its value for lubricating purposes, as it determines the speed of flow of the oil under certain temperature conditions, and it is obvious that the rate of flow of the oil is of great importance in considering conditions of pressure and speed in connection with all ordinary lubricating work.

The trouble with the viscosity specification as it is used at present arises from the fact that the viscosity depends upon the temperature at which the oil will work, and if this temperature varies considerably from the standard temperatures at which the tests are usually made, there will necessarily be a great deal of difference in the usual working of the oil under the practical conditions involved. Furthermore, the variations in viscosity of lubricating oils made from different crudes are not the same for different temperature conditions. Finally, the viscosity of lubricating oils made from different crudes does not by any means indicate the fluid friction which is set up internally in the use of the material. In oils made from some crudes the characteristics of the oil change with the viscosity, whereas in oils made from other crudes the viscosity alone can be changed without affecting the other characteristics as shown in tests.

Cold Test.

The cold test is of importance as demonstrating the ability of lubricating oil to remain fluid under conditions of exposure to low temperatures. Its value, however, depends entirely upon the work to which the oil is to be put. The cold test is sometimes made by reducing the temperature of the oil and taking the point at which it becomes cloudy; again by reducing the temperature and taking the point at which it refuses to pour out of a standard orifice in a standard quantity. The cold test is a question of the ability of the lubricating oil to meet the practical requirements of the working conditions, and it is evident, therefore, that an oil which will flow at a point in temperature as nearly as possible the minimum temperature experienced in actual conditions of use will be most valuable for the purpose.

The point, however, which should be noted in connection with all these tests on specification for oils is that they do not demonstrate the value of the oil under practical conditions, and merely put a limit upon the competition which can be secured or upon the amount of oil which can be drawn from for use, without in any way furthering the value or advantage. To put this matter

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concretely, engine oils manufactured from different crudes show the following variations in the characteristics:

Gravity	19° to 31°
Flash	320° to 400°
Fire	370° to 450°
Cold	0° to 30°
Viscosity (on Saybolt instrument)	120° to 750°

Or higher at 100° Fahrenheit.

Within this range of characteristics oil suitable for all classes of engines can be picked out, and the question of their suitability would not depend upon the particular tests displayed by the oil. Two oils answering the same laboratory tests might show entirely different results in actual work, due to difference in the methods of manufacture not appreciable in a laboratory inspection; one would lubricate and the other would not.

Requirements.

Inasmuch as the arbitrary tests to determine the physical characteristics of the oil do not illuminate its value for any particular purpose, let us consider what the oil should do. In order to bring this directly to the point of greatest interest to the society, that is, the lubrication of the motor of automobiles, let me suggest the requirements which a lubricant for this purpose should meet:

1. The oil should posses a sufficient body to keep the bearing surfaces apart at the temperature at which the bearings run.
2. It should possess such qualities as will reduce the friction to a minimum.
3. The flash point should be sufficiently high to insure against the presence of volatile constituents.
4. It should remain fluid at such low temperatures as will be met in service conditions.
5. It should have no tendency to decompose or to form such deposits as will gum up the machine and increase the friction, where the object is to decrease it.
6. It should contain no ingredients which will corrode or pit the metal.

In considering the qualifications to be added to these general requirements in order to define application to the mechanical conditions of cylinder lubrication, it is necessary to consider the questions involved in the operation of an internal combustion engine, which are different from those of any other type. What I have to say now may appear very elementary from a mechanical standpoint, but unless it is mentioned, the important bearing which it has upon lubrication will not be as obvious as I want to make it.

After a charge has been taken into the cylinder on the suction stroke it is compressed to from 50 to 75 pounds before being fired. Naturally upon the starting of the compression stroke there is a tendency for the gasoline mixture to leak. There are two ways of obviating this difficulty, of securing full compression. These two ways might be stated as mechanically secured compression, formed by the close fit between the piston or piston rings and the cylinder wall; or compression secured by liquid seal, which means the use of an easy clearance between the piston rings and the cylinder wall and the sealing of the space between them by the use of a proper kind of lubricating oil. In respect to the mechanically secured compression the following points are worth noting as axioms which must be taken into consideration in estimating the conditions:

1. The closer the fit, that is, the less the clearance between the piston and cylinder walls, the more the power absorbed in turning the engine over. In fact, it is possible to secure perfect compression in this way only by securing so tight a fit that the mechanism will not turn. Even in practise good compression can be secured only at the sacrifice of some of the effective power.
2. The closer the mechanical fit between piston and cylinder walls the thinner a lubricating oil which will work its way between them. The thinner the lubricating oil the greater will be the wear and tear, because of the impossibility of keeping the metal surfaces apart where the clearances are so small and the lubricant must be such a slight film.

With these conditions, when wear and tear has once begun, every stroke of the engine increases the loss of compression, the consumption of lubricating oil, the consumption of gasoline, in proportion to the amount of power, and, in fact, decreases continually the efficiency of the motor. You will readily see the impossibility of securing and maintaining maximum efficiency under the conditions.

The motor after leaving the factory is run at great variations of speed and considerable variation of load. These variations are quite rapid and frequent. On account of the mechanical conditions of the motor you have recommended a very thin, light lubricating oil for the motor, under the guarantee. This lubricating oil has no particular adhesiveness and will flow as readily from the cylinder wall as to it. Consequently, during the rapid and frequent variations of speed, cylinder walls are sometimes overburdened with oil and sometimes practically dry, making wear and tear excessive and naturally resulting in a very rapid increase in the space between the piston and cylinder wall. This wear and tear is not thoroughly even; the clearance is larger in some places than in others. Then the lubricating oil flows freely up and down the walls of the cylinder and there is never any time when just the proper amount of oil is on the cylinder wall. The oil is so thin that it cannot be held in the increased space, consequently on the compression stroke the gasoline mixture escapes past the piston, destroying the lubricating oil in the crankcase, and reducing from 15 to 30 per cent. the power which should be secured from the gasoline.

You have seen from time to time in your experience with races, racing motors, etc., that after a three or four hours' run the oil in the crankcase has had to be dumped because it was so light in body as to be like water. I have heard some drivers, and also some engineers, thoroughly well acquainted with the motor, try to explain this fact by saying that the oil decomposed. Such a thing is, however, unknown in the oil business. In all other cases of the use of petroleum oils for lubricating, length of use only makes the oil a little heavier and a little darker in color. In no case has it ever been found possible to use an oil for lubricating purposes and secure a lighter product. This can be done by admixture only.

Carbonization.

Further, the condition under discussion is responsible largely for the carbon which is so constantly being experienced on account of the fact that the oil, being very light in body and free-flowing, is drawn up during the suction stroke into the compression chamber and onto the piston head, where it is distilled, leaving a coke baked on the piston head to the first ring, upon the valves, etc.

Consider, instead of the mechanically secured compression used in connection with thin oil, compression which depends upon the use of lubricating oil, the clearances being larger. From the standpoint of the mechanical efficiency of any power generator, and, in fact, any moving equipment, the best fit—that is, the mechanical fit which absorbs the least amount of power due to friction in the power generator itself—is an easy sliding fit. If dependence is to be laid, however, upon the metal and not upon the lubricating oil to maintain compression, this easy sliding fit is too loose to give the compression required. If, however, it is intended to secure the compression by the liquid seal of the lubricant, then an easy sliding fit can be given to the motor, a sufficiently heavy-bodied oil used for lubricating with the result that the metal surfaces can be kept apart, the compression can be maintained so that there will be practically no change in the lubricating oil in the crankcase and only the ordinary wear and tear on a properly lubricated surface will take place, which wear and tear is infinitely slower than the wear and tear which usually occurs under the conditions previously mentioned.

In working out lubricating oils for automobile engines we are using today oil of 200, 300, 500 and 750 viscosity; the oil of 200 seconds viscosity being used entirely for those motors which are being made with clearances too small to permit of the oil of the proper body being used. Thousands of tests by private owners, which, while they may not be accurate, indicate the general result that in practise by the use of these heavier oils they have secured from 10 per cent. to 20 per cent. and in some cases over 30 per cent. more power from the fuel, owing to the saving of any loss on the compression stroke. On this account they have also used less lubricating oil, due to the fact that there is no admixture of gasoline, deterioration consequently being very slow. There is also less wear and tear on the cylinders and practically no trouble from carbon.

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INFLUENCE OF SALES DEPARTMENT UPON DESIGN.

(Extract from paper read by F. E. Moskovics before the midsummer meeting of the Society of Automobile Engineers.)

A few years ago the design of motor cars was practically dictated by the sales department, the engineering department being merely a way station to put the views of the sales department into such technical form as would enable the factory to manufacture a car therefrom. This was due chiefly to the embryonic condition of the industry and also to the fact that substantially all the real executives and heads of factories were themselves salesmen, as well as to the fact that there was no intelligent public demand. The motor car was new; the man in the street did not know what he wanted; horsepower varied from four to 120; gearboxes from belt to direct drive. Technical knowledge was as yet unmated with experience—so, naturally, the views and influence of the sales department were dominant and supreme.

Then, a few cars appeared, which due to their great mechanical advances, made a profound impression on the public. The design of these cars was actuated solely and purely by experience; the result was Renault, with light weight and shaft drive; Mercedes, with selective transmission, mechanical valves, cellular radiator, etc. Coincident with the arrival of these cars appeared the awakening of public demand, and, whereas the early engineer taught the public what it ought to have, today the public is surely telling the engineer and manufacturer what it wishes to have, in no silent voice.

About this time the influence of the sales department in the matter of design began to wane a little, in a large degree from the fact that any car on four wheels would sell. It was not so much a matter of which car was best, as what car could be delivered. Now, if we can assume that the day has passed when a customer considers himself fortunate if he can obtain an early delivery; if we take for granted the absolute necessity for stronger basic work (sound financing, good engineering, efficient production and economic and effective selling); if we can thoroughly grasp the why and wherefore of interdepartment economies, and the need of inter-departmental co-operation, and, with these things in mind, grant the advantages that may be attained, we can approach the subject of this paper from a more intelligent angle.

Co-Operation.

In many organizations the sales department wears a halo unwarranted by facts and bad in principle. This is due to many causes, the main one being that it actually brings in the dollars; it is apparently the department that creates the much sought dividends. Besides it is the department that comes into contact and mixes with the outside world to the greatest extent. It is, or should be, better fitted to tell of its own importance and greatness than any other arm of the business; its business is the art of selling, and it can, or should be able to, sell itself as well as it praises and sells the product at its disposal. In other words, the sales department is the mouthpiece of the organization, the real point of contact between that final judge, the ultimate consumer, and the factory. Naturally, this condition ofttimes becomes galling, especially to one so little given to the study of environment as the average motor car engineer. The result is lack of regard for the ideas, views and opinions of one department for the other. Of course, no lasting benefit can come from such a relationship. Each department has its functions; each is all-important to the success of the other. Healthy and deep respect for each other's views in everything that pertains to the welfare of the organization as a whole is requisite to permanent success.

In the past the average sales department has had little real knowledge of the art of motor car building what it gleaned was of a purely superficial and perfunctory character, usually limited to parrot-like repetition of a few technical platitudes called for want of a better name "talking points." No systematic attempt was made to thoroughly ground the salesman in the rudiments of the profession, nor did he, for lack of initiative and time, obtain the information on his own account. How few salesmen of even today have a real general knowledge of the basic facts of the business! They have been, and to some extent are still chosen for their appearance, glibness of tongue, and personality, rather than with due regard to the adaptability to learn, digest and transmit knowledge in a clean-cut manner.

The day is, however, rapidly approaching, if indeed it is not already upon us, when motor cars must be sold and not bought. The buying public become car-wise and knowing what it wants has little respect for or patience with the man who cannot explain in a clear, concise and logical manner the different points of a car that may come up for discussion. The man buying his second or third car has well defined ideas of his own, and cannot be talked into an unwise investment, nor influenced by mere talking points. The points must be real points, and be well presented. The public craves information in a rational form. The time has passed when anything less will do. This is a day of facts, not fancies. The merely magnetic talker has seen his day.

A Proposed Solution.

Could the engineer have at his disposal the concrete views of a trained body of men; could these views be presented to him in time to reasonably allow him to get up new designs; could he be placed automatically in closer contact with the user of his car, is it not evident at a glance that enormous benefits and economies would result? It is clear that the economies so necessary to success in the industry today will not allow an organization to have a specially trained corps of men for this work.

Where then should the engineering department get its closer contact with the public? Analysis points plainly to the fact that it is through the sales department. Moreover, the bringing of these departments into closer working relation should serve to raise the sales department to a higher standard of knowledge of its own products as well as of those of its competitors, thus enabling it to become more efficient in its own field and more capable of placing intelligently before the engineering department its views of future necessities of design, including comparison of the products of the particular organization and of competitors in actual service. In addition the sales department should grasp more understandingly the large problems of the production department, deterring it from making suggestions which on their face are out of accord with the policies or possibilities of the organization.

Summed up the problem has two aspects: First, in the majority of instances there are entirely insufficient points of contact between the sales department and the engineering department; second, there are insufficient points of contact between the engineering department and the ultimate user of its product.

How, then, to cure these apparent defects? Surely, an annual meeting where all the salesmen are brought together in a joy feast is not the place; the chief engineer, let us say, addresses the body; as a whole, the members are known to be gathered merely for the purpose of mutual admiration. The average house organ is not the medium, because truths are not told there; the house organ is usually a means of self-praise rather than self-analysis.

In this paper no consideration is given to the chief executive or the general manager as a factor for the reason that its object is to suggest an automatic means of communication of thoughts and ideas between the two arms of the business, and naturally the supposed superior knowledge of the head of the organization will be superimposed on the hoped-for result of the closer union of these two departments. As there appears to be at present no definite channel through which the two departments can come more closely together, the writer suggests:

First—A weekly engineering bulletin, edited by the chief engineer, taking up in groups the different parts of the vehicle, preferably employing the same nomenclature the factory has given to the various parts; appending the part or piece numbers in question (this will familiarize the salesman with part numbers).

Pains should be taken that the bulletin be free from abstruse technical terms and data which might not be easily digested. Care should be taken to inquire whether the salesmen can read simple blueprints; if so, diagrams explaining the theory of the various points should be furnished. The salesman would thus obtain a direct knowledge of the product which he could gain in no other way. In each bulletin a personal appeal should be made to the salesman that he request any information on any point

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that he does not understand thoroughly, and a further explanation should be cheerfully and gladly given to him. The chief of his department should constantly urge him to correspond directly with the chief engineer on these points, and it should be strongly impressed on his mind that it is no disgrace to come back and say that he does not understand the topic discussed in a certain bulletin. In fact, the writer should urge that upon publication of the bulletin it become mandatory on the part of the salesman to express weekly his view on the topic described.

Is it not patent that a sales organization understanding thoroughly the car in the manner which the bulletin indicated would bring about, would be of great assistance to the engineering department, and that its value to the general organization would be increased enormously not only by reason of the efficiency of the salesmen, but because of its role as the eye of the organization?

Would not the engineer, when the time came to consider the views of the sales department, feel greater confidence in the ideas and opinions of an organization which he had reason to believe had at least a thorough knowledge of his product, than under the existing conditions? Few companies are so strongly entrenched that they can disregard arbitrarily the demands of such a sales department. Certain firms assume the attitude that a given mechanical theory is correct simply because they have adopted it, but even they, if they are far-seeing, know the day is coming when a just retribution may overtake them.

The sales department should have a voice and influence in the design of the car, but must first be so schooled and trained that it will harmonize with the organization rather than be a discordant note.

With regard to my second suggestion, contact between the engineer and the owner, the problem is somewhat more simple. The appended form could be sent to every agent and distributor of the factory, with positive instructions that it must be filled out every 60 days. This would give the engineer first hand information as to exactly how the product is being received. It would enable him to eliminate apparent defects due to local conditions. Let us assume that from the replies it becomes evident that there is considerable noise in the shifting of gears. It is not supposed that the average agent will be able to analyze the clutch problem, that he can tell whether the clutch is too heavy or the gear ratios incorrect. That, of course, remains for the engineer to diagnose. But the replies will place in your hands, without delay, troubles resultant upon design or manufacturing defects. Again, let us assume that the gasoline and oil consumption are very high, much higher than you know should be the case; the service department will instantly get into communication with the dealer and help him to alleviate the condition.

Of course, the theories advanced here, like all theories, are useless, if not used. The object of this article is to point out a means whereby the influence of the sales department on the engineering department can be brought to a stage of intelligent co-operation.

FORM.

For the Confidential Use of the Engineering Department.

It is highly important for your own benefit as well as ours that you give us the following information as accurately as possible. It is our endeavor to make our cars meet the severest general requirements and only by a definite, direct and accurate knowledge of how they act under widely varying conditions can we hope to accomplish this. Please be guided accordingly.

Date:
Agent's name:
Territory covered:
How many of our cars are in operation in your territory?
What is mean altitude of territory covered by you?
What is general topography of territory covered by you? Mountainous, hilly, level.
Are road conditions good?
If not, please briefly state conditions and about what proportion of roads are macadamized, etc.
What is maximum average temperature?
What is minimum average temperature?
1. Does our line have power enough for your customers. If not, what would you suggest?
2. Is our motor quiet enough for your clientele?
3. Is our line flexible enough?
4. Do our motors accelerate rapidly enough?
5. How do we compare with competitors in our class? Please state which competitors, if any, surpass us?
6. Is the fuel consumption (both oil and gasoline) satisfactory? Please state your experience generally.
7. Are our gears quiet enough for your clients? If not, please state which are noisy.
8. Is the clutch action satisfactory, both as to engagement and holding?
9. Does our spring suspension meet with general approval?
10. Is our steering gear meeting all requirements?
11. Are our gear ratios correct for your territory?
12. Have you heard any criticism of our upholstery, either in material or workmanship?
13. Have you heard any complaint on the accessories we use? If so, please particularize.
14. Have you had any trouble reported on the bearings we use?
15. Is our rear axle construction meeting the requirements of your trade?
16. Please state any general criticism on appearance or general design you may have encountered.

This information is so important to us that we urge it be made out under the direct supervision and be signed by the head of your organization. It will materially help us build better cars.

INNER TUBE BAGS.

Chas. E. Miller Calls Attention to Desirability of Their Use.

"After all, it is the attention to little details that counts in touring," says Chas. E. Miller, the New York City automobile supply dealer. "Notwithstanding the use of the demountable rim and the carrying of already inflated complete tires on these rims, it is still necessary to carry extra inner tubes, and the old idea of tying them up with a string and throwing them in loosely with a lot of tools and oil cans in a tool box no longer prevails.

"And why should it, when, for a nominal charge one can secure a real inner tube bag made of heavy napped cloth and mailed free to any part of the United States? Such a bag will keep the tubes free from grit and dirt and from scratching and chafing while in the tool tox or luggage carrier. The bag will hold a five-inch tube or smaller, but in ordering it is just as well to get the right size."

The Joseph Dixon Crucible Company. Jersey City, N. J., has published a booklet entitled "Graphite for the Boiler." This booklet deals with no new discovery, for graphite has been used to remove scale from boilers and collections in motors, etc. No startling claims are set forth, but a simple statement relative to the product and its use is made. The Joseph Dixon Crucible Company is the oldest and largest maker of graphite and graphite products in the world and it guarantees all of its various manufactures.

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ITINERARY IS DECIDED UPON.

Indiana Automobile Manufacturers' Association Pick Route to Coast.

The tour committee of the Indiana Automobile Manufacturers' Association has announced the itinerary for the transcontinental tour of that association, which is scheduled to start from Indianapolis, July 1. The route was compiled by the following: W. McK. White, tour chairman; W. D. Edenburn, assistant chairman, and J. M. Ward, Jr., secretary of the association. It will visit eight states and take the tourists through a section of the country which has shown enormous interest in the event. The itinerary follows:

Indianapolis to	Miles*
July 1, Terre Haute, Ind.	70.4
July 2, Springfield, Ill.	149.5
July 3, St. Louis, Mo.	116.7
July 4, Columbia, Mo.	140.7



Map Indicating Itinerary Selected for Transcontinental Tour of Indiana Automobile Manufacturers' Association.

July 5, Kansas City, Mo.	159.2
July 6, in Kansas City.	
July 7, Fort Riley, Kan.	156.6
July 8, Ellis, Kan.	177.9
July 9, Burlington, Kan.	169.8
July 10, Colorado Springs, Col.	166.7
July 11, Denver, Col.	69.2
July 12, in Denver.	
July 13, Hot Springs, Col.	89.8
July 14, Glenwood Springs, Col.	104.2
July 15, Grand Junction, Col.	104.5
July 16, Woodside, Utah	172.0
July 17, Salt Lake City, Utah	175.0
July 18, in Salt Lake City.	
July 19, side trip to Ogden, Utah	74.4
July 20, Kearney's Ranch, Utah	146.8
July 21, Ely, Nev.	124.3
July 22, Tonopah, Nev.	147.3
July 23, Bishop, Cal.	....
July 24, Reno, Nev.	179.0
July 25, Sacramento, Cal.	165.8
July 26, Oakland, Cal.	130.7
July 27, ferry to San Francisco, Cal.	6.0
July 28 and 29, in San Francisco.	
July 30, De Monte, Cal.	141.0
July 31, San Luis Obispo, Cal.	149.9
Aug. 1, Santa Barbara, Cal.	119.6
Aug. 2, Los Angeles, Cal.	105.8

*Mileages are approximate.

The following cars have been entered:

No	Car	Entrant
1	American	American Motors Co.
2	American	D. S. Menasco
3	Henderson	Henderson Motor Car Co.
4	Henderson	R. P. Henderson
5	Stutz	**Ideal Motor Car Co.**
6	Stutz	**Harry Stutz**
7	Marion	Marion Motor Car Co.
8	Marion	Marion Motor Car Co.
9	Marion	J. I. Handley
10	Premier	Premier Motor Mfg. Co.
11	Premier	H. O. Smith
12	Haynes	Haynes Automobile Co.
13	Haynes	Haynes Automobile Co.
14	Pathfinder	Motor Car Mfg. Co.
*15	Premier	G & J Tire Co.
16	McFarlan	McFarlan Motor Car Co.

*Truck.

The head of the shipping department of the Canadian factory of the Ford Motor Company, Ford City, Ont., maker of Ford cars, has troubles occasionally in locating towns for shipment of cars, because they are not upon the maps, nor in the postal guides. This is because of the suddenness with which towns spring up over night in the Canadian Northwest and the only way in which the difficulty is overcome is by having the postoffice department locate the places.

The non-stop reliability automobile run from Chicago to Boston, scheduled to start June 25, was postponed at a meeting of the contest committee of the Chicago Automobile Club. Assurances that the A. A. A. is preparing to formulate stock car rules caused the club officials to let the run go over until October.

There is much agitation in Detroit as to the advisability of inaugurating a strictly dealers' show in the summer. This will probably be held something on the order of the furniture dealers' show given annually at Grand Rapids, Mich.

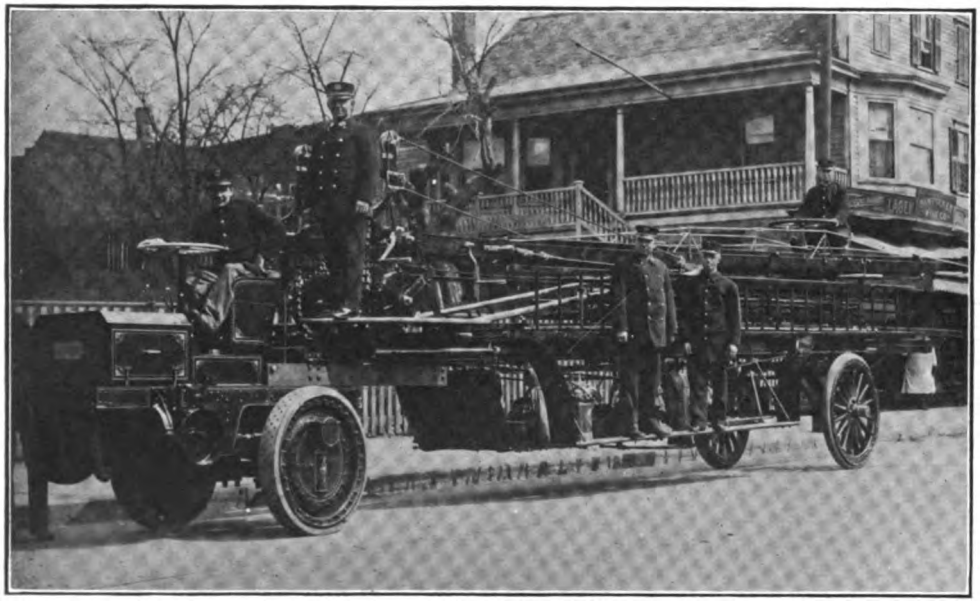
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IN THE COMMERCIAL VEHICLE FIELD.

Constructional Features of Christie Front-Drive Tractor Adopted by Fire Department in Pawtucket, R. I.—Description of New Willet Two-Ton Wagon.

FOLLOWING its announced plan to eliminate horses in the fire department as rapidly as possible, Pawtucket, R. I., has installed a 90 horsepower Christie front-drive tractor on the hook and ladder truck located at the central station. The tractor is the same in design as those which have been placed with the departments in New York City, Pittsburg and other cities, but is understood to be the first to be located in New England.

It will be remembered that Walter Christie has been an earnest exponent of the front-drive principle for a number of years, having built and driven racing machines of this type in several well known contests. Recently, Barney Oldfield, at the wheel of one of the Christie front-drive cars, covered a mile on the new Bakersfield mile dirt track in California in 0:46.5. Pending the receipt of further information concerning the timing device used, the contest board of the American Automobile Association has declined to accept the mark, but on the face of the returns it is a new world's record.



Christie Front-Drive Tractor Installed with Pawtucket's Hook and Ladder Truck.

The Christie tractor is made by the Front-Drive Motor Company, Hoboken, N. J., and does not resemble the racing machines in construction. The two disc wheels are supported by a heavy dead axle on which they revolve. Above this is the live or counter axle, which is in reality a jackshaft. This jackshaft is fitted with a heavy spur gear differential and with universal joints at either end which have a wide radius of movement. The pinions mesh with internal gears contained within the wheel housings, and power is transmitted through a gearset of the progressive type giving two speeds forward and reverse, and by chain from the transmission shaft to the jackshaft, there being no change whatever in the relation of the engine shaft and jackshaft. The power plant is located well forward of the axle, and is mounted transversely of the frame.

The universal joints in the jackshaft and the knuckles and wheel pivots of the dead axle permit of a 30-degree movement of the wheels by means of the steering wheel, this being the usual allowance for turning. There is a turntable on which the tractor is swung by a worm gear driven direct from the transmission gearset case, this being operated by a movement of the same lever that changes the speed ratios, and by this the turntable may be moved 60 degrees more. This is made with a frame that is rigidly bolted to the forward end of the truck, giving a slightly longer wheelbase than when it was utilized with horses, this now being practically 26 feet. Of course the rear wheels are steered by tiller as with the ordinary vehicle of this type, and the driver must govern his turning not only to accommodate the long wheelbase, but some 12 feet of overhang on the ladders. Pawtucket is one of those old time New England cities in which there are sufficient

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crooked streets to make necessary a large number of sharp turns in answering almost any alarm. Thus far the driver of the new truck says he has



KisselKar Combination at Work at Street Sprinkler.

experienced no more trouble than with the horse drawn vehicle.

NEW STREET CLEANING MACHINE.

Combined Flusher and Sprinkler Produced by Kissel Motor Car Company.

Accompanying illustrations present the new patent combination uniform pressure street flusher and sprinkler recently placed in the market by the Kissel Motor Car Company, Hartford, Wis., maker of KisselKar pleasure and commercial vehicles. The design is such that it is expected to afford a satisfactory means for cleansing city pavements. The flushing and sprinkling mechanism is operated by hand levers under the driver's control, and so arranged that it can be changed from one to the other in an instant.

The chassis is that of a regulation KisselKar three-ton truck, fitted with a 1000-gallon galvanized steel tank. Pressure is produced by taking the water by gravity from the bottom of the tank into a two-stage centrifugal pump directly connected to the motor, and it is maintained that this may be from 20 to 60 pounds, according to the speed of the engine. The water is then forced into distributing pipes and out through adjustable nozzles for flushing and through two pipes to sprinkling attachments of the vehicle type. It is claimed that the same pressure can be maintained when the tank is partially full as when entirely filled, making it possible to secure the benefit of all the water contained in the tank.

The sprinklers are so arranged that they will sprinkle the full width of a 60-foot street from curb to curb, or they can be closed down to accommodate 20, 30, 40 or 50-foot streets at will. They will sprinkle both sides at once or either side separately, making it possible to operate the machine successfully where the traffic is heavy. One tank of water will sprinkle seven to eight blocks of 50-foot roadway, or will flush a distance of 3.5 blocks.

WHITE IN LUMBER HAULAGE.

Unusual Service Rendered by Five-Ton Vehicle in the Ohio Woods.

An interesting example of efficiency in the use of a motor vehicle under unusual conditions is to be found in the service of a five-ton White truck, made by the White Company, Cleveland, O., with Theodor Kundtz, who conducts a lumbering business in the woods in the southern part of Cuyahoga county, that state, near the Breckville station. The work differs somewhat from ordinary lumbering, as it is his policy to select only the trees that will yield the class of timber desired and haul the logs to the railroad station.

The engineering department of the White Company assisted Mr. Kundtz in solving the problem, after obtaining from him detailed information as to what was desired. The five-ton chassis was utilized, but instead of the regular four-cylinder motor a six was employed. Special axles were built as well as special wheels, both front and rear. The front members were of the standard White cast steel construction, but



Indicating Value of KisselKar Flushing Apparatus.

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White Five-Ton Truck with Special Equipment Engaged in Lumber Haulage in Ohio Woods.

fitted with steel tires having a centre flange to prevent side slip. The rear wheels were the regulation tractor type with 22-inch steel rims and round steel spokes mounted at either side of the hub. In the centre of the outer surface was fitted a ring of steel and from this at an angle of perhaps 20 degrees flat cleats extended to the edge of the rim, stiffening the construction and insuring traction on any surface.

The truck is fitted with a power winch that is driven off the transmission gearset shaft, this being installed transversely and operated with a hand lever. With this winch it has been found possible to load 1000 feet of timber in 20 minutes. It will be understood that many times it is impossible to drive the truck directly to the point where the tree has been felled, and the winch also is employed to bring the logs to the vehicle.

Hauling from five to six tons at a load the truck makes trips between the forest and the Breckville station, a distance of about six miles. Upon arrival at the station it is possible either to pile the logs beside the track or load them directly upon the cars. After a year's service in all conditions of weather and surface the machine has been found equal to expectations in every way.

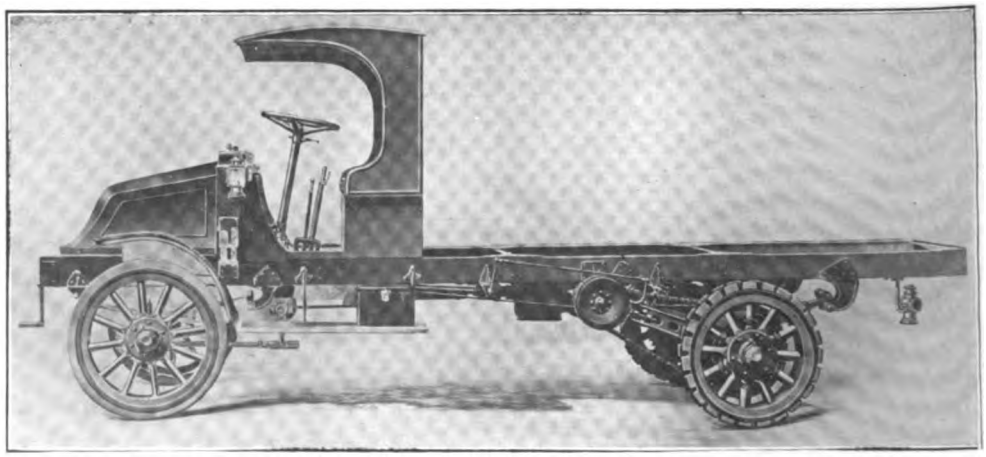
WILLET TWO-TON MODEL.

New Design of Delivery Wagon Utilizing Motor of Two-Cycle Type.

Announcement is made by the Willet Engine & Truck Company, Buffalo, N. Y., of a new two-ton chassis, which is the first of a series of sizes it is to produce. A feature of the construction is the use of a two-cycle motor which is novel in design and which has been patented and is the exclusive property of this concern.

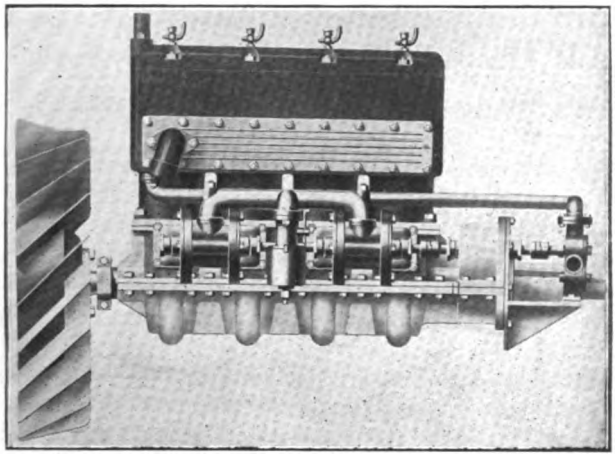
This motor differs from conventional two-cycle engines in that rotary intake valves are employed, it being maintained that these are self-grinding and self-adjusting, thereby requiring practically no attention. The cylinders are cast en bloc, with the head of the block cast separate, this being cored for a liberal water space. The head of the water jacket is a plate that is slightly crowned and it is retained by a series of cap screws. There is a single outlet at the extreme rear of the block. The engine base is in three sections, the upper and lower halves and an extension that covers the forward end of the crankshaft and forms a cover for the timing gears. In the upper section are large plates covering handholes through which the main and crankpin bearings may be examined or adjusted. The lower section is formed to have four transverse channels or pits into which the big ends of the connecting rods swing and which take the drainage of lubricant from the interior of the engine case.

The bore is 4.5 inches and the stroke five, giving a rating of 32.4 horsepower under the S. A. E.



Chassis of Willet Two-Ton Delivery Wagon, Indicating Design and Arrangement of Components.

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Right Side of Willet Engine, Showing Mechanism of Rotary Valves.

formula for a four-cycle engine, and if the usual 50 per cent. is added to this it will be seen that the maker's rating of 32 horsepower is very conservative. Lubrication is by feeding the oil in the fuel in the proportions of one pint to five gallons of gasoline. The carburetor has a fixed adjustment. Ignition is by an Eisemann high-tension magneto. The radiator is of the flat tube type, mounted on springs on the main frame in front of the dash, following the so-called foreign design.

The clutch is a leather faced cone with a series of flat springs beneath the facing to insure ease in engagement. The transmission is of the selective type, assembled as a unit with the jackshaft, and has three forward speeds and reverse. The drive from the jackshaft is by side chains. Springs are semi-elliptic all around. The service brake is on the jackshaft and the emergency on the rear wheel drums. Wheels are of wood, artillery type, these being shod with 36 by four-inch single tires in front and 36 by 3.5 dual in the rear. The driver is located at the left with the control levers in the centre. The wheelbase is 144 inches, regular, or 168, special.

BUICK WINS ABROAD.

American Machine Finishes in First Place in Two Important Events.

Word recently reached this country that two model 25 Buick cars, made by the Buick Motor Company, Flint, Mich., finished in first and second place in the annual Oranias circuit race in Oran, Algeria. The entries included five cars of French make, two Belgian and two other American. The winning Buick made an average speed of 61 kilometers, equivalent to 31 miles an hour.

It also is announced that a Buick, entered in competition with several machines of foreign make, won in a recent contest at La Sarthe, France, finishing at an average speed of 65 miles an hour.

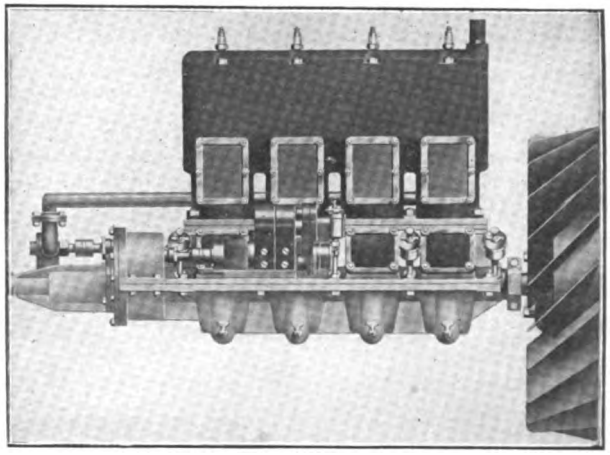
NOVEL BRIDGE CONSTRUCTION.

New Mexico Provides Road That Cannot Be Used for Horse Drawn Vehicles.

Between the towns of Roswell and Vaughn, New Mexico, there is an automobile road with bridges of unique design. The road runs through stretches of almost impassable sand and despite the fee of five cents a mile it is very popular with motorists. The peculiar feature of the route lies in the bridges, which can be used only for automobiles.

These consist of two wooden troughs placed 56 inches apart, and as they are not connected with cross boards, the middle of the bridge is open for its entire length and horse drawn vehicles cannot pass over. Each trough has protecting sideboards, so that the cars cannot leave the track and slide into the ravine. It is a popular road for motorists when touring the southwest.

The Chicago Motor Club is preparing to erect at a cost of $500,000 a new seven-story structure, containing both hotel and club facilities. The plans provide for a hotel of about 250 apartments, a thoroughly equipped club house and a garage capable of holding at least 150 machines. Members of the club will be given special rates in the hotel, although the renting of rooms will not be restricted exclusively to the club membership.



Left Side of Willet Two-Cycle Motor Used in Willet Two-Ton Vehicles.

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MOTORING LAWS AND THEIR ENFORCEMENT.

Mississippi Supreme Court Declares Statute Is Unconstitutional—Automobile Legal Association Takes Stand Against Reckless Driving—Other Legislative News.

UNDOUBTEDLY one of the most important decisions with reference to the motoring laws of any state is that handed down recently by the supreme court of Mississippi. This action was brought against H. C. Lawrence of Jackson soon after the Mississippi law became effective, June 1, 1912, and was largely in the nature of a test case. The local courts held in favor of the statute, but the highest court of the state takes the opposite view, declaring the law unconstitutional, void and of no effect. In his opinion, Chief Justice Smith stated:

While there is no doubt of the police power of the legislature and of its authority to pass suitable laws governing the operation, the numbering and registration of the machines, it is apparent that the registration fee is excessive and out of proportion to the actual cost of operation of the law. It develops, on inquiry, that the actual cost of numbering and registering these cars, issuing licenses and other routine work connected with the enforcement of the act, is not over $1 a car. The license fee is graduated from $5 to $25, where $5 might seem a reasonable registration fee on a straight basis.

As a result of the decision the state auditor is required to return to automobile owners some $28,115 which has been collected in registration fees since the law went into effect. But here arises another difficulty, since the constitution provides that the state auditor shall pay out no money except upon authorization of the legislature. The legislature provided for the collection of the fees, but of course, made no provision for their return.

TO HELP ENFORCE LAWS.

Automobile Legal Association Takes Determined Stand on Reckless Driving.

The Automobile Legal Association, with headquarters in Boston, has taken a determined stand in the matter of reckless driving, having employed a corps of motorcycle riders who will secure evidence against violators of this provision of the motoring laws in particular. These patrols will operate in Massachusetts, southern New Hampshire and Rhode Island for the present.

The plan is based upon that which has proven effective in Great Britain, under the auspices of the Motor Union, and in some countries of Europe. Not only will the patrols secure evidence of real reckless driving, but similar attention will be paid to the matter of lights on all vehicles using the roads at night, where such laws are in force.

ROADS AND BRIDGES.

Official of Automobile Association Surprises Motor Truck Interests.

George C. Diehl, chairman of the American Automobile Association's good roads board, makes the suggestion that a meeting of the leading state highway commissioners and the manufacturers of horse drawn wagons and motor driven trucks be held for the purpose of an interchange of views and the drafting of suitable legislation governing the width of tires and weight of loads. Mr. Diehl states his position as follows:

Many states have enacted laws which endeavor to regulate the width of tires of vehicles, but unfortunately there has not been strict enforcement of these regulations. The width of tires is one of the important factors in highway construction and maintenance. Narrow tires, especially during the wet season, form ruts in improved roads and in many instances, where the roads are weak, break through the surface, with the subsequent rapid destruction of the highway.

One great difficulty in enforcing wide tire ordinances with horse drawn vehicles has been that while less traction is required with wide tires, on slippery clay or hill roads it is very difficult in wet weather to manage a horse drawn vehicle with wide tires, owing to its tendency to skid and slide onto the ditches. Instances are frequent where in a journey a farmer must drive over miles of slippery road and only have a few miles of improved highway, in which case he would naturally prefer to use narrow tires for the entire distance.

There is no question that protection and economical maintenance of improved highways require that narrow tires should be discarded, and ordinances must be enforced which will prevent their use on main travelled highways which have been improved at great expense. If a vehicle owner desires to use narrow tire wagons on slippery roads, he must be absolutely prevented from using the same tires on improved roads. Equal, if not greater, damage can be done to the highway with tires of insufficient width on motor trucks. There is no state where wide tire ordinances are drawn which relate to both horse drawn and motor driven vehicles, or where a scientific attempt has been made to prepare such ordinances, or where a strict enforcement is had.

It also is entirely practicable and reasonable that the weight of loads should be limited, as the bridges which form an integral part of the highway are not, in a great majority of cases, sufficiently strong to carry weights which are becoming more and more excessive. It must be recognized that it is impossible, within any reasonable time, to reconstruct thousands of bridges. There should be legislation in all the states limiting the weight of loads and prescribing the width of tires, and specifying an adequate and reasonable method of strictly enforcing such regulations. As far as possible, the laws in the various states should be uniform, with a view that the manufacturers of wagons and motor trucks may be guided in their construction of vehicles.

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Another traffic factor which should be the subject of uniform legislation or regulation, is the carrying of lights on vehicles at night. Nearly all automobile laws require front and rear lights on motor driven vehicles. In some of the more populous sections, such as New York and Connecticut, many drivers of horses use lights, without the legal requirement, as a matter of self-protection. That all do not do so emphasizes the need for laws on the subject. With the travel on the roads constantly increasing, there is no reason why lives and property should be endangered by absence of lights on any class of vehicles.

Mr. Diehl's position with regard to the limitation of weights to be carried comes as a decided surprise in view of the stand taken by the National Association of Automobile Manufacturers and a large number of organizations of motor truck owners and users. It would appear from this statement that the American Automobile Association was not in accord with other interests of the industry in this respect.

WANTS NEW REGULATIONS.

Commissioners of District of Columbia Ask Congress for More Power.

A bill conferring upon the commissioners of the District of Columbia general and complete authority to regulate motor vehicle traffic in that district has been filed in Congress. It is contended that better results can be obtained where the commissioners are enabled to enact new regulations, than when the matter of controlling the subject is dependent upon the action of Congress.

The bill provides for the repeal of the present motoring law in the district and for the following: Annual registration instead of the present single registration without time limit; abolishing the special wheel tax imposed upon automobiles and giving the commissioners discretion in the making of regulations governing the speed at which motor cars shall be driven.

TRUCK FEE BILL KILLED.

Massachusetts House of Representatives Votes Against Registration Plan.

The proposition to increase the registration fees for commercial motor vehicles in Massachusetts has been defeated in the house of representatives by a vote of 66 to 126. This is the bill which has occasioned so much discussion among motor truck owners and users in that commonwealth.

When the matter came up in the house of representatives May 29 several amendments were offered, one of these providing for a fee based upon the horsepower instead of the tonnage. All amendments were defeated, before the final and decisive action was taken.

OKLAHOMA'S HIGHWAY COMMISSION.

Non-Residents Are Not Exempt from Registration Provision in New Law.

The new highway commission of Oklahoma is now being organized under the provisions of the law passed during the recent legislative session. Unless some additional provisions are made, it would appear that this body would have but very little to expend upon roads. The salary of the state highway commissioner is placed at $2500, with an additional allowance of $1500 for travelling expenses. The provision for the registration of automobiles follows:

For the purpose of carrying out the provisions of this act, and to create a fund for the maintenance of this department, a state license fee of $1 shall be charged annually the owner of each automobile owned by him. Said license fee shall be collected by the state highway commission, and shall be used for the payment of the salary of the highway commissioner provided for in this act, and the expenses of said office. Any surplus from the above said amounts is to be paid into the state treasury. The state highway commissioner shall issue to the owner of said automobile the license, duly signed and sealed with the seal of his department, together with proper description for the proper identification of such automobile license, record of which, together with the number of the license, shall be made in the office of the state highway department. And no automobile so owned shall be operated within the state without having paid such annual state license, under penalty of the law in such cases made and provided. Non-residents operating automobiles within this state shall be required to pay the same license as provided for in this section. Nothing in this act shall be construed to interfere with the rights of cities and towns to license and regulate automobiles through the streets of such cities and towns.

LEGISLATIVE BRIEFS.

The city engineer of Baltimore, Md., has introduced an ordinance in local city council entirely prohibiting the use of motor trucks on certain streets.

The Pennsylvania senate has defeated the bills introduced to increase the registration fees for automobiles and to regulate the use of motor trucks and traction engines.

A new ordinance in New York City stipulates that the operator of a motor car shall not approach within eight feet of a surface car which has stopped to discharge or take on passengers. In streets which are so narrow that the automobile cannot pass the car at a distance of eight feet, the operator is expected to stop.

Secretary of State May of New York has requested the police of New York City to investigate all cases of alleged fictitious names and addresses given by persons making application for and obtaining automobile licenses. The maximum penalty for violation of this section of the law is $50.

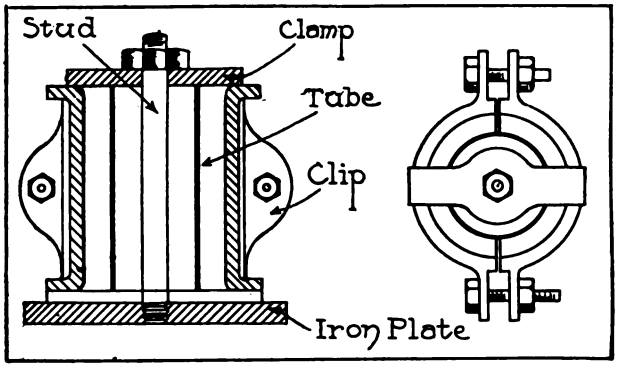
Alderman Burnett of Detroit has introduced an ordinance in that city requiring fenders on all motor trucks of more than one ton capacity. It provides that a fender capable of being raised and lowered by the operator must be placed on each vehicle, the life saving apparatus to be approved by the police commissioner and the commission of public works.

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THE REPAIR SHOP AND THE GARAGE.

Jig for Remetalling Bearings---Straight Edge for Verifying the Alignment of Bearings with Wristpin---Suggestion for Hardening Tools.

THE remetalling of bearings requires care if satisfactory results are to be secured. In an accompanying illustration is presented a suggestion for a jig which is aid to prevent blow holes and to provide a smooth bearing surface. It comprises a stiff iron plate of suitable dimensions and drilled to receive the stud member. The clamp, which is shaped to leave a space for pouring the metal between the inner side of the bearing and the tube, is secured to the stud as shown.



Suggestion for a Jig for Metalling Brasses for Big End Bearings.

Between the edges of the brasses are placed graphited tin strips secured by a clip. To prevent leakage of the molten metal from the bottom a piece of asbestos packing is utilized. This arrangement permits of metalling a pair of brasses at a time. If care be exercised in heating the brasses the old metal may be removed without injuring the tinned surfaces. It is important that there be a sufficient number of holes in the shell for securing the new lining in addition to the tinning.

VERIFYING BEARINGS.

Extreme care in fitting and scraping bearings does not necessarily mean that the axis of the bearing will be exactly in line with the wristpin. The centre line of the wristpin bushing will frequently be found to be inclined toward the centre line of the crankshaft, owing to the fact that the connecting rod has become slightly bent or out of alignment. It is not always easy to detect the defect before assembling and to facilitate matters the special straight edge shown in an accompanying illustration will be of service.

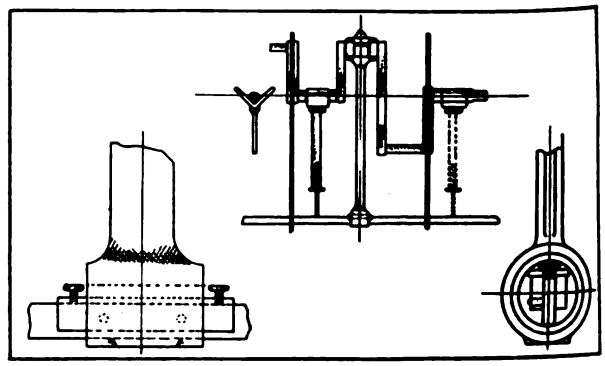
If it is used in connection with a length gauge, one having a V block at one end and a screw extension at the other extremity, the slightest variation from trueness in the horizontal plane may be noted readily. Similar misalignment in the vertical plane may be discovered by using an ordinary straight edge. It will be noted that provision is made for adjustment in order that worn wristpin bushings or those of larger or smaller dimensions than standard may be accommodated, two set screws being provided for this purpose. Other set screws in the side of the straight edge permit the taking up of any slack sideways.

A HARDENING HINT.

Brittleness of small cutting tools, drills, taps, etc., may be prevented and economy effected by plunging the part into a cake of soap or wax after hardening when being cooled.

TEMPERING SCREW DRIVERS.

Occasionally one will pick up a screw driver that is too soft. While they should be hardened to a degree of toughness, beyond that is not necessary as they are not called upon to do any cutting. When water is used for hardening it has a tendency to make the metal too hard. Oil is superior. If water is to be used it should be heated until it reaches nearly the boiling point.



Special Straight Edge for Verifying the Alignment of Bearings with Wristpins, Etc.

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FEATURES OF NOBLE BI-FUEL CARBURETOR.

A CARBURETOR using either gasoline or kerosene, or both, has been brought out in England by W. Noble and it will be noted from the accompanying part sectional illustrations that two distinct float chambers are provided. From each of these float chambers leads a jet which is shown at B Fig. 2. The tip of each jet passes into a choke tube C, the bottom end of which is provided with means for adjusting the amount of air passing the jet. Both choke tubes extend into the chamber D, which has a rotating sleeve valve. The latter makes it possible to cut off either the gasoline or kerosene supply, or to utilize both fuels simultaneously.

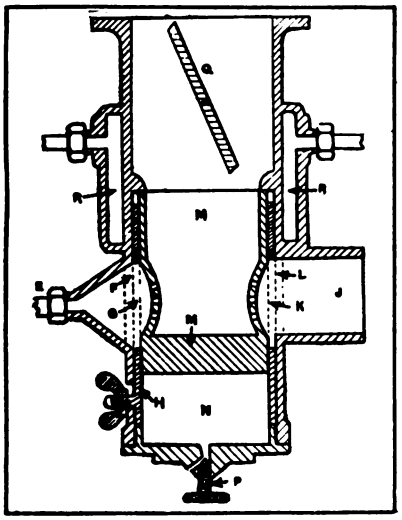


Fig. 1—Mixing Chamber of Noble Bi-Fuel Carburetor.

From the chamber D the rich mixture is led into a vaporizing tube E, which passes into and along inside the exhaust branch, finding exit through a packing gland at the front end of the motor, whence it is led to a mixing chamber illustrated at Fig. 1.

The gas from the vaporizing tube E passes through a slot F in the wall of the mixing chamber and a corresponding slot G in the sleeve H. The latter is employed for adjusting the proportions of gas and air to provide a correct mixture. Additional air enters the mixing chamber by the way of the pipe J from an open ended warming jacket around the exhaust pipe. The slots K and L correspond more or less according to the position of the sleeve H, which also has a rotary movement, so that these slots also work in conjunction with the slots F and G. The slots on both sides of the sleeve H are uncovered internally by a piston M, which rises or falls according to the negative pressure in the mixing chamber, this pressure being governed by the position of the throttle and speed of the engine.

The piston M has holes communicating with the slots in the walls of the chamber, these apertures allowing the air and gas to pass through to the motor. Below the piston is a dash pot space N having an adjustable screw P. A hot water jacket R is also embodied in the mixing chamber casting.

The slow speed is adjusted by moving the sleeve H vertically, and when the desired position is obtained the sleeve is locked by means of a wing nut. The carburetor includes the conventional butterfly throttle valve, this being shown at Q and being located above the piston member.

The engine is started on gasoline and as soon as the exhaust pipe attains a certain temperature the two-way valve is utilized, bringing kerosene into service. In either case a rich mixture is provided, and the fuel is vaporized in its passage along the vaporizing pipe E. The level of both fuels is controlled by means of floats and needles in the conventional manner.

After a long series of tests in which many American and foreign cars competed, the Canadian government has purchased a fleet of Studebaker roadsters, made by the Studebaker Corporation, Detroit, for the use of Dominion officials at Regina and in the service of the Northwest Mounted Police.

That the motor car is becoming more and more accustomed to deep sea travel has become apparent through the rush of inquiries on European motor tours received by the foreign department of the Touring Club of America. Hundreds of motorists are to ship their cars to Europe this year and will tour with their own equipment.

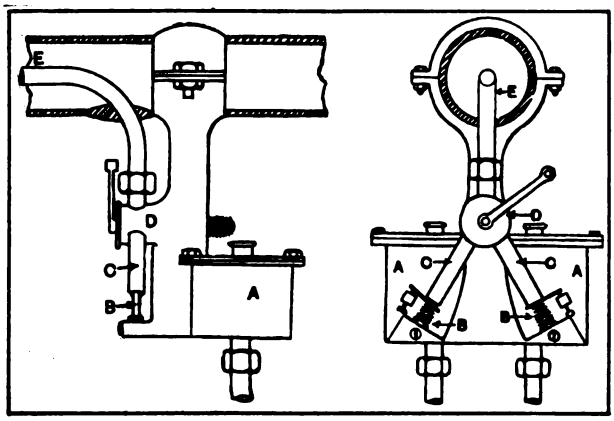
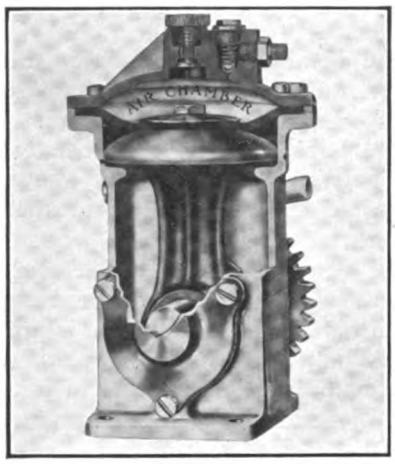


Fig. 2—Part Sections of Float Chamber Portion of Noble Carburetor Utilizing Gasoline and Kerosene Independently or Together.

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GARAGE AND REPAIR SHOP EQUIPMENT.

THE Taylor Manufacturing Company, West 14th street and 48th avenue, Chicago, is marketing a new mechanically operated portable tire pump for garage service that presents interesting features because of its convenience and compactness. The pump proper is driven by a .25 horsepower electric motor, which is constructed either for direct or alternating current and for varying voltages.



Air Chamber of Noil Pump.

The outfit, which is shown in an accompanying illustration, is mounted on a heavy golden oak base and may be moved easily about the garage, it rolling on four heavy steel casters. A looped steel handle is provided, and its weight makes for convenience in operation.

The motor is mounted beside the pump and drive from the former is by means of steel pinions and cast iron gears. The equipment is very complete, including 15 feet of high grade flexible hose with connection and pressure gauge and 15 feet of electric wiring and socket.

The pump itself is known as the Noil, so named because its operation precludes all possibility of lubricant or oily vapors being carried with the air into the inner tube when inflating. The pump works on the plunger-diaphragm principle, and it is held that frictional heat is eliminated. It is but 7.5 inches high, weighs but 6.5 pounds and employs no leather cups, etc.

The crankcase is of aluminum and gears and plunger of solid bronze. The plunger is specially constructed and it is claimed that it will withstand a pressure of 1000 pounds. As will be seen from the accompanying illustration showing a cross section of the pump, its air chamber is independent of the crankcase, being separated from it by an air tight rubber diaphragm which forms the base of the air chest. Since no lubricant enters this chamber no oil can be discharged. One of the qualities claimed for the Noil is that it will deliver a steady flow of air and that it will supply from 90 to 150 pounds at low speeds.

TAPE GRIP WATER JOINT.

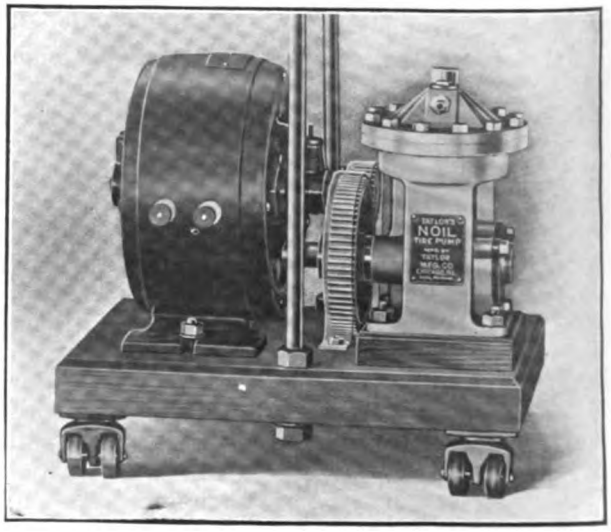
Herz & Co., 295 Lafayette street, New York City, is manufacturing the Tape Grip water joint, a device for making a connection between rubber hose and a metal pipe, such as the outlet manifold and the radiator. Rotating a ring member winds the tape firmly. It is held that it may be as easily displaced, and may be utilized over and over again.

RADICO.

The Radico Manufacturing Company, Springfield, Mass., is marketing a new compound known as Radico, which is guaranteed to stop leaks in radiators or other sections of the cooling system and without injuring the components. It is claimed that Radico will cure a leak in 15 minutes.

TAD'S TROUBLE FINDER.

The Toledo Auto Devices Company, Toledo, O., has brought out what may be termed a mechanical stethoscope, called Tad's trouble finder. It is designed for locating mysterious noises which may develop in the power plant. The finder is made of wood and metal and is inexpensive.



Taylor Noil Portable Garage Tire Pump, a Compact Unit Operated by Electricity.

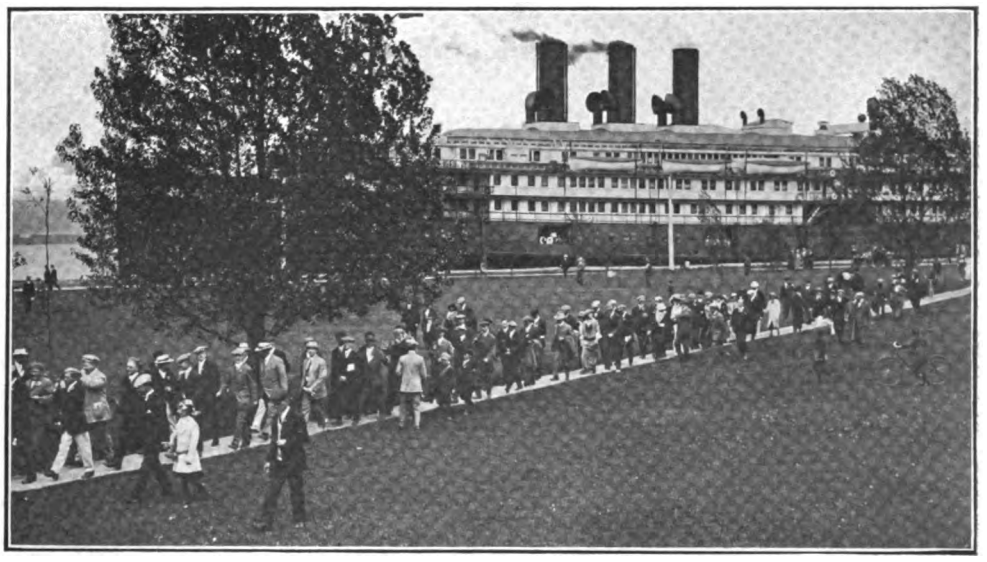
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BRITISH ENGINEERS IN NEW ENGLAND.

Representative Delegation Inspects Eastern Plants After Conclusion of Midsummer Meeting on Lake Huron—Some Impressions at the Close of the Trip.

THIRTEEN of the 27 members of the party representing the Institution of Automobile Engineers of Great Britain reached New England, June 11, but one of these, Secretary Basil H. Joy, left the party at Pawtucket, R. I., going immediately to Montreal, from which port he sailed June 14 after completing certain business matters. President and Mrs. T. B. Browne left the party at Buffalo, N. Y., June 10, returning to their home in England by way of the Pacific Coast and the Far East. The remainder went direct to New York City from Buffalo, sailing June 11 on the Mauretania.

After the return from the trip on Lake Huron, included in which was the midsummer meeting of the Society of Automobile Engineers, the party left Detroit the evening of June 8 for Cleveland, taking the Detroit & Cleveland Navigation Company's boat. Cleveland was reached early Sunday morning, and the party was escorted immediately to the Hotel Stadler. The day was spent in a round of entertainment at country clubs in that vicinity.



British and American Engineers Leaving the Boat at Sault Ste. Marie, Mich.

Monday was devoted to an inspection of the plants of the White Company, the Peerless Motor Car Company and the Winton Motor Car Company, although several members of the party took advantage of the opportunity to visit the factory of the Goodyear Tire & Rubber Company in Akron. That evening another boat was taken for the trip to Buffalo, where after inspecting the plant of the Pierce-Arrow Motor Car Company those who were to remain behind visited Niagara Falls.

Wednesday morning they caught their first glimpse of the New England hills. Upon their arrival in Pawtucket the entire arrangements for the remainder of the trip were placed in charge of Coker F. Clarkson, secretary of the American society, who had accompanied the visitors since their arrival in New York, and three hearty British cheers were given Secretary Joy as he stepped back on the car platform for the commencement of his homeward journey.

Mrs. E. B. Wood was the only woman member of the party who visited New England. During her stay in Rhode Island she was the guest of a Providence committee, composed of Mrs. F. P. Nehrbas and Mrs. W. A. Viall, who took her on a boat ride to Newport for the day.

The engineers were entertained at breakfast at the To Kalon Club as the guests of the Potter & Johnston Machine Company, after which they inspected that plant. The trip from Pawtucket to Providence was made by motor 'bus. In the latter city the plants of the American Locomotive Company and the Brown & Sharpe Manufacturing Company were visited, and a dinner was tendered the party at the Country Club.

The party left Providence about midnight for Bridgeport, Conn., which was reached Thursday morning. After breakfast at the Hotel Stratfield the plants of the Locomobile Company of America and the Spring Perch Company were inspected. Luncheon was served with the former

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company as host and the party left by motor car for New Haven, visiting the factory of the New Haven Carriage Company.

Thursday night was spent at the Hotel Taft. The next morning the automobiles were impressed into service again for the trip to Hartford, where the plants of Pratt & Whitney, the Pope Manufacturing Company and the Hartford Rubber Works division of the United States Tire Company were inspected. The trip was brought to an official close Saturday morning, June 14, upon the arrival of the Hartford boat in New York City.

Those who took advantage of the New England trip had had three weeks of hard work, and on a minimum amount of sleep. One of the members of the party declared he was going to sleep as soon as he reached his stateroom and did not expect to awake until he arrived in England. They were tired, but they had taken advantage of every opportunity to study American production methods.

The consensus of opinion among the visitors appeared to be that America is producing cars which compare favorably with those which are manufactured in any country, and while there may be difference of opinion as to the relative merits of any particular make of machine, the American product is worthy of competing with the British. There was no attempt on their part to differentiate between what they had observed in any one city or plant, but there was evidence in their conversation upon the subject that they were particularly impressed with the industry as represented in Detroit.

With respect to motor starters, a subject with which they had had little previous opportunity to familiarize themselves, there was suggestion that within another twelvemonth there would be quite a different story to tell in Great Britain. "But one concern in Great Britain has taken up this matter," said Charles Wheeler, "and this has not placed any self-starting cars on the British market. Practically the only make of this type now sold there is an American car. It is ridiculous, when you stop to think of it, that we should do a bit of hand organ grinding every time we want to take a ride. It has got to come and before another year you will see a large number of self-starting cars made in England."

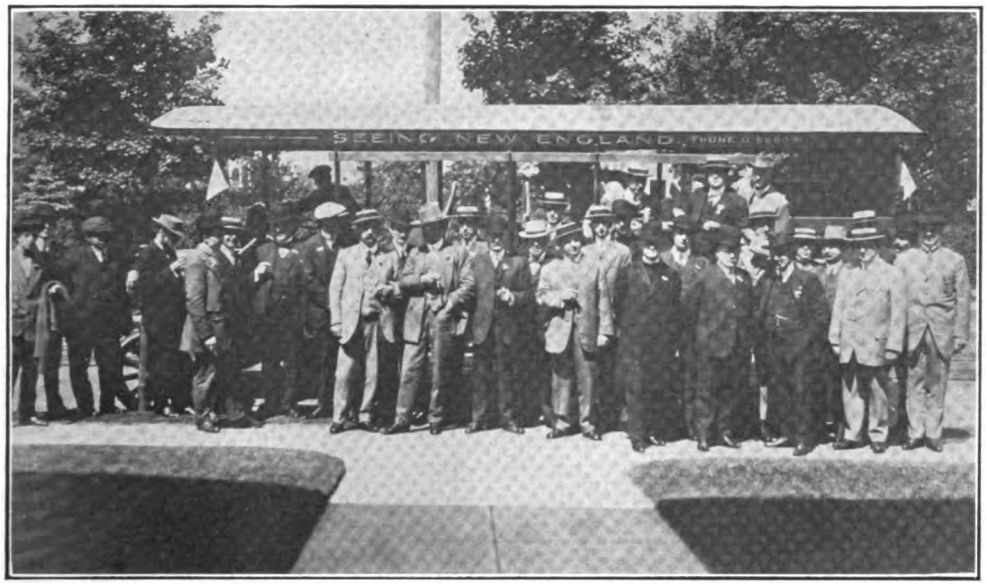
Mr. Wheeler is in charge of the motor driven equipment of the postal department for the United Kingdom, and it would appear that decidedly greater attention has been paid to this matter in England than in this country. He stated that practically all horse drawn vehicles had been eliminated, and that in many instances motor trucks were doing the work formerly left to the railroads.

He also explained that there was decided interest in the matter of the so-called char-a-banc, virtually a motor 'bus, but much more elaborately furnished than those in use in this country. Both Mr. Wheeler and R. W. Smith were of the opinion that such vehicles would see larger service in the smaller towns in America. Char-a-bancs are operated in England instead of trolley cars in many of the outlying districts and for transportation between the railroad stations and many of the hotels.



British Engineers at Play During the Halt at Mackinac Island, Between Sessions of the Midsummer Meeting.

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Members of the New England Party at Potter & Johnston Plant, Pawtucket, R. I.

It was stated that electric vehicles were not much used, the reason assigned being that the country was too hilly. Upon more mature reflection, and when it was pointed out that electric commercial vehicles were utilized to advantage in America even under such conditions, it was suggested that possibly the reason could be assigned to lack of initiative. On the other hand, steam vehicles meet with a much better reception in England than in America.

The matter of roads is one concerning which much has been published in Great Britain. It was on the trip between Pawtucket and Providence that the visitors became enthusiastic upon this subject. When turning into Blackstone boulevard, practically every member of the party exclaimed that they must be back in England. E. C. Paskell explained that the surroundings were typical of a country lane in the home country, and Mr. Wheeler stated emphatically that the finest roads they had observed anywhere in this country were those over which they were then travelling.

It is impossible, in the space available to quote all of the impressions voiced by the visitors toward the end of their trip. They had seen and absorbed a large amount of information and were distinctly of the opinion that the three weeks had been well spent. They were equally certain that much that they had learned would be reflected in the future production of Great Britain, although the so-called American invasion was carefully avoided in summing up their impressions.

The 10,000 employees of the Willys-Overland Company and the Kinsey Manufacturing Company, a subsidiary concern, Toledo, O., have been notified that after Aug. 1, 50 hours will constitute a week's work instead of 54 hours. The decrease does not carry any reduction in wages with it.



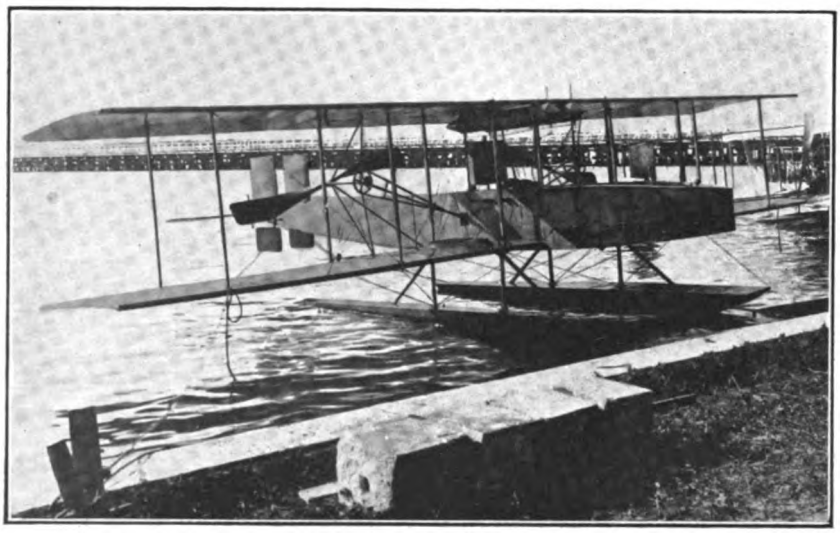
British Visitors and Their Hosts upon Their Arrival at American Locomotive Company's Plant in Providence, R. I.

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BURGESS COAST DEFENSE HYDRAEROPLANE.

THE Burgess Coast Defense hydraeroplane, presented herewith, has several features which distinguish it from any other aeroplane yet constructed. Among these may be mentioned the long enclosed body, in the bow of which the aviator and passenger are arranged in tandem, well forward of the supporting surfaces, so that both members of the crew have an unobstructed view in all directions. The maker is the Burgess Co. & Curtis, Marblehead, Mass.

The power plant is a six-cylinder Sturtevant motor. This is located amidships, back of the crew, and drives twin propellers by a long chain and sprocket gear. The empennage, including the elevator and double rudders, is similar to the model H, which preceded it. The supporting surfaces are built very nearly flat with a slight reverse curve and are covered with strong linen, surfaced with a special composition which is held to produce an unusually smooth and flexible finish. The hydroplane hulls are two in number and are of novel design, the bottom sloping down to an angular step under the centre, while the aft half is of concave cross section.



The Burgess Coast Defense Hydraeroplane Which Has Proved Successful in Service with the United States Signal Corps.

The principal dimensions are: Spread of wings, 39 feet 10 inches; length over all, 31 feet five inches; length of enclosed body, 29 feet seven inches; height from bottom of hull, nine feet six inches; depth of wing, six feet three inches; area of main surfaces, 484 square feet; weight, empty, 1500 pounds.

The motor is equipped with an efficient muffler, which is of decided importance in military service, this machine having been designed for and used by the United States signal corps. Twin Zenith carburetors are utilized, and the ignition is by a Mea magneto. The machine is fitted throughout by R. I. V. ball bearings, these being supplied through the New England distributor, F. Shirley Boyd, 903 Boylston street, Boston.

A new cross country record was established June 10 by Marcel G. Brindejonc des Moulinais of Belgium, who flew from Villacoublay, near Paris, to Warsaw, Russia, a distance of 900 miles, with but one stop, that being at the Johannisthal flying field, Berlin, Germany. The aviator left Villacoublay at 4 in the morning and reached Berlin shortly after noon. He left Berlin at 3:40 with St. Petersburg, 1699 miles from Paris, as his objective point, and arrived at Warsaw at 6:15. The make of machine was not stated in the dispatches, but it is presumed that he used a Morane-Saulnier, as that is the make he has been flying.

A new altitude record for a pilot and six passengers was established by Frangeois of France in a Savary biplane at Chartres, France, last month, when he reached a height of 2789 feet. The previous mark was held by Frantz at 2133 feet. The duration of the flight was 1:13:25, which is also a new mark.

The Aero Club of France has decided that the second trials for the $10,000 Michelin target prize shall be held at Chalons during the weeks of June 15-22, July 13-20, Aug. 10-17 and Sept. 7-14.

Fifteen members of the Aero Club of Philadelphia have volunteered to make up the "fourth arm" of the Pennsylvania National Guard, an aviation corps having been established to work in conjunction with the signal corps of the United States Army.

Of particular interest is the recent prosecution of Brindejonc des Moulinais of Belgium for violation of the new law in Great Britain forbid-

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ding foreign aviators to land in the United Kingdom without first notifying the home office of the trip and the intended landing place, and also with having flown over a part of the United Kingdom without having first alighted in one of the official prescribed areas. The defendant pleaded guilty, explaining that he was not aware of the existence of the law. Upon his promise not to repeat the performance and to request the Aero Club of France, of which he is a member, to advertise the laws of foreign countries in this respect, he was permitted to depart upon his own recognizance in the sum of 1000 francs.

TACOMA ROAD RACES.

Sixteen Cars Already Entered for Events Scheduled for July.

With 16 entries already listed, including the well known drivers, Tetzlaff, Burman and Oldfield, and others promised, the automobile road races for 1913 at Tacoma, Wash., July 5-6, promise to furnish an opportunity for creating new world's dirt track records. The 3.5-mile course is being given constant oiling and rolling and is already in excellent condition. The prizes to be offered will aggregate $10,500, including the $5500 award for the Montmarathon. The complete list of entries to date is as follows:

July 5, Inter-City Century Trophy.

Car	Entrant	Driver
Stutz	E. J. Cameron	Cameron
Simplex	C. H. Hooper	Hooper
American	M. MacLeod	MacLeod
Cole	Frank A. Tauscher	Tauscher
Apperson	W. L. Alfred	Nickels
Reo	H. M. Prince	.....
Stutz	Stutz Motor Car Company	.....

July 5, Golden Potlatch Trophy, 200 Miles.

National	Charles M. Thomsen	Taaffe
Locomobile	C. L. J. Welch	Welch
Stutz	Stutz Motor Car Company	.....
Fiat	E. E. Hewlett	Tetzlaff
Stutz	Earl Cooper	Cooper
Mercer	Walter Hempel	Oldfield

July 6, Montmarathon Trophy, 250 Miles.

National	Charles M. Thomsen	Taaffe
Locomobile	C. L. J. Welch	Welch
Stutz	Stutz Motor Car Company	.....
Fiat	E. E. Hewlett	Tetzlaff
Fiat	E. E. Hewlett	Magone
Benz	E. A. Moross	Burman
Benz	E. A. Moross	Carlsen
Stutz	Earl Cooper	Cooper
Mercer	Walter Hempel	Oldfield

NATIONAL RELIABILITY TOUR.

How Eastern Contestants May Best Reach the Starting Point.

No event in motoring will be more typical of the nationalizing influence of the motor car on the country than the American Automobile Association's national reliability tour, which in July will traverse Minnesota, North Dakota and Montana, for it will typify in a larger way the best utility of the motor as an invader of "new country," because to a majority of people East and West, those states lie in a region which is comparatively little known.

In the tour many business men, particularly from the East, have recognized an opportunity for an educational vacation under auspices which eliminate all thought of the discomforts sometimes attendant upon travel through a country where motorists are not plentiful. For those residing along the Atlantic Coast the tour offers unique possibilities. Cars may be shipped from Buffalo by steamer through the Great Lakes to Duluth, Minn. Thence there is a drive of 175 miles to the twin cities of St. Paul and Minneapolis, from which point the tour will start July 11 and terminate at Midvale, the northern gateway to Glacier national park, July 19.

TWELVE ENTRIES FOR COLUMBUS.

Third Annual 200-Mile Dirt Track Event Scheduled for July 4.

The third annual 200-mile race, which is the classic dirt track event of the season at Columbus, O., will be held in that city July 4. The track of the Columbus Driving Association, upon which the race will be run, is considered the best dirt course in the country and upon it all of the records from 75 miles to 200 miles have been made. It is also the first track in the country to stage a 24-hour race and the record for such a contest was held by it for some time.

Twelve cars will be started in this year's event, some of which participated in the 500-mile race at Indianapolis, Memorial Day. In order to prevent dust the committee will use 30 tons of calcium chloride. The Baker electric timing apparatus will be used to secure the proper scores. The committee in charge consists of: Chairman, L. M. Browne; J. C. McIntyre, Frank J. Girard, F. H. Thorpe and J. W. Means.

A Studebaker machine, made by the Studebaker Corporation, Detroit, and driven by Harry Hooker of Hollywood, Cal., recently accomplished the ascent of Mount Wilson, an altitude of 6000 feet, while carrying four passengers. Although often within but a few inches of the edge of the rough, tortuous trail, it was never necessary to back the car in order to get it around the many sharp turns.

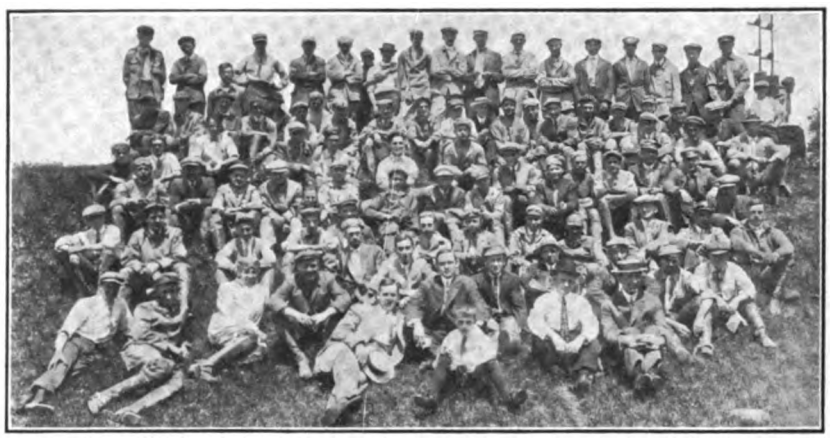
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IN THE REALM OF THE MOTORCYCLIST.

Details Arranged for the First National Motorcycle Road Race at Elgin, Ill., July 4---Plans for New York and Chicago Shows---Tourist Trophy Results.

WITH many of the fastest riders and machines in the country entered, the first annual national motorcycle road race will be held over the Elgin course at Elgin, Ill., near Chicago, July 4. The contest is being promoted by the Chicago Motorcycle Club, which has raised over $15,000 for the event. There will be two classes, the amateur and professional. The professional race will be 250 miles for stock machines of 61 cubic inches or under. The first three cash prizes will be $500, $250 and $100 in gold coin. The amateur race will be for 174 miles and the value of the first three prizes will be $250, $125 and $75.

As this will be the first national motorcycle road race ever held in America, it is expected that about 100,000 persons will be in attendance at the course, which will be guarded by the state militia. When the entry blanks had been out a week 48 entries had been promised and several of the motorcycle factories have entered teams. The Indian team will be composed of Charles Balke and Raymond Seymour, two California riders, who have broken many world's records on the board tracks; Charles Gustafson, the 24-hour record holder, and E. G. Baker of Indianapolis. It is stated that the Merkel, Jefferson, Yale, Excelsior and Dayton factories will enter teams for the event, having so notified Chairman R. H. Hill of the Chicago Motorcycle Club's contest committee. F. L. Valiant of the Miami Cycle & Manufacturing Company will act as starter.



Party of Recent Motorcycle Visitors to the Flying Merkel Plant of the Miami Cycle & Manufacturing Company, Middletown, O.

New York and Chicago Shows.

At its regular meeting at Buffalo, N. Y., the Motorcycle Manufacturers' Association voted to incorporate under the laws of New York State. The next meeting will be held at Atlantic City, N. J., Aug. 6, in connection with the meeting of the Cycle Parts & Accessories Association. The show committee was authorized to make the best arrangements possible with Manager S. A. Miles for a motorcycle show in connection with the automobile show in Grand Central Palace, New York City. It was decided to hold the Chicago show at the Coliseum the first week in November.

Tourist Trophy Results.

In the Senior Tourist Trophy race on the Isle of Man, the winner was T. Wood, who rode a Scott motorcycle, while second place was taken by A. R. Abbott on a Rudge, and third by J. R. Alexander on an Indian. The Indian entries were all singles, and the performance of the five machines taking part is considered excellent. Aside from third place, Indian machines finished as follows: C. B. Franklin, fourth; Brown, 10th; George, 14th; A. H. Alexander, 26th. These scores were made in a field of 103 entries. The features of the winning Scott model include a new design rotary valve and new type of Hans Renold chain.

In the Junior Tourist Trophy event the winner was Hugh Mason on a 2.75 horsepower N. U. T. machine, S. A. Newman being second on a Precision and W. F. Newsome on a Douglas, third.

A cable from the Bosch Magneto Company, London, announces that the winning Scott machine was equipped with a Bosch magneto. Bosch also was the equipment of the third and fourth machines to finish in the senior event.

Thiem Increases Capital.

It is stated that the Joerns-Thiem Motor Company, St. Paul, Minn., maker of Thiem motorcycles, is to increase its capital stock to $500,000

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Merkel's Road Race Team.

At the 250-mile motorcycle race at Elgin, Ill., July 4, the Miami Cycle & Manufacturing Company, Middletown, O., will be represented by four well known riders, L. S. Taylor of Middletown, Ray Snyder of Columbus, O.; Ray Bowser of Chicago, and Herman Sill of Cleveland. These riders are fast and the Merkel machine may be expected to be among the leaders throughout the race.

Addition to Saddle Plant.

The H. & F. Mesinger Manufacturing Company, New York City, has nearly completed a 50 by 60-foot extension to its new factory at Austin place and East 114th street, to be devoted exclusively to the manufacture of saddle springs, necessitated by the steady and rapid growth of business in Mesinger saddles. The addition will be in full operation by Aug. 1.

Indian Wins Century Event.

The Allegheny Motorcycle Club's 100-mile race, held at Brunots Island track, Allegheny, Penn., was won by A. G. Schmidt on an Indian machine. His lead was about two miles. H. H. Giesey, a novice rider, also riding an Indian, was second, and J. M. Davis on an Excelsior, was third. The time made by Schmidt for the 100 miles was 1:45:35.

Death of W. K. Aurandt.

The Miami Cycle & Manufacturing Company, Middletown, O., maker of Merkel motorcycles, through its president, K. R. Jacoby, announces with regret the death at Altoona, Penn., June 13, of W. K. Aurandt, who was connected with the concern and who was well known in motorcycle circles.

Spanish Road Race.

Julian Olave, Indian dealer at San Sebastian, Spain, will enter a team for the Spanish international road race to be held Sunday, July 20. The race is from San Sebastian to Bilbao, a distance of 100 miles.

New Mile Board Track.

The Dodge City Motorcycle Club of Dodge City, Ia., has decided to build a one-mile board track, upon which to hold races when the run of the Short Grass Touring Club passes through the city in July. The track will be banked at the turns with four-foot embankments.

Merkel Takes Twin Award.

At the recent hill climb at Toronto, Can., G. Bilton on a Flying Merkel motorcycle with sidecar and passenger, won the event for twins. The meet took on the aspect of an international affair, as American machines were pitted against those of English make in many of the matches. The American riders were returned victorious. Following is the summary:

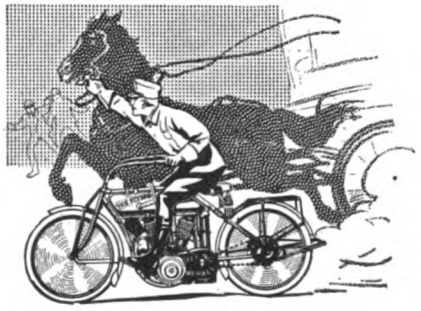
Twins, 7 horsepower, with sidecar and passenger—First, G. Bilton, Merkel; second, Bert Webb, Indian; third, C. Macdonald, Excelsior; fourth, Stephen Wilkins, Indian; time, 0:25.

Singles, 4 horsepower, with sidecar and passenger—First, H. Greenwood, Triumph; second, P. Barnes, Triumph; time, 0:44.8.

Seven horsepower—First, C. Macdonald, Excelsior; second, Bert Webb, Indian; third, G. Bilton, Merkel; fourth, Stephen Wilkins, Indian; fifth, A. Vann, Merkel; sixth, C. J. Spiers, Excelsior; seventh, Arthur Shuttleworth, Jefferson; eighth, Walter Andrews, Merkel; ninth, J. Plowman, Excelsior; 10th, Robert Barton, Matchless; time, 0:19.8.

Four horsepower—First, F. Miles, Indian; second, Arthur Shuttleworth, P. E. M.; third, Bastedo, Triumph; fourth, W. Morrison, Excelsior; fifth, Burgess, Triumph; sixth, W. Banfield, Triumph; seventh, T. Smith, Douglas; eighth, P. Barnes, Triumph; ninth, H. Greenwood, Triumph; 10th, Bert Webb, Indian.

For flexibility special prizes were awarded to the following: Singles—H. Greenwood, Triumph; H. Burgess, Triumph. Twins—A. Vann, Flying Merkel; C. Macdonald, Excelsior.



ALWAYS READY FOR ANY EMERGENCY!

With its ability to pick up speed quickly—(60 miles an hour from a standing start within a city block)—the 1913 Flying Merkel Motorcycle is always ready for instantaneous use. These features and the fact that the Flying Merkel Motorcycle is the most economical in the world to operate has led to its universal adoption by Police Departments, Park Boards, Gas Companies, Telephone and Electric Light Companies and all other business concerns and individuals whose requirements demand a sturdy, reliable motorcycle at the minimum cost of upkeep. Remember, the Flying Merkel

"Made Its Name on Merkel Mileage."

Free Art Catalog on Request.

The Miami Cycle & Mfg. Co.

330 Hanover St. Middletown, Ohio, U. S. A.

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New Registered Repair Shops.

Following are the new repair shops registered with the F. A. M.: Harwood & Minton, Sixth



Morris Ross, Providence, R. I., and His Indian Mount.

avenue and Commerce street, Nashville, Tenn.; W. R. Garcelon, 520 High street, Palo Alto, Cal.; Charles A. Williams & Son, 609 Main street, Zanesville, O.; Coleman's Motorcycle Shop, 43 Bowery street, Akron, O.; The Big 4 Auto Company, 15 North Cascade avenue, Colorado Springs, Col.; Sterling Motor Company, Darien, Conn.; Hobbie Automobile Company, Maple and Fourth streets, Hampton, Ia.; Perfection Cycle Company, 220½ Main street, Conneaut, O.; Astoria Garage, 565 Duane street, Astoria, Ore.; G. W. Beardsley, 1120 Texas avenue, Houston, Tex.; Arvid Anderson, Fourth and Locust streets, DeKalb, Ill.; Chapin & Kibbe, 1552 Riverside street, West Springfield, Mass.

Pope Man Secures Promotion.

J. P. Fogarty, who for 17 years has been connected with the Pope-Hartford Manufacturing Company, Hartford, Conn., maker of Pope motorcycles, has been appointed manager of the motorcycle plant at Westfield, Mass. He succeeds E. E. Hinsman, who has resigned.

De Luxe Needs More Room.

The Excelsior Cycle Company, Chicago, maker of the De Luxe motorcycle, has made arrangements for the addition of another story to its plant and also for securing of adjoining property for stockrooms. This action is taken to make room for a greatly increasing output.

Merkel Announces Racing Policy.

It is announced by Advertising Manager F. L. Valiant that in keeping with the attitude of many motorcycle makers in oppositon to board track racing, the Miami Cycle & Manufacturing Company, Middletown, O., maker of Merkel machines, has decided to recall all Merkel racing models that are not owned outright by competing riders. The position of the Merkel company is that racing with ported machines has outlived its usefulness to the trade and in the future none of this type of motorcycle will be manufactured. Those machines which have competed recently are owned by their riders and the Merkel company has no riders drawing salaries.

Recent Commissioner Appointments.

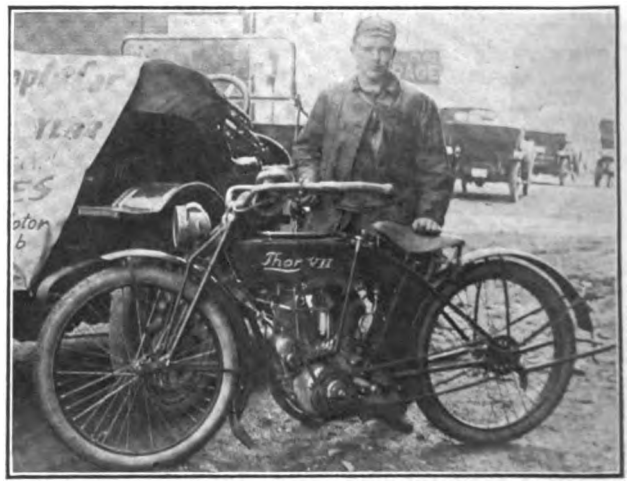
President Patterson of the F. A. M. has appointed as state commissioners, Philip Kennard, Tampa, Fla., and Dr. A. L. Gindrup, 234 Main street, Salt Lake City, Utah. Following are the county commissioners that have been designated by the Ohio state commissioner: Paul H. Sheridan, Youngstown, O., for Mahoning county; Tide Davenport, Portsmouth, O., Scioto county; Robert Carroll, 403 Rensselaer street, Bucyrus, O.

New Cyclecar Company.

That some persons in the motorcycle trade believe in a future for the cyclecar is shown by the incorporation under the laws of Arizona of the California Cyclecar Company, with a capital of $50,000. The concern is an offshoot of the California Motorcycle Company of Los Angeles, western distributor of Eagle and M-M motorcycles.

Michaelson in New Building.

The Michaelson Motor Company, Minneapolis, Minn., maker of the Michaelson motorcycle, has moved into its new building and is planning for an increased output for 1914. The Minneapo-



Glen Crandall of Boston, Well Known Thor Racing Rider.

lis Motor Company of the same city is also branching out, having made additions to its brazing and blacksmith shops in preparation for the

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1914 trade, which indicates that the Minneapolis concerns are enjoying prosperity.

Thor Is Nearly All Moved.

The new factory at the corner of Sedgwick and Huron streets, Chicago, recently secured by the Aurora Automatic Machinery Company, maker of Thor motorcycles, is ready for occupancy and the transfer of machinery from Aurora, Ill., is being carried forward. Operations are expected to begin by July 1 and the full equipment is expected to be installed by the middle of July.

Long Distance Sidecar Trip.

George M. Beckett, a member of the Pittsburg Motorcycle Club, Pittsburg, Penn., accompanied by Mrs. Beckett, recently left that city on a motorcycle tour of the North Atlantic states. They are riding an Indian with sidecar attachment and before they return they will visit Harrisburg, Philadelphia, Atlantic City, New York, Providence, Boston, Springfield, Albany and Buffalo.

Motorcycle Patrols for A. L. A.

The Automobile Legal Association, in the interests of law enforcement, is employing special policemen, mounted on powerful motorcycles, to patrol roads in Rhode Island, Massachusetts and southern New Hampshire, to secure evidence of reckless automobile driving or driving while intoxicated. The work will not be confined to this feature only, but evidence will also be gathered against drivers of horse vehicles who do not conform to the laws requiring lights on their wagons after dark.

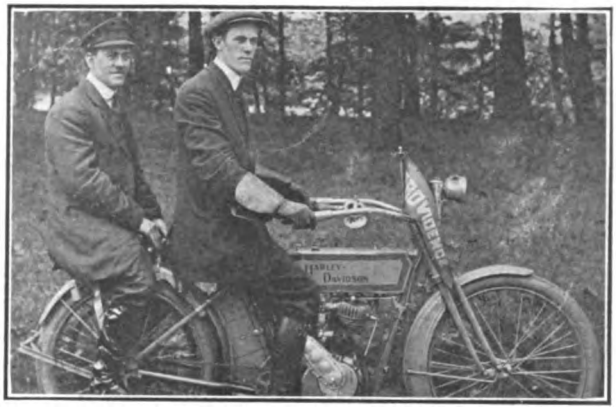
New Members in May.

The registrations with the Federation of American Motorcyclists for May totalled 918, which is an exceedingly good month for new members. The various states were represented as follows: New York, 152; Ohio, 146; Indiana, 73; Texas, 69; Pennsylvania, 59; New Jersey, 57; Illinois, 48; Maryland, 31; Colorado, 30; Tennessee, 29; Oregon, 27; Massachusetts, 20; Missouri, 19; Wisconsin, 19; South Dakota, 19; Nebraska, 17; Oklahoma, 14; Kansas, 14; California, 10; Michigan, eight; Virginia, seven; Georgia, six; West Virginia, five; District of Columbia, five; Iowa, five; Philippine Islands, five; Washington, three; Rhode Island, three; Louisiana, three; Kentucky, three; Minnesota, two; Wyoming, two; Florida, North Dakota, Nevada, New Mexico, Panama, Porto Rico, Mexico, one each.

Club Notes, Here and There.

The Columbia Motorcycle Club, Columbia, S. C., has reorganized with the following officers: President, Dr. Hoefer; vice president, K. W. Hollingsworth; secretary-treasurer, George M. Thayer; captain, Charles W. Cochrane. It is planned to hold a race meet later in the season on the South Carolina fair grounds track.

The National Motorcycle Club, Washington, D. C., held a most interesting run on Memorial Day to Gettysburg, Penn. A large number attended.



Two Satisfied Harley-Davidson Riders—Walter and Ernest Jackson, en Route from Providence, R. I., to Dover, N. H.

Recently 18 motorcycle riders started on a run from Niagara Falls to Lewiston, Lockport and Buffalo, and at Lewiston it was decided to hold a meeting and organize the Niagara Falls Motorcycle Club. The following officers were elected: President, Homer Cumberland; vice president, Albert Wienkie; secretary-treasurer, J. MacPherson; captain, William Coleman; lieutenants, R. H. Douglas and Sylvester Wagner.

The Fond du Lac Motorcycle Club, Fond du Lac, Wis., has a membership of 30 and has taken new quarters on East First street, where it will welcome visiting clubs.

At Vancouver, B. C., motorcycles have been barred from Stanley Park, but a committee of the Vancouver club recently held a conference with the park commissioners, who agreed to amend the by-laws, permitting the two-wheeled vehicles the privileges of the park.

1913 F. N. SHAFT-DRIVE MOTORCYCLES.

Lightweight Single, with Two-Speed Gear $275
Only Machine Built With Handle Bar Control of Clutch.
Four-Cylinder $300
With Handle Bar Control of Clutch $350
Two-Speed Gear, Extra $50
Equipment includes two brakes, footrests if desired, compound spring fork, combined luggage carrier and stand.

American F. N. Company, Boston, Mass.

Branch—415 Trumbull St., Hartford, Ct.

JOIN THE F. A. M.

which is the National Organization fostering the interests of motorcyclists along legislative and other lines. Cut this out, mail it, and you will get the reasons.

E. M. ESTABROOK
Chairman Membership Committee Federation American Motorcyclists,
BANGOR, MAINE.

Please send me the F. A. M. Booklet and all information interesting to prospective members.

Name .....

Address .....

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NEWS OF THE MANUFACTURER AND DEALER.

The following concerns have been incorporated recently to manufacture or deal in motor cars, accessories, etc.:

Darling Automobile Manufacturing Company, Britton, Okla.; $25,000; C. P. Stealey, A. W. Hedge, H. O. Crum, George E. Crawford, S. L. Sintaffer, D. L. Sellers, W. C. Settle, H. S. Emmerson, C. L. Stealey.

Chattanooga Buick Company, Chattanooga, Tenn.; $15,000; K. McKarger, George D. Lancaster, P. Campbell, H. C. McVey.

Original Puncture Fix Company, Dallas, Tex.; $5000; A. Marks, Vincent L. Hughes, A. F. Weisberg.

Sacred Heart Automobile Company, Sacred Heart, Minn.; $10,000; J. H. Sagnes, P. O. Melsneas, T. Arestad, W. A. Day, E. P. Dosseth.

Platte Center Automobile Company, Platte Center, Neb.; $15,000; E. J. Macken and others.

Auto Owners' Sales Company, Los Angeles, Cal.; $10,000; A. G. Heskett, F. L. Toombs.

Autopart Company, Los Angeles, Cal.; $10,000; H. L. Kimmell, W. C. Hanson, John H. Lane.

Michigan Motor Car Company, Memphis, Tenn.; $5000; I. Bennett, C. V. York, J. J. Carrigan.

F. P. Motor Wagon Company, Pierre, S. D.; $250,000; Thomas F. Graham, Edward E. Slade, William G. Price, R. J. Reynolds, L. L. Stephens.

Pacific KisselKar Company, San Francisco, Cal.; $500,000; G. W. Emmons, H. K. Butterfield, E. Roger Stearns, G. A. Kissel.

Empire Auto Company, Webb City, Mo.; $2400; W. L. Miller, J. Caesar, W. S. Miller.

Canham Auto Company, Wahpeton, N. D.; $25,000; Roland Canham and others.

West Motor Car Company, Topeka, Kan.; $10,000; H. G. West, F. Langley, L. Langley, J. E. Folley, F. A. Folley.

St. Louis Motor 'Bus Company, St. Louis, Mo.; $2000; Robert J. Kirkwood, James A. Rector, Walter R. Wayne.

Western Co-Operative Auto Supply Company, Topeka, Kan.; $25,000; M. T. Kemper, M. C. Wells, J. H. Walters, T. R. Paxton, J. R. Mulvane.

Variable Clutch & Variable Transmission Company, Seattle, Wash.; $100,000; to manufacture clutches and transmissions; C. E. Lawson, H. A. Emery and others.

Velie Motor Car Company, Salt Lake City, Utah; $5000; Thomas E. Kelly, J. R. Hall, O. M. Olsen.

Davis Livery & Motor Car Company, San Antonio, Tex.; $10,000; E. E. Davis, Earl Wood, R. L. Aspley.

Himeloch Auto & Taxi Company, $1000; Isaac Himeloch, Joseph Himeloch.

Liquid Tire Company, Kansas City, Mo.; $125,000; Charles S. Wright, George L. Schofield, Clay W. Prewett.

E. Landis Auto Company, Kansas City, Mo.; $5000; Emanual Landis, M. J. Oldham, W. G. Bryant, M. S. Kenney, W. J. Gregg.

American Motor Company, Galveston, Tex.; $2000; John Christensen, John Rasmussen, Gaston Weigel.

American Gas Engine Company, Davenport, Ia.; $500,000; J. E. Burmeister, A. Clifford, C. A. McCune.

Texas Carriage & Top Company, $10,000; John R. Patton, Charles E. Gardner, S. U. Turney.

WITH THE MANUFACTURERS.

The Chemical Rubber Company of Western Pennsylvania is the name of a new company organized at Pittsburg, Penn., to manufacture a tire filler. The men behind the concern are: Allen W. Pence and Charles Mesta of Pittsburg, Grant Cummings of Springdale and W. H. Snyder of Beaver. Offices will be established in People's Bank building and a factory erected on Grant boulevard.

E. L. Atkinson, general manager of the Lange Motor Truck Company, Pittsburg, Penn., is on an extended business trip, during which he will visit Baltimore, Philadelphia, New York and Boston.

E. W. Lyle, formerly connected with the Alden Sampson branch of the United States Motors Company, has recently associated himself with the Adams Bros. Company, Findlay, O., maker of Adams trucks, as superintendent.

M. Lucien Louys, director and manager of Les Fils de Peugeot Freres, manufacturer of the Peugeot racing car which won the sweepstakes prize at Indianapolis, Memorial Day, recently visited Toledo as the guest of the Willys-Overland Company, maker of Overland cars.

Samuel Hill, president of the American Road Builders' Association, at the invitation of President George McAneny of the Borough of Manhattan, and President Cyrus C. Miller of the Borough of the Bronx, New York City, recently delivered an illustrated address on "The Highways of the Northwest" before an assemblage of over 50 municipal engineers who are in charge of the highways of Greater New York.

The Metz Automobile Company, Waltham, Mass., maker of Metz cars, has opened temporary salesrooms on the second floor at 1700 Broadway, New York City. E. L. Rieser is manager.

The Gramm Motor Truck Company, Lima, O., maker of Gramm trucks, will enlarge its factory this summer. It is the intention to increase the output to 50 trucks daily.

The Goodyear Tire & Rubber Company, Akron, O., manufacturer of Goodyear tires, has commenced the construction of an elaborate factory building at Seattle, Wash., which will have a floor area of 10,000 square feet.

F. E. Moskovics, who recently resigned as sales manager of the Remy Electric Company, Anderson, Ind., has purchased an interest in the Jones Electric Starter Company of Chicago, maker of Jesco electric lighting and starting systems. Mr. Moskovics will have charge of sales and at the next directors' meeting will be elected an officer in the comapny, it is said. He has been in the automobile business 15 years, both as an engineer and sales manager. He designed and built the Yellow Bonnet taxicabs, and also designed the Allen-Kingston car in New York City.

I. W. Penniman, who has been New England sales manager of the Walpole Tire & Rubber Company, maker of Walpole tires, has been made general sales manager of the same concern with offices at 757 Boylston street. He has had wide experience in the tire business, being previously with the Goodyear Tire & Rubber Company and for four years its branch manager at Portland, Me.

George H. Duck has resigned as general service manager of the American Locomotive Company. Mr. Duck organized the service department of the company and put it on its present basis, establishing systems that are being followed generally by other concerns. He was formerly branch manager for the Matheson Automobile Company before joining the Alco concern.

The Henderson Motor Car Company, Indianapolis, Ind., announced its 1914 line of Henderson cars during the progress of the recent 500-mile race, the new models being displayed in the Hotel Claypole. An accompanying illustration presents the exhibit, which attracted not a little favorable comment from all who saw it.

The Bosch Magneto Company, New York City, announces the following Bosch distributors: Oskamp Auto Supply Company, Race and Seventh streets, Cincinnati, O.; Gus Habich, 142 East Washington street, Indianapolis, Ind.; Kimball-Upson Company, 609-611 K street, Sacramento, Cal. The following Bosch supply stations have also been designated by the company: S. S. Parmalee Company, Second and Poplar streets, Macon, Ga.; Lackawanna Automobile Company, 314 Adams avenue, Scranton, Penn.; Armstrong Auto Company, St. Joseph, Mo.; Electric Manufacturing Company, St. Paul, Minn.; Edwards & Dickey, 13 Vaughan street, Portsmouth, N. H.; Susquehanna Motor Car Company, Wilkesbarre, Penn.; John F. Esser, 58 Broadway, Flushing, N. Y.; Spokane Cycle & Supply Company, Spokane, Wash.

The Adams Bros. Company, Findlay, O., maker of Adams trucks, has appointed the following agencies: Holcomb Company, New Haven, Conn.; Fisher & Lambing, Kittanning, Penn.; Charles R. Roehl, Caracas, Venezuela; Cuba Electric Supply Company, Camajuani, Cuba.

The Cole Motor Car Company, Indianapolis, Ind., maker of Cole cars, has designated the following distributors: Ellingson Bros., Sioux Falls, S. D.; De Smet Auto Company, De Smet, S. D.; Gas Belt Auto Company, Pierre, S. D.; H. J. Hooper, Mitchell, S. D.; Abel Mitchell, Madison, S. D.; S. L. Canevascini, Petaluma, Cal.; Clayton & Donahay, Freehold, N. J.; Laing Machine-Auto Repair Company, Plainfield, N. J.; Leon M. Bolter, Grand Rapids, Mich.; E. A. Landes, Hastings, Neb.; Sellick Bros., Edmonton, Alberta, Can.; Edward Klein, Farmington, Mo.; E. J. Love Motor Company, Raton, N. M.; A. M. Urquhart, Huron, S. D.; Thomsen Bros., Round Lake, Minn.

The Keeton Motor Company, Detroit, maker of Keeton cars, has announced the opening of its 1914 season and the following distributors have been appointed: H. A. Dougherty, 1525 Grand avenue, Kansas City, Mo.; John A. Bender Company, 2807 Michigan avenue, Chicago; Lin-

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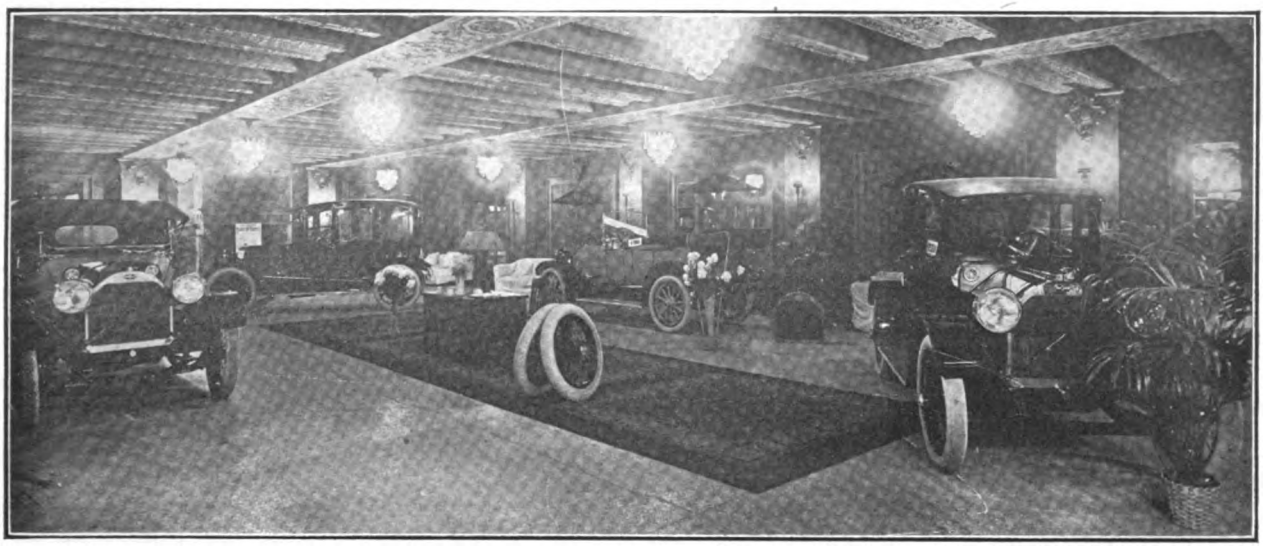
coln Automobile Company, Lincoln, Neb.; G. N. Jordan, 310 Union Oil building, Los Angeles, Cal.; C. Thompson, Rochester, N. Y.; L. Streuberm, Erie, Penn.; W. B. Doan, 643 Washington avenue, Brookline, Mass.; Davenport Automobile Company, Davenport, Ia.; Southern Motors Company, Jacksonville, Fla.; Usborne & Whitson, Ltd., Woodward avenue, Detroit; Engineers Podrowsky & Feyerabend, Sagorondy 21, St. Petersburg, Russia; J. Azevedo & Cia, Rua dos Ourives, 45, Rio de Janeiro, Brazil.

The Franklin Automobile Company, Syracuse, N. Y., has named the following dealers as its representatives: Franklin Motor Car Company, Spokane, Wash., and Walla Walla, Wash.; Franklin Motor Car Company, 3340 Main street, Kansas City, Mo.; Jacob Struhldreher, Youngstown, O.

The Chandler Motor Car Company, Cleveland, O., which was recently formed to manufacture the Chandler car, has announced the following appointments of distributors of its product: C. S. Ransom, Albany, N. Y.; Charles R. Fluke, Altoona, Penn.; Cole Motor Sales Company, Baltimore, Md.; Chandler Motor Car Company of New England, Boston; J. N. Bulkley, Bridgeport, Conn.; Tanner Motor Car Company, Brooklyn, N. Y.; Iowa Motor Sales Company, Cedar Rapids, Ia.; S. H. Stern, Chicago; J. L. Russell, Chicago; Lozier Sales Company, Cleveland, O.; Jenkins & Co., Des Moines, Ia.; Grant Bros., Detroit; Stirling Bros. Company, Erie, Penn.; Brant Bros., Indianapolis, Ind.; Burke Bros. Company, Jersey City, N. J.; Sparks-Miller Motor Company, Los Angeles, Cal.; Blomberg Auto Company, Memphis, Tenn.; Archambault Motor Sales Company, Milwaukee, Wis.; Whiting Motor Company, Newark, N. J.; Holcomb Company, New Haven, Conn.; Brady-Murray Motors Corporation, New York City; W. L. Huffman, Omaha, Neb.; John Van Benschoten, Poughkeepsie, N. Y.; Chandler Motor Car Company, Philadelphia, Penn.; Whiting Motor Car Company, Philadelphia, Penn.; Strong Crittenden Company, Rochester, N. Y.; E. C. Eads, St. Joseph, Mo.; Overland Auto Company, St. Louis, Mo.; S. G. Chapman, San Francisco, Cal.; Conrad-Chandler Motor Car Company, Scranton, Penn.; Clayton Gibson, Seattle, Wash.; R. A. McKee, Springfield, Mass.; Miller Company, Washington, D. C.; Central Auto & Supply Company, Waterloo, Ia.; Wilmington Automobile Company, Wilmington, Del.; Canadian Motor Car Company, Ltd., Winnipeg, Can.; W. J. Woods, Worcester, Mass.; Standard Automobile Garage, Uniontown, Penn.; Hoffmeister Bros., Vancouver, B. C.

F. E. Wilson has severed his connection with the Tone Car Corporation, Indianapolis, Ind. maker of Tone cars, and has joined the sales force of the Marathon Motor Works, Nashville, Tenn., maker of Marathon cars. His headquarters will be at Dallas, Tex.

Production Manager Max Wollering of the Studebaker Corporation, who was reported to have joined the Maxwell Motor Company in a similar capacity, denies the report and states he will not break his long term contract with the Studebaker concern.



Exhibition of 1914 Henderson Models at Hotel Claypole, Indianapolis, Ind., During the Recent 500-Mile Race, by the Henderson Motor Car Company of That City.

GARAGE AND DEALER.

The Automobile Accessories Company, of which William P. Yost is president, has opened its new headquarters at Grant boulevard and Craig street, Pittsburg, Penn.

The Boston Automobile Dealers' Association at its annual meeting elected the following officers: President, J. H. MacAlman; vice president, J. S. Hathaway; treasurer, F. A. Hinchcliffe; secretary, Chester I. Campbell; directors, J. H. MacAlman, J. S. Hathaway, F. E. Wing, C. E. Fay, J. W. Bowman, E. A. Gilmore, F. A. Hinchcliffe, C. P. Rockwell and J. W. Maguire.

E. C. Morton, formerly with the Automobile Accessories Company, Pittsburg, Penn., is now with the Pittsburg Auto Equipment Company. He has taken charge of the new branch store recently opened at Grant boulevard and Ridge street.

Harry Branstetter, who was until recently assistant manager of the KisselKar Company at Chicago, has taken charge of the branch at Kansas City of the Cole Motor Car Company, Indianapolis, Ind., maker of Cole cars.

Thomas Hustwick, formerly connected with the Oldsmobile branch at Boston, has transferred his interests to the Oakland Motor Company in that city.

Moore & Bearce, conducting the Central garage at Tulare, Cal., has dissolved, the interests of both parties being taken over by J. H. Scott, who will conduct the business along former lines.

Harry Nestlewode, Fostoria, Ia., has taken over the garage business and Oakland agency, conducted under the name of Nestlewode Bros., Charles Nestlewode having retired from the business.

P. J. Hurley, formerly a real estate dealer, has purchased the White garage at Ft. Madison, Ia., and has taken possession. He will conduct a garage and repair shop.

The New York Sales Company, Binghamton, N. Y., has formally opened its new $35,000 garage at State and Collier streets. The company handles Cole, Hudson, Paige and Chevrolet cars and carries a line of accessories and supplies for these machines.

The Carolina Motor Company is erecting a garage on Broad street, and N. W. Fox is having one erected on North Center street, both at Salisbury, N. C.

A. E. Stegerm, formerly with the United Garage Company, Toledo, O., has leased the ground floor of the Meredith building on Jefferson avenue and Michigan street and will operate a garage under the name of City garage. The building is being remodelled.

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RECENT PATENTS.

Oil Spraying Apparatus, Franklin C. Pillsbury, Boston, assignor to Walter Cressy, Gloucester, Mass., No. 1,062,029. The combination with a tank wagon having a discharge pipe and a valve in said pipe, of a spray pipe communicating with the discharge pipe, a steam pipe communicating with said discharge pipe intermediate the valve and the tank whereby steam may be admitted to the tank through the discharge pipe, a steam pipe communicating with said discharge pipe in rear of the valve whereby steam may be blown through the spray pipe, and means for applying a pressure to the tank above the liquid therein.

Dirigible Headlight, Louis Marcel Gabriel Lourdin, Paris, France, No. 1,062,883—A dirigible headlight comprising in combination a lamp having trunnions, a revoluble fork having bearings for said trunnions, a revoluble shaft near the end of said fork, a pinion on one of said trunnions, a pinion on said revoluble shaft, connections between said pinions, a second shaft mounted so as to be capable of both swinging and revolving on its axis, and a cardan joint connecting said shafts, substantially as described.

Automobile, Fred Drew, Boston, No. 1,062,898—The combination with the body of an automobile having front and rear seats and side doors, of a collapsible cover secured to the back of the front seat and arranged when extended to inclose the space between the front and rear seats to form a storage space, means whereby the collapsible cover may be locked in operative position, and securing means for the doors inaccessible when the cover is extended.

Automobile Tire, William F. Haas, Hartford, Conn., No. 1,063,196. A tire or shoe comprising superposed layers of endless, circular, knitted bands, each without lap or seam, said bands being formed of a continuous thread or yarn knitted in a circle of a diameter substantially the same as the diameter of the tire or shoe, and having the ribs or chain of the knitting stitch extending transversely of the bands, whereby the threads or yarns are not severed at the edges of the bands, and a resilient cementing compound impregnating the superposed bands.

Crankshaft, Henry L. Bock, Toledo, O., assignor to William L. Bock of the same city, No. 1,063,323. A crankshaft having a multiple section sheet metal crank arm, the sections being secured together to form a space therebetween, one of said sections having an outwardly drawn hollow shaft part and another having an outwardly drawn hollow wristpin part, with each of said parts in communication with said space.

Clamp, Jacob Diehl, Sheboygan, Wis., No. 1,063,332. A C clamp, having a screw fitted in one terminal, an abutment plate connected to the screw by a ball and socket joint, two plates connected together and having terminal straddling lugs pivoted astride the other terminal of the clamp for back and forth swinging movement relatively to the abutment plate of the screw, and two abutment plates connected each by a ball and socket joint to the two swinging plates and for co-operation with the abutment plate of the screw.

Valve Mechanism, Oscar Treier, Brooklyn, N. Y., No. 1,063,477. In a valve mechanism for engines the combination with the engine cylinder having an admission and outlet passage, of a tubular valve chamber, having an admission opening at one end, an exhaust opening at the other and circumferential openings in alignment with the said passage, a tubular valve body slidably mounted in said chamber and having circumferential openings, the inner end of said valve body being tightly closed and the outer end thereof being open, a nozzle in the interior of said tubular valve directed toward the said closed end of the latter, said valve being adapted to alternately establish communication between the said cylinder and the said chamber to permit the fuel to exhaust, and between its interior and the said cylinder to admit fresh fuel.

COMING EVENTS.

July.

July 1—Manufacturers' tour, Indianapolis-San Francisco.
July 4—200-mile race, Columbus, O.
July 4—Track meet, Taylor, Tex.
July 4—Panama-Pacific road race, Los Angeles, Cal.
July 4—Track meet, Washington, D. C.
July 4-5—Track meet, Sioux City, Ia.
July 4-6—Road race, Tacoma, Wash.
July 11-19—A. A. A. tour, Minneapolis-Glacier Park.
July 20—Track races, Seattle, Wash.
July 21-25—Tour, Seattle, Wash.
July 27—Tour, Grand Rapids, Mich.
July 27-28—Road races, Tacoma, Wash.
July 28-30—Beach races, Galveston, Tex.

August.

Aug. 12—Reliability run, Kansas State Automobile Association.
Aug. 29—Chicago Trophy race, Elgin, Ill.
Aug. 30—Elgin Trophy race, Elgin, Ill.
Aug. 30-Sept. 6—Reliability tour, Chicago, Ill.

September.

Sept. 1—Fire chiefs' convention, Madison Square Garden, New York.
Sept. 1—Track races, Columbus, O.
Sept. 12—Track races, Youngstown, O.

October.

Oct. 4-11—Around Lake Michigan tour, Chicago Motor Club.

November.

Nov. 24—Vanderbilt Cup race, Savannah, Ga.
Nov. 26—Grand Prize race, Savannah, Ga.

FOREIGN.

July.

July 1-16—Plowing competition, Winnipeg, Manitoba.
July 12—Grand Prix race, Amiens, France.
July 19-20—Grand Prix race, Belgium.

August.

August 10—Hill climb, Mount Ventoux, France.
August 15—Hill climb, Tonale, Italy.

September.

September 28—Hill climb, Mont Verdun, France.

NEW PUBLICATIONS RECEIVED.

Arizona Tour Book—Compiled and published by Harry Locke for the Arizona Good Roads Association, Prescott, Ariz. Contains 200 pages of detailed information concerning road conditions, touring maps, routings, etc., covering the state. Fully illustrated. Price $2.

The Ideal Tour—Compiled and published by Almon C. Judd, The Elton, Waterbury, Conn. Illustrated routings for the so-called Ideal Tour of New England, occupying 11 days, with connection from the West and South, fully revised and brought up-to-date. Mailed free upon request.

Pastime Journeys for Electric Automobiles—Published for the Electric Motor Car Club of Boston by F. D. Stidham, 138 Pearl street, Boston. Contains a series of routes with Boston as a centre, practical for electric automobiles, with charging stations in the various cities indicated.

Gas Engines and Producers—Comprises three parts, the first two being devoted to gas and oil engines, by Lionel S. Marks, S. B., M. M. E., and the last taking up gas producers, by Samuel S. Wyer, M. E. A treatise on the modern development of the internal combustion motor and of efficient methods of fuel economy and power production. Fully illustrated. Published by American School of Correspondence, Chicago. Price, $1.

Electric Vehicles—Published by the Electricity Magazine Corporation, Monadnock building, Chicago, now incorporated with Ignition. The May number contains the following articles of special interest: "The Electric Vehicle Association of America," S. F. McIntyre; "Co-Operation in Electrical Vehicle Progress," Arthur Williams; "Charging Your Own Car," John B. Rathbun; "How a Woman Sells Electrics," Mabel Condon; "Some Facts About Storage Battery Electrolyte," Hudson F. Smith; "Up-Keep Cost, Horse Drawn vs. Electric Vehicles," W. R. Metz; "Some Recent Electric Truck Applications," Fred W. Harrington; "Significance of Electric Truck Recorders," E. E. Witherby, and the electric pleasure car specifications for 1913.

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ROADS CONGRESS IN DETROIT.

Annual Convention of National Bodies to Meet There in September.

The American road congress will hold its third annual meeting at Detroit during the week of Sept. 29. This decision was reached by the joint committee of which Logan Waller Page, director of the United States office of public roads, is chairman, after a spirited contest which finally narrowed down to the cities of St. Louis, Denver, Minneapolis and Detroit.

The congress is the great national assemblage of the good roads organizations throughout the United States and is held under the direction of the American Highway Association, American Automobile Association and the National Association of Road Machinery & Material Manufacturers, the latter organization being concerned primarily with the exposition of machinery and materials held in conjunction with the congress.

As there are between 30 and 40 state and interstate organizations identified with the American Highway Association in addition to its 1800 regular members, the big meeting will be thoroughly representative in character. Arrangements have been made to hold the annual meeting of the Michigan State Good Roads Association, which has 15,000 members, the newly formed Michigan Trunk Line Association, and the Ontario Good Roads Association, in connection with the congress. The combined attendance of these various organizations will be well over 5000 and will set a record far in advance of attendance figures at any previous good roads meeting held in the United States.

PLANNING OWNERS' EVENT.

Manhattan Automobile Club Would Hold Contest on Prince Henry Tour Rules.

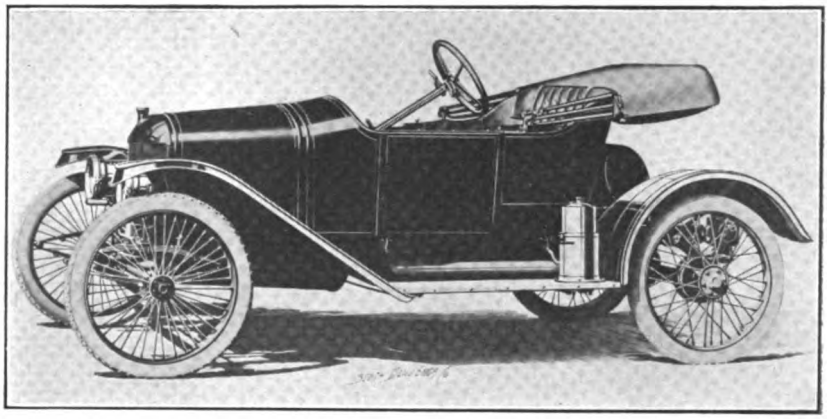
The Manhattan Automobile Club, New York City, which is coming to the front as an active organization in the motor world, is planning for some time in September a tour intended primarily for owners of motor cars rather than for the trade. Work on this is to be started soon. If there is a trade division it is stated that it will be kept entirely separate.

If such an event is held it is planned to have it on lines of the Prince Henry tour abroad, in which many distinguished car owners have competed. It has been recommended that there be some sort of time regulation based on an observation of the speed laws, so that the tour will not be a race, as it might be with go-as-you-please regulations and no penalty except for failure to arrive on time.

THE NEW GRANT CAR.

Uses Four-Cylinder, 15 Horsepower Engine and Weighs but 930 Pounds.

Announcement of the organization of the Grant Motor Car Company, Detroit, is made elsewhere in this issue, and an accompanying illustration presents the product of the concern. The new Grant car is small in size, having a wheelbase of only 90 inches, although the tread is standard, 56. The weight is very light, being but 930 pounds.



The New Grant Car, Rated at 15 Horsepower and Weighing 930 Pounds.

The motor is a four-cylinder unit of the long stroke type rated at 15 horsepower, and is made especially for this machine. The clutch is a cone member and the transmission is incorporated with the rear axle. The driver is placed at the left with the control levers in the centre. Wire wheels are fitted as standard equipment.

The machine is no sense a new product, the first model having been produced by the designer, George Salzman, in Mishawaka, Ind., about a year ago, and having undergone severe road tests since that time. It is understood that it has been passed upon by a number of automobile engineers who predict a satisfactory future for it.

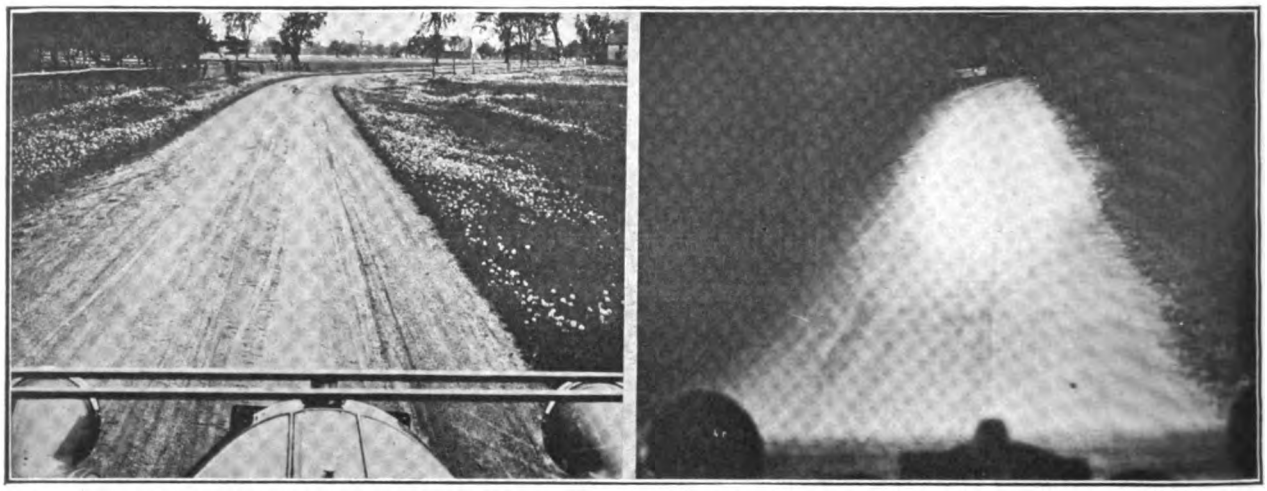
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LIGHTS ON MUDGUARDS.

New Pierce-Arrow Cars Inaugurate an Innovation in This Respect.

The value of the headlight lies in its ability to so project the beam of light that the driver is enabled to see the road ahead as well as to completely illuminate the sides of the roadway. The Pierce-Arrow Motor Car Company, Buffalo, N. Y., maker of the Pierce-Arrow car, believes it has solved this problem in the most efficient manner by placing the headlights on its new models directly on the mudguards.

An accompanying illustration shows the arrangement, and also indicates its value in illuminating the curves. The two photographs, which are presented here side by side, were taken at the same spot, the first in the daytime and the other at night. The curve is 750 feet from the car.



Showing Efficiency of Headlights Incorporated with the Mudguards on New Pierce-Arrow Cars, the Two Photographs Being Taken at the Same Point.

SPLITDORF DURING THE RACE.

Maker States That All Cars Thus Equipped Came Through Without Trouble.

According to the Splitdorf Electrical Company, Newark, N. J., maker of the Splitdorf magneto and spark plugs, misleading newspaper reports, arising through the lack of authoritative information as to the ignition equipment on several cars taking part in the Memorial Day 500-mile race on the Indianapolis speedway, have created a false impression as to the performance of machines equipped with Splitdorf ignition. It adds that all cars in the event thus equipped came through without the suggestion of ignition trouble, their failure to win out being attributable to divers other causes.

Louis Disbrow, who drove the Case so masterfully, and who was in the lead of the Splitdorf equipped machines at the finish, covers the situation, insofar as Splitdorf ignition is concerned, when he says: "The Splitdorf magneto in the race gave the perfect satisfaction that it has always given me during my five years of racing."

THOSE BRAENDER TIRES.

Additional Evidence of the Manner in Which They Withstood Racing Test.

The Braender Rubber & Tire Company, Rutherford, N. J., may be pardoned for again calling the attention of the motoring public to the fact that four of its Braender tires went through the 500-mile race on the Indianapolis motor speedway, Memorial Day, without change. The following extract appeared in the report of the race written by a member of the staff of the Indianapolis Star, who has witnessed all the 500-mile events:

> Such a record speaks volumes for the car and casts much credit on the driver, but the real glory of the epoch-making performance goes to the tires. Three 500-mile races have been held in Indianapolis. In the first two events cars were few which even carried one casing throughout the grind. Dawson did it in the second race and the occurrence received much comment. This year the record of having the same four tires which started the race and finished it was made.
>
> Too much cannot be said for a tire which will withstand 500 miles of the hardest usage to which rubber can be subjected. The feat approached the marvelous. Starter Root, when seen yesterday noon, asserted that he looked at the tires at the finish of the race, and they showed little sign of wear. "Never in my life," he said, "have I seen tires withstand such a strain."

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NATIONAL RELIABILITY RUN.

Expected That at Least 50 Cars Will Take Part in Next Month's Contest.

It is anticipated that fully 50 cars will take part in the contest for the new A. A. A. trophy in the national reliability tour of the American Automobile Association from Minneapolis to Glacier national park, July 11-19. Already it is announced that some 30 entrants have filed application with Dr. C. E. Dutton, chairman of the touring board.

The tour will be novel in a number of respects, but chiefly from the fact that it will be the first in which American Indians have competed. It also will be the initial appearance of a Canadian as a contestant, an entry having been received from a resident of Fort William, Ont. Several women will drive their own cars. The full list of entrants is not ready for publication, but contains the following:

C. H. Metz, C. Walter Metz and George H. Voter, representing Boston, Metz cars; Louis W. Hill, chairman of the board of directors of the Great Northern Railroad; Reuben Warner, H. C. Irvine and W. A. Ramaley, St. Paul; Dr. J. D. Park, Duluth; J. A. Bailey, Alexandria, Minn.; C. E. Christman, Ortonville, Minn.; L. M. Bolter, Grand Rapids, Mich.; G. E. Raymond, Asa Paine, Charles Gates, F. C. Legg, F. M. Mapes and C. E. Van Duzee, Minneapolis; O. R. Brictson, Brookings, S. D.; Mrs. Lillian Mendel, Mt. Vernon, N. Y.; Mrs. Dudley Hershey, Minneapolis; Long Time Sleep, Glacier Park reservation; Horse's Ghost, Ft. Peck reservation.

BOSTON'S CHILDREN'S DAY.

Sixth Annual Outing for Crippled and Orphaned Girls and Boys.

More than 3000 children, crippled or orphaned, inmates of Boston institutions, were given an outing at Nantasket beach June 11. The generosity of the Boston motor dealers and owners of cars, as well as a number of public spirited people who assisted with cash donations, made the outing possible. It was the sixth annual outing under the direction of the Boston Automobile Dealers' Association, Inc., and was under the personal management of Chester I. Campbell, secretary of the association, who has also had charge of previous events.

The children were given every opportunity to enter the water and enjoy other sports arranged for them. The dinner at the pavilion was a real treat and consisted of all the good things usually found at the shore. Many of them had never before ridden in a motor car or seen the ocean and it is safe to say that all will cherish in their hearts a warm feeling for the Boston automobile dealers even after they shall have grown to the adult state.

IMPORTS AND EXPORTS.

Figures for Month of April as Reported by the United States Government.

The exports of American automobiles for April exceeded those of the same month a year ago, while the imports showed a corresponding decrease. The following are the figures as prepared by the Department of Commerce of the United States:

	Imports.			
	1912		1913	
Country	No.	Value	No.	Value
France	34	$74,489	14	$28,069
Germany	8	20,075	7	20,199
Italy	3	7,579	10	21,866
United Kingdom	10	23,817	4	12,783
Other countries	4	7,896	9	23,151
Totals	59	$133,856	44	$106,068
	Exports.			
France	104	$66,683	144	$99,300
Germany	64	46,735	108	104,095
Italy	21	16,181	43	34,865
United Kingdom	579	463,560	373	292,167
Other Europe	169	132,093	262	224,606
Canada	809	1,004,638	1048	1,326,079
Mexico	16	22,291	10	15,950
West Indies and Bermuda	43	34,415	30	28,957
South America	131	167,911	243	287,404
British Oceania	134	137,124	169	184,649
Asia and other Oceania	140	160,215	201	192,594
Other countries	28	28,353	135	113,558
Totals	2238	$2,280,199	2766	$2,904,224

The fuel committee of the Society of Automobile Engineers has recommended that an appropriation of $20,000 be made to install a laboratory, equip it properly, employ a trained expert and maintain the laboratory for a year. The committee making the report was composed of E. E. Sweet, C. E. Grimes and N. B. Pope. The fuel investigation was ordered by the Automobile Chamber of Commerce and the cost is to be borne by the manufacturers. It is proposed to use the laboratory to test all new appliances intended to make use of the heavier fuels which the shortage and rising price of gasoline have made essential. The committee recommended that the laboratory be established either in Indianapolis or Detroit.

E. W. Johnson, Fresno representative of S. G. Chapman, San Francisco, Cal., the northern California distributor of Hupmobile cars, made by the Hupp Motor Car Company, Detroit, recently created a new road record between Los Angeles and San Francisco by 3:05, making the distance in exactly 14 hours flat. The former record was held by the Cadillac car, made by the Cadillac Motor Car Company, Detroit.

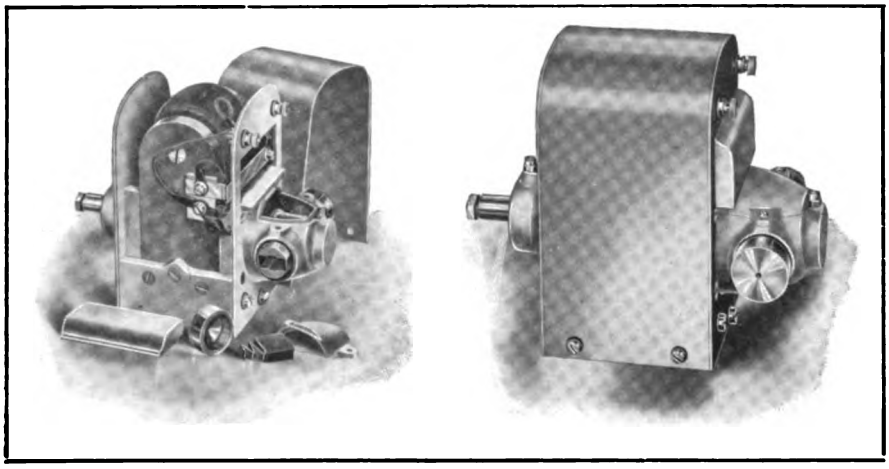
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ANNUAL BAY STATE OUTING.

Boston Motorists Enjoy a Day and Night at Lake Spofford, N. H.

The members of the Bay State Automobile Association and their guests, numbering about 150 people, enjoyed a delightful outing at Lake Spofford, N. H., June 16. Chairman W. H. Stevens of the runs and tours committee, and his associates, Walter Williams and Chase Langmaid, had everything ready for their reception when President Gilmore and his party arrived.

During the day the members patronized the lawn tennis courts and golf links, while there was also a ball game. In the evening the ballroom was the scene of a lively social event and it was voted one of the best outings ever held by the association. The tourists were given the choice of three different routes to the resort and all were well covered by various parties. The run home was made the following day.



Wells Lighting Generator with Cover Removed to Show Magneto Shunt Controlling Output.

GALVESTON BEACH RACES.

Plans Under Way for Another Meet This Year in July.

Plans for the race meet on the beach at Galveston, Tex., are under way and Capt. J. W. Munn recently visited the North in the interest of the event, which is to be held under the direction of the Galveston Automobile Club, July 28, 29 and 30. The big feature of the meet will be the 200-mile race, for which a prize of $5000 is offered.

Inasmuch as Pablo Beach and Ormond-Daytona in Florida no longer hold out inducements for beach racing, Galveston is approaching this enterprise in a big way and expects to eclipse the meets of the past three years, which have been very successful. A representative of the Galveston club interviewed a number of the drivers at Indianapolis who competed in the 500-mile race and many of them have signified their intention of entering.

WELLS LIGHTING DYNAMO.

Variable Speed of Car Is Compensated for by Magnetic Shunt.

While it is a simple matter to construct a dynamo for lighting purposes when the machine is driven at a constant speed, the utilization of a generator on the automobile presents problems among which is the compensation of the variable speeds of the motor. The R. C. Wells Manufacturing Company, Fond Du Lac, Wis., maker of the Wells lighting generator, holds that its system operates perfectly at all ratios.

The Wells generator is very compact, weighs but 19.5 pounds, and is of the bipolar type. It supplies current direct to the lamps, the storage battery being utilized as an auxiliary and when the voltage of the dynamo falls below a predetermined value. The control of the current is automatic, being held at a proper value by a magnetic shunt.

This device is simple in construction and operation, weakening the current when the output would be too strong or augmenting it when of low value. An automatic magnetic switch is utilized for opening and closing the circuit between the generator and battery, the latter being brought into service at very low car speeds. One of the features emphasized with the Wells is that the cells are properly charged at all times and that being constructed of high grade material and workmanship, it requires no other attention than an occasional oiling.

The last two days of the 32nd annual exhibition of the Taylor Fair Association, Taylor, Tex., July 3-4, will be devoted to motor racing under the rules and sanction of the contest board of the A. A. A. Three races will be conducted each day.

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ANNUAL TOURING NUMBER.

The Automobile Journal's Seventh Routing Guide to Be Issued July 10.

The Seventh Annual Touring Number of The Automobile Journal will be issued July 10. In keeping with the demand for authentic information covering all phases of motor touring, every effort has been made to compile a list of routes, including every section of the United States, a portion of Canada and some of the richest touring ground in Europe. New features have been added, which are expected to meet with decided approval. Aside from the tours themselves, full information is given concerning the motoring laws of the several states, shipping the car abroad, sailing dates, preparation of the car for the season's touring and its care and maintenance, while en route, wearing apparel for men and women, etc.

Inasmuch as the Annual Touring Numbers of The Automobile Journal are retained in constant use, being carried in the car throughout the entire touring season, it has been decided to bind this edition in a heavy cover, thereby making it even more serviceable in this respect. Particular attention has been paid to the matter of illustrations, from the special cover design throughout the entire magazine. In every way the number will be an edition de luxe.

Anticipating a large demand for this number, several thousands additional copies will be printed, but as there already is a large waiting list it is advisable to place orders for the extra copies needed as early as possible.

PLANS FACTORY ADDITION.

Service Recorder Company Expanding Under Direction of New General Manager.

H. T. Boulden, formerly general sales manager of the Ohio Motor Car Company, Cincinnati, O., maker of Ohio cars, is now vice president and general manager of the Service Recorder Company, Cleveland, O. With a modern, aggressive executive of Mr. Boulden's type, who has had wide experience in the pleasure car and motor truck industries, the Servis recorder is expected to become a decided factor in the accessory field.

An active sales organization has been brought together and 15 factory branches already have been established. To afford adequate facilities for meeting the increased sales an addition to the present plant is contemplated at East 105th street and Quincy avenue, Cleveland.

RED ROLL AUTO WASTE.

Novel and Convenient Form of Compressing Waste Into Individual Rolls.

Waste is indispensible to the motorist. It is superior to other forms of material, such as cloth for example, as it readily absorbs all lubricants and moisture. Having a fine texture it may be utilized on highly polished surfaces without danger of scratching and it makes an excellent polishing material. Until very recently waste came in bulk; that is, in large bundles. When purchasing in this form it is necessary to break or tear the material to secure a handful and this method leads to waste as frequently too large a quantity is used.

The Union Wadding Company, Pawtucket, R. I., has originated a novel method of compressing into a single sturdy container, 12 separate handfuls of waste, each one of which may be taken from the package without disturbing the others. As will be noted by the accompanying illustration the material is compressed into a compact roll, sufficient for all ordinary requirements. The advantage of this packing is obvious. It keeps the waste clean, prevents it tangling up tools, etc., when carried in the tool box; can be stored in a very small space and is always handy for use. The package is but 12 by three inches, and the container is of sturdy construction. The waste is a specially selected long fibre. The Union Red Roll Auto Waste is not only inexpensive, but the convenience of the package will appeal to automobilists, motor boat men and the garage man. It has been placed on sale at garages and supply houses.



Illustrating the Convenience and Compactness of the Union Red Roll Auto Waste, Marketed by the Union Wadding Company.

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"Always There"

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may have its advantages from a Congressional standpoint, but PERSONAL INVESTIGATION cannot be surpassed as a means of obtaining a real intimate knowledge of the superior qualities of SPLITDORF SPARK PLUGS.

And SPLITDORF PLUGS will come through any and every personal investigation—no matter how thorough, or how searching—with the unqualified endorsement of: "THE BEST SPARK PLUG ON THE MARKET."



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FACTORY: NEWARK, N. J.

ST. PETERSBURG EXHIBITION.

Representatives of American Automobile Manufacturers Meet with Much Success.

With much pomp and ceremony the international automobile exhibition was opened recently at St. Petersburg, Russia, and it was one of the most successful events ever held in that country. That Russia is just realizing the advantages of motor vehicles, both from a standpoint of travel and utility, is apparent, for the government officials are displaying much interest in the subject and have encouraged manufacturers in foreign countries, and particularly those in the United States, to exhibit their machines there. Russia has many bad roads and although the demand for motor cars is increasing rapidly, the country itself has only two small factories.

The cars made in this country are better suited to road conditions in Russia than many of those produced abroad. At this show there are 65 exhibitors, as follows: Germany, 26; France, 17; England, nine; Italy, six; United States, six; Belgium, four; Russia, two; Switzerland, two; Sweden, two; Austria, one. The business done thus far is reported to have left much to be desired as prospective purchasers were still hesitating. However, representatives of American automobiles reported better results in thise line than did most of the others.

ADDS ONE-TON MODEL.

Charles L. Barker, Norwalk, Conn., to Increase His Line Very Materially.

Charles L. Barker, Norwalk, Conn., builder of engines and the Barker three-ton truck, has begun the construction of Barker one-ton motor wagons, in which a combination of the best tried and proven units, assembled in the simplest and most practical forms for commercial service, are to be united to make a most serviceable vehicle. It is stated that the new departure of Mr. Barker contains a considerably smaller number of parts than do a majority of the motor vehicles of its class.

The machine is being built with a view of filling the needs of farmers and others having loads of moderate size and is so designed that the comparatively low upkeep cost enables the truck to do the work of from two to four double teams according to the length of the haul.

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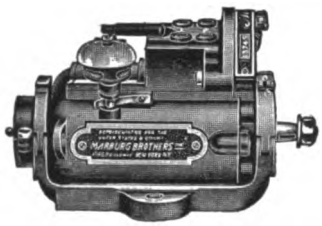
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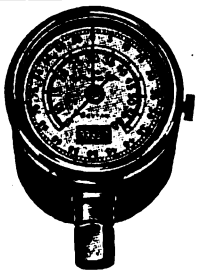
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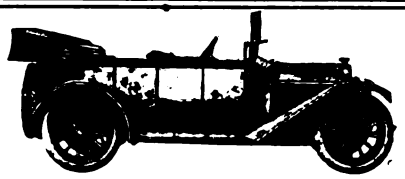


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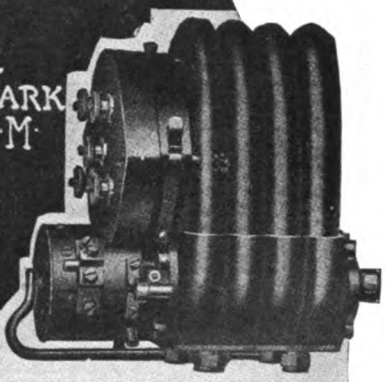
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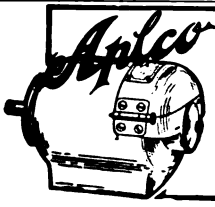
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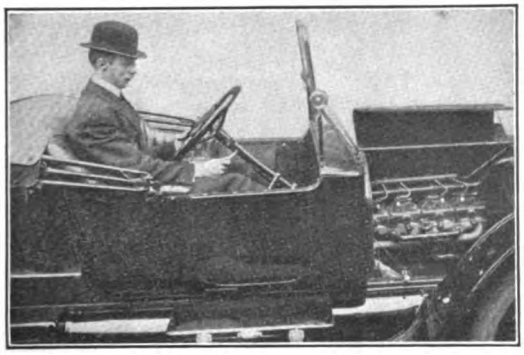
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By using the M&M Economizer.

WHAT YOU CAN DO WITH THE M&M ECONOMIZER!

YOU can save from 40 to 50% of gasoline. YOU can obtain 20% more speed and power than you can without it. YOU can develop more power in high altitudes. YOU can keep the cylinders clean and cool your engine at all times. YOU can use the M&M just like the coaster brake on a bicycle. YOU can use it as an air brake in descending grades, at the same time taking off the ignition. YOU can save wear and tear on clutch brakes and tires. YOU can immediately secure the proper mixture for different weather conditions without readjusting your carburetor. YOU can set your throttle at 12 miles per hour, and increase your speed and power to 18 or 20 miles, with the same amount of gasoline, and less carbon, simply by opening the M&M Economizer.

Pat. Europe Pat. America



Showing M&M Attached with ½" Elbow.

The M&M is nickel plated and highly polished. It is made with one ground valve and six portholes, which when open, admit auxiliary air into the manifold. The gas coming from the carburetor is broken up and sprayed by the incoming air, so that when it reaches the cylinders it is a gas of the greatest explosive power.

READ WHAT A MITCHELL OWNER SAYS ABOUT THE M&M!

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Gentlemen:—I have had the M&M Economizer installed on my 1910 Model T 35 h. p. Mitchell Touring Car, and I am very much pleased with it. It does all you claim for it in saving gasoline, and also gives more speed and power. It also saves clutch and brakes, and, in fact, it is the finest attachment I have ever seen. Yours very truly, WM. F. UTHE. (Signed)

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Mechanically correct—easy to operate—perfect in material and workmanship. Used as standard equipment on the better cars.

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25 Miles to Gallon

PAID FOR ITSELF

Lawrence, Mass., May 16, 1913.
Gentlemen:—I get 20 miles and over on a gallon and I never got more than 14 miles on the ——— I took off. G. A. Schmidt.

19 to Gallon on Cadillac

Planhard Co.—Edgewater, N. J., May 21, 1912.
I am very much pleased with my new Planhard Carburetor. I made a test of gasoline consumption from Edgewater to Hyde Park, N. Y., and return, and got a fraction over nineteen miles to the gallon. This is on my Cadillac.
John H. Hinners.

18 Miles on Buick

Malvern, Iowa, April 8, 1913.
Gentlemen:—The Planhard beats anything I ever saw. My first run was 55 miles on 3 gallons, and roads not good anywhere, 20 miles being very hilly and rough. An auto man said it was simply a wonder. It is a peach. Impossible to make it miss. Lots of power. All O. K. believe me. J. A. Tyler.

3¾ More Miles

When Planhard Carburetors were put on the 6 cylinder, 4 cycle Frisbie motor of the fast boat Delphi II, she increased 230 R. P. M., and 3¾ more miles per hour.

Much More Power

Bath Marine Construction Co.—"The gasoline consumption at normal power was better than others and it would develop much more power when pushed." H. D. Bacon, President.

On a Ford

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Gentlemen:—After taking the old Carburetor off my Ford car and putting on a Planhard, I increased my mileage from 18 to 25 miles per gallon, and my engine, which was a notorious heater, runs as cool as desirable for the best results. I am using 60 to 62 gasoline, and as I have a hydrometer, I know what I am talking about. A. W. Grandon.

Gallon Less Per Hour

on semi-speed boat

HARTFORD III

owned by A. N. Smith, Portland, Maine, who gets better control.

Old Glory II

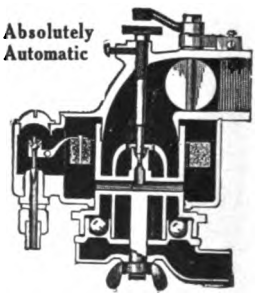
had a Planhard on her Loew-Victor on her famous trip to Nova Scotia.

Valient II and Alfred S

took all their prizes with Planhards on Metropolitan motors.

Emerson III

made a mile in 1 minute 8 seconds over the Washington government course with Planhards.



Absolutely Automatic

Note Simplicity.

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J. G. Davis, 1224 Music St., New Orleans, La.

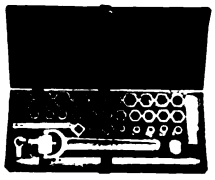
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Gentlemen:—Send at once your chart and book concerning Planhard Carburetor.
Name .....St.....
City .....State.....
Engine .....Carburetor....Size....in.
Threaded? Flanged? Horizontal? Vertical?

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"The demand of the day is that an organization shall be judged by its product and not by what it claims for itself." Keep this in mind when you examine the 1913 models of the Abbott-Detroit.
Advance Catalog on Request.

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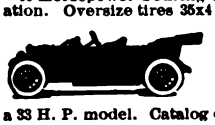
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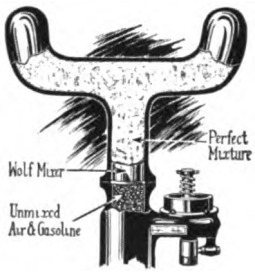
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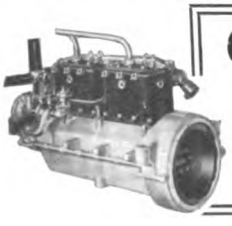
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General Motors Truck Co., 26 Cadillac Ave., Pontiac, Mich. (G. M. C.)
Branches: See Cars—Gasoline Commercial.

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Branches: See Cars—Gasoline Pleasure.

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Dover Stamping & Manufacturing Co., Cambridge, Mass. (Dover.)

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Dean Electric Co., Elyria, O. (Dynalux.)

Geissler Bros. Storage Battery Co., 514-520 W. 57th St., New York.

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Harris Oil Co., A. W., 326 South Water St., Providence. (Harris.)
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Haws, Geo. A., 142-144 Front St., New York. (Panhard.)
Branch: 899 Boylston St., Boston.

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Invader Oil Co., 80 Broad St., New York. (Invader.)
Branches: 284 Columbus Ave., Boston; 113 Arch St., Philadelphia; 3556 11th St., N. W., Washington, D. C.

Miller, Chas. R., 97-103 Reade St., New York. (Pan-American.)
Branches: See Accessory Manufacturers and Jobbers.

New York & New Jersey Lubricant Co., 165 Broadway, New York. (MoToRol, Non-Fluid, Kejex.)

Standard Oil Co., New York. (Polarine.)
Branches: In all cities.

Texas Company, The, 7 West St., New York.
Branches: Boston, Philadelphia, Chicago, St. Louis, Norfolk, Atlanta, New Orleans, Dallas, El Paso, Pueblo, Tulsa, Houston.

Vacuum Oil Co., Rochester, N. Y. (Mobiloil.)
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Valvoline Oil Co., 27 State St., Boston. (Valvoline.)

MAGNETOS AND SUPPLIES.

Bosch Magneto Co., 223-225 W. 46th St., New York.
Branches: 119-121 E. 24th St., Chicago; 1250 Woodward Ave., Detroit; 357 Van Ness Ave., San Francisco.

Brets Co., J. S., 250 W. 54th St., New York. (U. & H.)

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Marburg Bros., 1790 Broadway, New York. (Mea.)

Remy Electric Co., Anderson, Ind. (Remy.)

Splitdorf Electrical Co., 98 Warren St., Newark, N. J.
Branches: 10-20 W. 63rd St., New York; 1110 S. Michigan Ave., Chicago; 180-182 Massachusetts Ave., Boston; 1028 Geary St., San Francisco; 972 Woodward Ave., Detroit; 1228 S. Olive St., Los Angeles, Cal.; S. W. Corner Cherry and Juniper Sts., Philadelphia; 1823 Grand Ave., Kansas City; 1628 Broadway, Seattle, Wash.; London, Eng.; Buenos Aires.

MEASURES.

Dover Stamping & Manufacturing Co., Cambridge, Mass. (Auto and Savol.)

MIXING DEVICES, GASOLINE.

Approved Auto Specialties Co., 1731-37 Broadway, New York. (Wolf.)

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CLASSIFIED BUYERS' GUIDE—Continued

Royal Equipment Co., 422 Housatonic Ave., Bridgeport, Conn. (Gyrex.)

MOTORCYCLES AND SUPPLIES.

American F. N. Co., Boston. (F. N.)
Branches: 49 Union St., Providence; 415 Trumbull St., Hartford, Conn.
Hawthorne Manufacturing Co., 29 Spruce St., Bridgeport, Conn. (Old Sol Lamps.)
Miami Cycle & Manufacturing Co., 320 Hanover St., Middletown, O. (Flying Merkel.)

MOTORING ORGANIZATIONS.

Federation American Motorcyclists, E. M. Estabrook, Bangor, Me.

MOTORS AND POWER PLANTS.

Continental Motor Mfg. Co., Detroit. (Continental.)
Rutenber Motor Co., Marion, Ind. (Rutenber.)

PACKING, FIRE.

Johns-Manville Co., H. W., Madison Ave. and 41st St., New York City.

PAINT, ANTI-RUST.

Anti-Rust Paint Co., Dept. 7, Akron, O. (Thomas.)

PATCHES.

Invincible Puncture Proof Tire Co., 52 Sabin St., Providence, R. I. (Invincible.)
National Motor Supply Co., 1911 Euclid Ave., Cleveland.

POLISH.

International Metal Polish Co., Quill St. and Belt R. R., Indianapolis, Ind. (Blue Ribbon.)
Johns-Manville Co., H. W., Madison Ave. and 41st St., New York City.

PRIMERS.

Interstate Auto Accessory Co., Indianapolis. (Ideal.)

PUBLICATIONS, AUTOMOBILE.

The Automobile Journal, 24 issues, $1.00 the year.
The Motor Truck (Commercial Car) Monthly, $1.00 the year.
The Accessory and Garage Journal, Monthly, $1.00 the year.
The A B C of Aerial Navigation.....$1.00
The A B C of Motor Car Operation..... .50
Overhauling, Rebuilding and Equipping the Motor Car..... .50
Lighting the Motor Car by Electricity.. .50
The A B C of Internal Combustion Engine Maintenance and Repair..... .25
The A B C of Carburetor Construction, Maintenance and Repair..... .25
The A B C of Magneto Systems..... .25
The A B C of Battery Ignition Systems .25
The Motorcycle, Maintenance, Repair and Construction..... .25
The A B C of Motor Car Chassis Maintenance and Repair..... .25
Maintenance and Repair of Motor Car Tires..... .25
Sent Postpaid to any address in United States upon receipt of price. Address all communications to The Automobile Journal, Pawtucket, R. I.

PUMPS, OIL AND GREASE.

Randall-Faichney Co., Boston. (B-Line.)
Branches: See Horns.

PUMPS, TIRE.

Brown Co., Syracuse, N. Y. (Brown Impulse.)
Dewey-Anderson Co., Toledo, O. (Dewey Power.)
Hawthorne Manufacturing Co., Inc., 29 Spruce St., Bridgeport, Conn. (Hawthorne.)

RADIATOR CONNECTORS.

Johns-Manville Co., H. W., Madison Ave. and 41st St., New York City.

RIMS—REMOVABLE AND DETACHABLE.

Boyd, F. Shirley, 903 Boylston St., Boston. (Dorian.)
Firestone Tire & Rubber Co., Akron, O.
Branches: In all principal cities.
Standard Welding Co., Cleveland, O. (Stanweld.)
United States Tire Co., Broadway and 58th St., New York. (Continental and Whittlesey Demountable.)
Branches: New York, Chicago, San Francisco.

ROAD BUILDING MATERIALS.

Barrett Manufacturing Co., New York. (Tarvia.)
Branches: Chicago, Philadelphia, Boston, St. Louis, Cleveland, Pittsburg, Cincinnati, Kansas City, Minneapolis, New Orleans, Seattle, London, Eng.; Montreal, Toronto, Winnipeg, Vancouver, Can.; St. John, N. B.; Halifax, N. S.

SELF-STARTERS.

Willard Storage Battery Co., 5716 Euclid Ave., Cleveland. (LBA.)
Branches: See Batteries.

SHIELDS, MOTOR.

Johns-Manville Co., H. W., Madison Ave. and 41st St., New York City. (Asbestos.)

SHOCK ABSORBERS AND SUPPLEMENTARY SPRINGS.

Boyd, F. Shirley, 903 Boylston St., Boston.
Sager Co., J. H., 271 South Ave., Rochester, N. Y. (Peerless.)
Sumner, George, Inc., 1926 Broadway, New York. (Velvet Auxiliary, Acme.)

SOAPS.

Hopewell Brothers, Newton, Mass. (Paes.)
Branch: 1974 Broadway, New York.

SOLDERS.

Simplex Aluminum Solder Co., 108 Broadway, Long Island City, N. Y. (Simplex.)

SPARK PLUGS AND IGNITERS.

American Ignition Co., 819 Adams St., Dorchester, Mass. (Amico.)
Bosch Magneto Co., 223-225 W. 46th St., New York.
Branches: See Magnetos and Magneto Supplies.
Heinze Electric Co., Lowell, Mass. (H. E. Co. Priming.)
Janney, Steinmetz & Co., Philadelphia.
Johns-Manville Co., H. W., Madison Ave. and 41st St., New York City.
Mosler, A. R., & Co., P. O. Box M, Mt Vernon, N. Y. (Spit Fire.)
Randall-Faichney Co., Boston. (Mac-Kae.)
Branches: See Horns.
Splitdorf Electrical Co., 98 Warren St., Newark, N. J.
Branches: See Magnetos and Supplies.
Standard Co., The, Torrington, Conn. (Black Eagle.)

SPARK PLUG TERMINALS.

Johns-Manville Co., H. W., Madison Ave. and 41st St., New York City.
Randall-Faichney Co., Boston. (Mac-Kae Blits.)
Branches: See Horns.

SPEEDERS.

Interstate Auto Accessory Co., Indianapolis. (Ideal.)

SPEEDOMETERS, RECORDERS, ETC.

Hoffecker Co., The, Motor Mart, Boston. (Hoffecker.)
Jones Speedometer, New Rochelle, N. Y.
Branches: Broadway and 76th St., New York; 109 Massachusetts Ave., Boston; 1416 Vine St., Philadelphia; 1430 Michigan Ave., Chicago; 852 Main St., Buffalo; 253-255 Jefferson Ave., Detroit; 580 Golden Gate Ave., San Francisco; 1229 So. Olive St., Los Angeles, Cal.; 329 Ankeny St., Portland, Ore.; 917 E. Pike St., Seattle, Wash.
Service Recorder Co., 2245 East 105th St., Cleveland. (Servis.)
Stewart-Warner Speedometer Corp., Chicago, Ill. (Auto-Meter.)
Branches: 116 Edgewood Ave., Atlanta, Ga.; 925 Boylston St., Boston; 720 Main St., Buffalo; 2420 Michigan Ave., Chicago; 807 Main St., Cincinnati; 2062 Euclid Ave., Cleveland; 1518 Broadway, Denver; 870 Woodward Ave., Detroit; 230½ North Illinois St., Indianapolis; 1618 Grand Ave., Kansas City; 748 S. Olive St., Los Angeles, Cal.; 1902 Broadway, New York; 802 N. Broad St., Philadelphia; 5940 Kirkwood Ave., Pittsburg; 14 N. Seventh St., Portland, Ore.; 36-38 Van Ness Ave., San Francisco; 611 E. Pike St., Seattle, Wash.; 3923 Olive St., St. Louis; 580 Yonge St., Toronto, Can.

SPRINGS FOR AUTOMOBILE SUSPENSION.

Marburg Bros., Inc., 1700 Broadway, New York. (Marburg-Hagen.)
Perfection Spring Co., No. 1 Plant, 2414 Superior Ave., N. W.; No. 2 Plant, East 65th and Central Ave., Cleveland.

SPROCKETS.

Boyd, F. Shirley, 903 Boylston St., Boston. (Baldwin.)

STEEL PARTS, SEAMLESS.

Standard Welding Co., Cleveland.

STORAGE SYSTEMS—GASOLINE AND OIL.

Janney, Steinmetz & Co., Philadelphia.
Scaife & Sons Co., Wm. B., Pittsburg, Penn.
Branch: New York City.

SWITCHES, LOCK.

Blackburn Specialty Co., 1120 Prospect Ave., S. E., Cleveland. (Autolock.)

TANKS, ACETYLENE GAS.

Prest-O-Lite Company, 271 East South St., Indianapolis. (Prest-O-Lite.)
Branches: See Cylinder Cleaning Compound.

TANKS FOR FUEL AND WATER.

Janney, Steinmetz & Co., Philadelphia.
Scaife & Sons Co., Wm. B., Pittsburg, Penn.
Branch: New York City.

TANKS, TIRE INFLATING.

Prest-O-Lite Co., 271 East South St., Indianapolis. (Baby Tire Filler, The Emancipator.)
Branches: See Cylinder Cleaning Compound.

TAPE, ASBESTOS.

Johns-Manville Co., H. W., Madison Ave. and 41st St., New York City.

THERMOS CASES.

Dover Stamping & Manufacturing Co., Cambridge, Mass.

TIRE ACCESSORIES.

Firestone Tire & Rubber Co., Akron, O.
Branches: See Rims—Removable and Detachable.
Shaler Co., C. A., Waupun, Wis.

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CLASSIFIED BUYERS' GUIDE—Continued

TIRE CASES.

Hopewell Brothers, Newton, Mass. (Hopewell.)
Branch: 1974 Broadway, New York.

TIRE CHAIN GRIPS. (See Chains.)

TIRE PRESERVATIVES AND PROTECTORS.

Approved Auto Specialties Co., 1731-37 Broadway, New York. (Goodman Tire Shield.)
Grey Specialty Co., 148 Avon Ave., Newark, N. J.
National Rubber Co., 4433 Papin St., St. Louis, Mo. (Tirenew.)
Page-Lester Co. 2644 Indiana Ave., Chicago. (Tite-Wad Rubber Putty.)

TIRE REMOVERS.

O-Tak-A Tire Remover, Le Roy, N. Y.

TIRES—CASINGS AND INNER TUBES.

Braender Rubber & Tire Co., Rutherford, N. J. (Braender.)
Dayton Rubber Mfg. Co., Dayton, O. (Dayton Airless.)
Diamond Rubber Co., Akron, O. (Diamond.)
Firestone Tire & Rubber Co., Akron, O. (Firestone.)
Branches: See Rims—Removable and Detachable.
Fisk Rubber Co., Chicopee Falls, Mass. (Fisk.)
Branches: 811-813 Boylston St., Boston; 17½ Dorrance St., Providence.
Frontier Tire & Rubber Co., 1054 Main St., Buffalo, N. Y. (Frontier.)
Gaulois Tire Co., 1926 Broadway, New York. (Gaulois.)
Goodyear Tire & Rubber Co., Madison St., Akron, O. (No-Rim-Cut.)
Branches: In all principal cities.
United States Tire Co., Broadway and 58th St., New York. (Continental, G & J, Hartford, Morgan & Wright.)
Branches: See Rims—Removable and Detachable.
Walpole Tire & Rubber Co., Walpole, Mass. (Walpole.)

TIRES—CUSHION.

Cataract Rubber Co., Wooster, O. (Cataract.)
Branches: Boston, New York, Providence.
Firestone Tire & Rubber Co., Akron, O. (Firestone.)
Branches: See Rims—Removable and Detachable.
Mots Tire & Rubber Co., The, Akron, O. (Electric Special Mots Cushion.)
Branches: Boston, New York, Philadelphia, Pittsburg, Chicago, Kansas City, Detroit, Cleveland, Los Angeles.

TIRES—MOTORCYCLE.

United States Tire Co., Broadway and 58th St., New York. (Morgan & Wright. G. & J.)
Branches: See Rims—Removable and Detachable.

TIRES—SOLID AND COMMERCIAL.

Diamond Rubber Co., Akron, O. (Diamond.)
Firestone Tire & Rubber Co., Akron, O.
Branches: See Rims—Removable and Detachable.
Fisk Rubber Co., Chicopee Falls, Mass.
Branches: See Tires—Casings and Inner Tubes.
Mots Tire & Rubber Co., The, Akron, O. (Mots.)
Branches: See Tires—Cushion.
Polack Tyre and Rubber Co., 246 W. 59th St., New York City. (Polack.)
Republic Rubber Co., Youngstown, O. (Republic.)
United States Tire Co., Broadway and 58th St., New York.
Branches: See Rims—Removable and Detachable.

TOPS AND ATTACHMENTS.

Springfield Metal Body Co., 20 Medford Ave., Springfield, Mass.

TROUBLE FINDERS.

Hopewell Brothers, Newton, Mass. (Vibrator.)
Branch: 1974 Broadway, New York.

TRUCKS AND TRACTORS—See Cars, Commercial.

TRUNK RACKS.

Connecticut Steel & Wire Co., Hartford, Conn.

TUBING, GAS.

Johns-Manville Co., H. W., Madison Ave. and 41st St., New York City.

TURNTABLES.

Beach Co., T. C., 108 Ottawa St., St. Johns, Mich. (Beach.)

UNIVERSAL JOINTS.

Brets Co., J. S., 520 W. 54th St., New York. (Hartford.)
Kinsler-Bennett Co., The, P. O. Box 134, Hartford, Conn. (Kant-Break.)

VALVE GRINDERS.

Wall, J. H., 290 Hope St., Bristol, R. I. (Ford.)

VULCANIZERS.

McVey Manufacturing Co., Third and Canal Sts., Dayton, O. (McVey.)
National Motor Supply Co., 1911 Euclid Ave., Cleveland. (Garage and Individual.)
Branches: In all principal cities.
Shaler Co., C. A., Waupun, Wis.
Vanderpool Tire & Rubber Co., Springfield, O.
Williams Foundry & Machine Co., Akron, O.

WELDING OUTFITS.

Prest-O-Lite Co., 309 W. South St., Indianapolis. (Prest-O-Welder.)
Branches: See Cylinder Cleaning Compound.

WELDING, STEEL.

Standard Welding Co., Cleveland.

WHEELS.

Eberly & Orris Mfg. Co., Mechanicsburg, Penn.
McCue Co., The, Buffalo, N. Y. (Wire.)

WIRES AND CABLES.

Diamond Rubber Co. of N. Y., Akron, O. (Diamond.)

WIRE MECHANISM.

Bretz Co., J. S., 250 W. 54th St., New York. (Bowden.)

WRENCHES AND COMBINATION OUTFITS.

Allen Wrench and Tool Co., Providence, R. I. (Allen Friction Socket Sets.)
Coes Wrench Co., Worcester, Mass.
Cutter, George A., Taunton, Mass.
Walworth Manufacturing Co., Boston. (Stillson.)

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THE AUTOMOBILE JOURNAL THE MOTOR TRUCK

THE ACCESSORY AND GARAGE JOURNAL

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The Automobile Journal Publishing Company

Times Building **Pawtucket, R. I.**

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Index to Automobile Manufacturers Who Have Contracted For



Storage Batteries

A

Abbott Motor Co.....Detroit, Mich.
Adams-Lancia Co.....New York City.
Allen Motor Car Co.....Fostoria, O.
Alpena Motor Car Co.....Alpena, Mich.
American La France Fire Engine Co....Elmira, N. Y.
American Locomotive Co.....Providence, R. I.
American Motors Co.....Indianapolis, Ind.
Ames Motor Car Co.....Owensboro, Ky.
Apperson Bros. Automobile Co.....Kokomo, Ind.
O. Armleder Company.....Cincinnati, O.
Auburn Automobile Co.....Auburn, Ind.
Austin Automobile Co.....Grand Rapids, Mich.
The Avery Company.....Peoria, Ill.

B

Bartholomew Company.....Peoria, Ill.
Benton Motor Car Co.....Benton, Ill.
Buckeye Manufacturing Co.....Anderson, Ind.

C

Canadian Standard Auto & Tract. Co..Fort Wayne, Ind.
Cartercar Company.....Pontiac, Mich.
J. I. Case T. M. Machine Works.....Racine Junct., Wis.
Chadwick Engineering Works.....Pottstown, Penn.
Chandler Motor Car Co.....Cleveland, O.
F. Coleman Carriage & Harness Co....Ilion, N. Y.
Columbus Buggy Company.....Columbus, O.
Commerce Motor Truck Co.....Detroit, Mich.
Corbitt Automobile Co.....Henderson, N. C.
Crane Motor Car Co.....Bayonne, N. J.
Crawford Automobile Co.....Hagerstown, Md.
Crescent Motor Company.....Cincinnati, O.
Crow Motor Car Co.....Elkhart, Ind.
James Cunningham Son & Co.....Rochester, N. Y.
Cutting Motor Car Co.....Jackson, Mich.
Croxton Motor Car Co.....Washington, Penn.

D

Geo. W. Davis Carriage Co.....Richmond, Ind.
De Dion Bouton.....New York City.
Dorris Motor Car Co.....St. Louis, Mo.

E

Enger Motor Car Co.....Cincinnati, O.
Elkhart Carriage & Harness Co.....Elkhart, Ind.

F

F. I. A. T. Company.....Poughkeepsie, N. Y.
Flanders Motor Co.....Detroit, Mich.
H. H. Franklin Manufacturing Co.....Syracuse, N. Y.

G

Gramm-Bernstein Company.....Lima, O.
Gramm Motor Truck Co.....Lima, O.
Gramm Motor Truck Co.....Walkerville, Ont.
Great Western Automobile Co.....Peru, Ind.

H

Havers Motor Car Co.....Port Huron, Mich.
Haynes Automobile Co.....Kokomo, Ind.
Henderson Motor Car Co.....Indianapolis, Ind.
Herreshoff Motor Co.....Detroit, Mich.

I

Ideal Motor Car Co.....Indianapolis, Ind.
Imperial Automobile Co.....Jackson, Mich.

J

Jackson Motor Car Co.....Jackson, Mich.

K

Kelly-Springfield Motor Truck Co.....Springfield, O.
King Motor Car Co.....Detroit, Mich.
Kissel Motor Car Co.....Hartford, Wis.
Kline Motor Car Co.....Richmond, Va.
Knox Automobile Co.....Springfield, Mass.
Krit Motor Car Co.....Detroit, Mich.

L

Lenox Motor Car Co.....Boston, Mass.
Lexington Motor Car Co.....Connersville, Ind.
Little Motor Car Company.....Flint, Mich.
Locomobile Co. of America.....Bridgeport, Conn.
Lozier Motor Car Company.....Detroit, Mich.
Lyons Atlas Company.....Indianapolis, Ind.

M

W. H. McIntyre Company.....Auburn, Ind.
McLaughlin Motor Car Co.....Oshawa, Ont.
Marathon Motor Co.....Nashville, Tenn.
Marion Motor Car Co.....Indianapolis, Ind.
Maritime Motor Car Co., Ltd.....St. John, N. B.
Martindale & Millikan.....Franklin, Ind.
Maxwell Motor Car Co.....Detroit, Mich.
Mercer Automobile Co.....Trenton, N. J.
Metzger Motor Car Co.....Detroit, Mich.
Michigan Buggy Co.....Kalamazoo, Mich.
Midland Motor Car Co.....Moline, Ill.
Mitchell-Lewis Motor Car Co.....Racine, Wis.
Moline Automobile Co.....East Moline, Ill.
Moon Motor Car Co.....St. Louis, Mo.
Motor Car Manufacturing Co.....Indianapolis, Ind.

N

Nance Motor Car Co.....Philadelphia, Penn.
National Motor Vehicle Co.....Indianapolis, Ind.
Nordyke & Marmon Co.....Indianapolis, Ind.
Norwalk Motor Car Co.....Martinsburg, W. Va.
Nova Scotia Carriage Co.....Kentville, N. S.
Nyberg Automobile Works.....Anderson, Ind.

O

Oakland Motor Car Co.....Pontiac, Mich.

P

Packard Motor Car Co.....Detroit, Mich.
Paige-Detroit Motor Car Co.....Detroit, Mich.
Palmer & Singer Manufacturing Co....Long Island City, N. Y.
Paterson Wagon Works.....Flint, Mich.
Peerless Motor Car Co.....Cleveland, O.
Pilot Motor Car Co.....Richmond, Ind.
Pope Manufacturing Co.....Hartford, Conn.
Premier Motor Car Co.....Indianapolis, Ind.
Pullman Motor Car Co.....York, Penn.

R

Regal Motor Car Co.....Detroit, Mich.
Renault Frerers Selling Co.....New York City.
Reo Motor Car Co.....Lansing, Mich.
Reo Motor Car Co. of Canada.....St. Catharines, Ont.
Russell Motor Car Co.....West Toronto, Ont.

S

Sayers & Scovill Co.....Cincinnati, O.
Schacht Motor Car Co.....Cincinnati, O.
Seagrave Company.....Columbus, O.
Selden Motor Car Co.....Rochester, N. Y.
Simplex Automobile Co.....New Brunswick, N. J.
A. O. Smith Company.....Milwaukee, Wis.
South Bend Motor Car Works.....South Bend, Ind.
Spaulding Manufacturing Co.....Grinnell, Iowa.
Speedwell Motor Car Co.....Dayton, O.
Stanley Motor Car Co.....Newton, Mass.
Staver Carriage Co.....Chicago, Ill.
F. B. Stearns Co.....Cleveland, O.
Stegeman Motor Car Co.....Milwaukee, Wis.
Sternberg Manufacturing Co.....Milwaukee, Wis.
Stevens-Duryea Co.....Chicopee Falls, Mass.
Stoddard-Dayton Co. (Maxwell).....Dayton, O.
Studebaker Corporation.....Detroit, Mich.

T

Tudhope Motor Car Co.....Orillia, Canada.

V

Vandewater & Company.....Elizabeth, N. J.
Velie Motor Vehicle Co.....Moline, Ill.

W

Warren Motor Car Co.....Detroit, Mich.
Wayne Works.....Richmond, Ind.
Webb Company.....Allentown, Penn.
Westcott Motor Car Co.....Richmond, Ind.
White Company.....Cleveland, O.
Wichita Falls Motor Co.....Wichita Falls, Tex.
Willys-Overland Co.....Toledo, O.
Winton Motor Car Co.....Cleveland, O.

Z

Zimmerman Manufacturing Co.....Auburn, Ind.

WILLARD STORAGE BATTERY CO.

Cleveland, Ohio

41

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FISK Tubes



Fisk Inner Tubes Are Not *Simply* Tubes

They Are Dollars in Your Pocket because they Greatly Reduce Your Tube Expense

FISK TUBES ARE PERFECT. There is no guess work, no chance about them. We have doubled the service and halved the expense for thousands of tube buyers. *We can do it for you.* Our confidence is based on a long record of actual accomplishment.

Fisk Tubes are pure gum tubes, made of the finest Pure Para Rubber vulcanized by the aid of sulphur to exactly the right degree to produce long life. You cannot take one of them in your hand without appreciating its quality from the texture.

Fisk Tubes have an original splicing which makes thin spots impossible. They are never porous. The construction is such that no imperfection can be present to develop a slow, but constant leak of air.

Send to Dept. 24 for Sample Section of Fisk Tube. It Tells the Story of Fisk Quality.

Fisk Tubes are built regardless of cost. The only economy which is recognized is that which we can ultimately offer YOU as a tire user. Only a tube built like the Fisk can give FISK SERVICE.

THE FISK RUBBER COMPANY

Factory and Home Office: CHICOPEE FALLS, MASS.

DISTRIBUTORS: THE FISK RUBBER COMPANY OF N. Y.

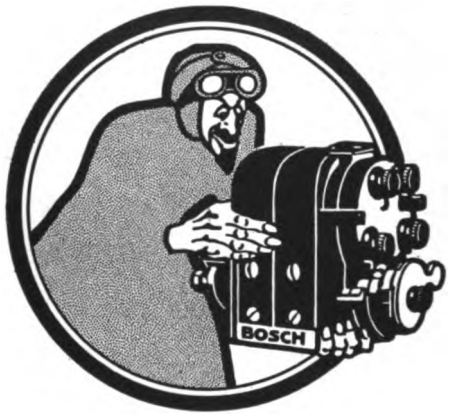
BOSTON: 811-813 Boylston Street **PROVIDENCE: 17 Dorrance Street**

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The Enjoyment of the Tour Depends on Your Equipment

IF your ignition system does not give you maximum results, if you experience that continual missing that racks engines and puts nerves on edge, if you don't obtain the economy and reliability that regularly is obtained from a Bosch Magneto and Bosch Spark Plugs, you can't enjoy your tour—you can't be satisfied.

Nearly Two Million Use the Bosch Magneto



Millions Now Use Bosch Spark Plugs

Bosch Magneto and Bosch Plugs

give the greatest economy. It is an ignition system of world-wide reputation for supplying continuous sparks at the precise moment and of such intensity as to assure the utmost efficiency and economy.

You can place every confidence in your ignition system if it is the Bosch System —you will have freedom from delays, you will have no expensive repairs, you will have absolute reliability and the greatest possible efficiency.

All the Good Cars Use Bosch—You Can Have Bosch Too

Be Satisfied *Write for Literature* *Specify Bosch*

Bosch Magneto Co., 204 West 46th St., New York

Maine Motor Car Co., Portland, Me.—Motor Parts Co., Boston—N. E. Distributors.

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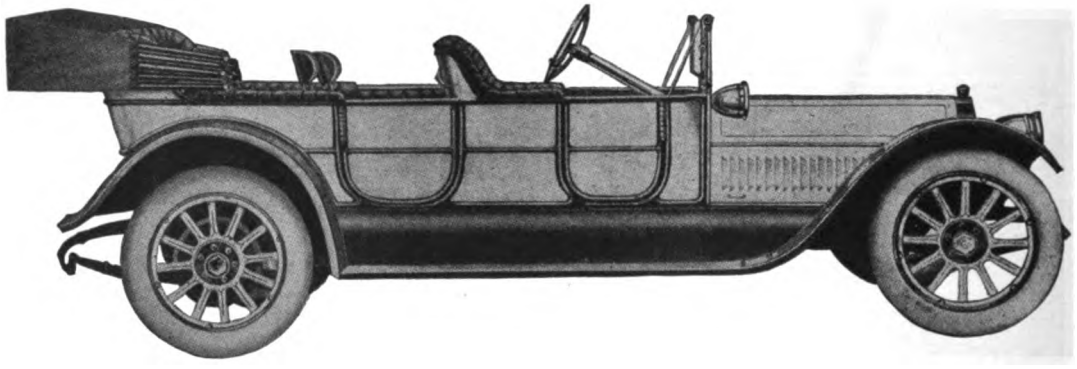
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We will (at small extra cost) furnish our Regular Models with the

AUSTIN

Two-Speed Axle

This axle provides two different gear ratios, both on direct drive, and in combination with a three-speed transmission gives six speeds forward and two reverse.



Model "77" has a Regular Direct Drive of 3 1-2 to 1, and a Special Direct Drive of 2 to 1.
Model "55" has a Regular Direct Drive of 4 1-2 to 1, and a Special Direct Drive of 3 to 1.

The Regular Direct Drive provides ample power and exceptional ease of control for hills, bad roads and crowded city traffic.

The Special Direct Drive for normal conditions, shows a gain of over 50% in mileage for the same fuel consumption and motor speed, eliminates the noise, wear and tear of running the motor at excessive speeds, adds materially to the life and durability of the car and pleasure of riding.

Model "77" Six Cylinders, 4 1-2 x 7 - - $6000.00
Model "66" Six Cylinders, 4 1-2 x 5 1-2 - - $5000.00
Model "55" Six Cylinders, 4 x 5 - - - $4000.00

MORE NEW, IMPROVED and **DISTINCTIVE FEATURES** than any other car. Two-speed rear axle, high pressure air self-starting system, complete electric lighting system, left hand steer, center control, two-spark magneto, four-speed transmission, both brakes controlled by foot pedals.

Write for complete description and any information you may desire in regard to our two-speed axle.

Austin Automobile Company

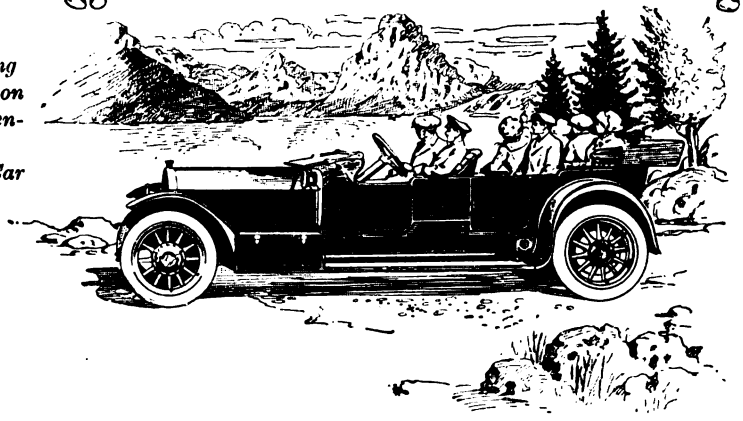
GRAND RAPIDS, MICHIGAN

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MARMON

"The Easiest Riding Car In The World"

Illustrating The Marmon "48" Seven-Passenger Touring Car



Touring in a Marmon---

is different. There is physical satisfaction in the luxurious comfort of the smooth, even-balanced bodies hung to absorb the shocks and bumps and make every road easier. There is mental satisfaction in the knowledge that every detail of this car is proved trustworthy and capable—that anywhere an automobile can go the Marmon will take you with safety and comfort.

Mr. Carl G. Fisher, president of the Prest-O-Lite Company, founder of the great Coast-to-Coast rock highway, and head of the Indianapolis Motor Speedway, recently purchased a Marmon "Thirty-Two" five-passenger touring car for his own use in the Indiana-Pacific tour of the I. A. M. A., leaving Indianapolis for San Francisco and Los Angeles, July 1st.

The touring records of the Marmon are ample proof of its value on the road.

In the Minneapolis-Helena, Montana, tour for the Minneapolis Journal trophy in 1911 the Marmon was the only registered stock touring car to finish the 1,461 miles with a perfect score—without even a tire change or puncture.

In 1912, it again won the same trophy in the tour to Winnipeg and return of 1,088 miles—again without even a tire change or a puncture.

In July, 1912, Four-States Tour of the Indiana Automobile Manufacturers Association it covered the 1,267 miles again without a tire change or puncture.

The wonderful performance of the Marmon, not only in these tours or in its world-famed list of racing victories, but in actual service in the hands of owners everywhere, is proof of its value. Its unusual balance of power to weight, its superlative endurance coupled with its luxurious and economical operation should command your investigation.

The Marmon "32"

A sensible, logical car—a car of moderate size and capacity, meeting every requirement for touring and city use, with the economy in tires, fuel and upkeep so important to the majority of motorists. Four-Cylinder, 32-40 h. p., 120-inch wheel base, electric starting and lighting system, with body types to meet every requirement and corresponding equipment. Touring Car, $3,000.

Detailed Information on Request

F. E. Wing Motor Car Co.

"Motor Mart", 12 Columbus Avenue,

Boston, Mass.

New England Dealers

Nordyke & Marmon Company

Indianapolis (Est. 1851) Indiana

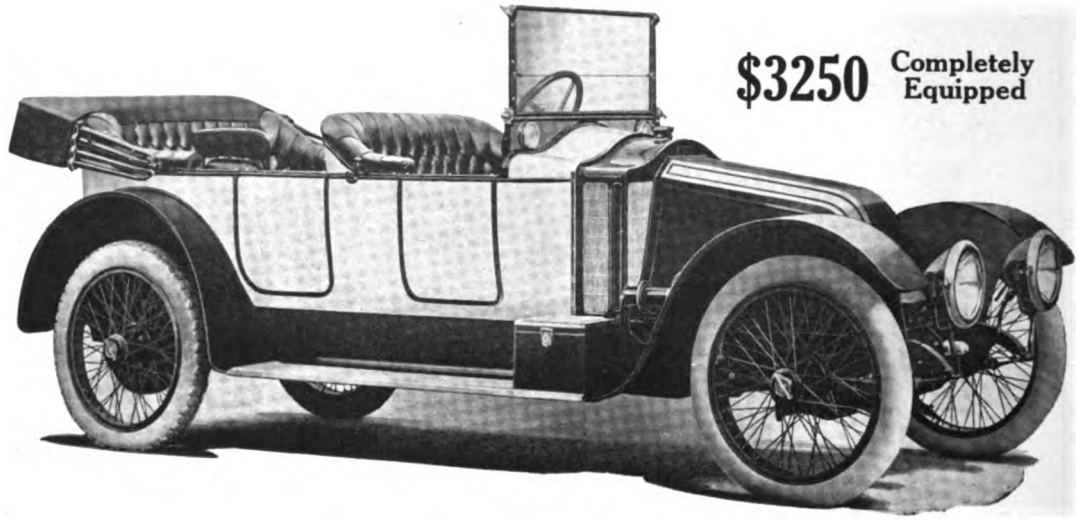
The Marmon "48"

Six-cylinder, 48-80 h. p., 145-inch wheel base—a large car with small car advantages, a car with short turning ability which eliminates the old objections to long wheel base—a car of wonderful and surpassing riding qualities: electric starting and lighting system, with body types to meet every requirement and corresponding equipment. Touring Car, $5,000.

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"SIX-48" KEETON

THE COOLEST CAR FOR SUMMER TOURING



"Six-48" Riverside Touring Car

In the hot summer months the front compartment in the ordinary type of fore door car is excessively warm, causing great discomfort to the occupants. This is due to the method of drawing the air through the radiator in front and forcing it back over the engine and out underneath the front floor boards. This hot air keeps the front compartment at an almost unbearable degree of temperature. Many makers have tried to overcome this by using ventilators, hinging the doors so that they are partly open—tilting the wind shield back and many other makeshifts that are only partly successful.

The front compartment of the Keeton is always at an even cool temperature. The hot air is forced out through the sides of the radiator away from the car. There is a draft of cool air under the front floor boards at all times.

The French type of the Keeton with its sloping hood also gives the driver a better view of the road directly in front of the car. This feature makes the Keeton more easily handled on rough roads or in night driving where it is imperative to get an unobstructed view of the road immediately in front of the car.

The long wheel base—wire wheels with big tires—long flat springs of special alloy spring Steels—the balance of weight gained by the dash location of the radiator—the light weight—smooth running 6 cylinder motor with its great freedom from vibration and the luxuriously roomy body all combine to insure an ease and comfort that is unequalled.

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All the accessories are placed in the handiest position, the clock and speedometer are mounted on the secondary dash and illuminated by the battery charging signal light and are plainly visible by the occupants of the tonneau.

The spare wire wheel is carried on a false hub over the gasoline tank at the rear of the car and is put on and taken off in the same manner as the other wheels.

The starting and lighting switch is easily reached by the driver—next to the gear shifting lever at his right hand.

In fact all the points in the Keeton construction show a careful application of sound engineering principles adapted to the convenience and comfort of the passengers.

Let us describe this car in detail to you.

KEETON
DETROIT, U.S.A.

IMPORTANT FEATURES
BRIEF SPECIFICATIONS

Electric starting.
Full electric light equipment.
Small 3¾-inch bore—long 5½-inch stroke.
Cylinders cast en bloc, large valves.
All moving parts completely enclosed.
Exceptionally powerful and flexible.
The most efficient cooling system in use today.
Radiator at rear of motor in proper and protected position.
Four speeds forward in transmission.
Direct on 3rd—geared up on 4th.
Left side drive—right hand control.
Wire wheels—60% more tire mileage.
Extra detachable wire wheel.
Long 136-inch wheel base—long springs, special alloy spring steel, nearly flat under load.
Chrome Vanadium Gears and Shafts on imported annular bearings.
Pressure gasoline feed.
Very roomy and comfortable bodies.
Best of foreign practice adapted to American road and touring conditions.

COMPLETE EQUIPMENT

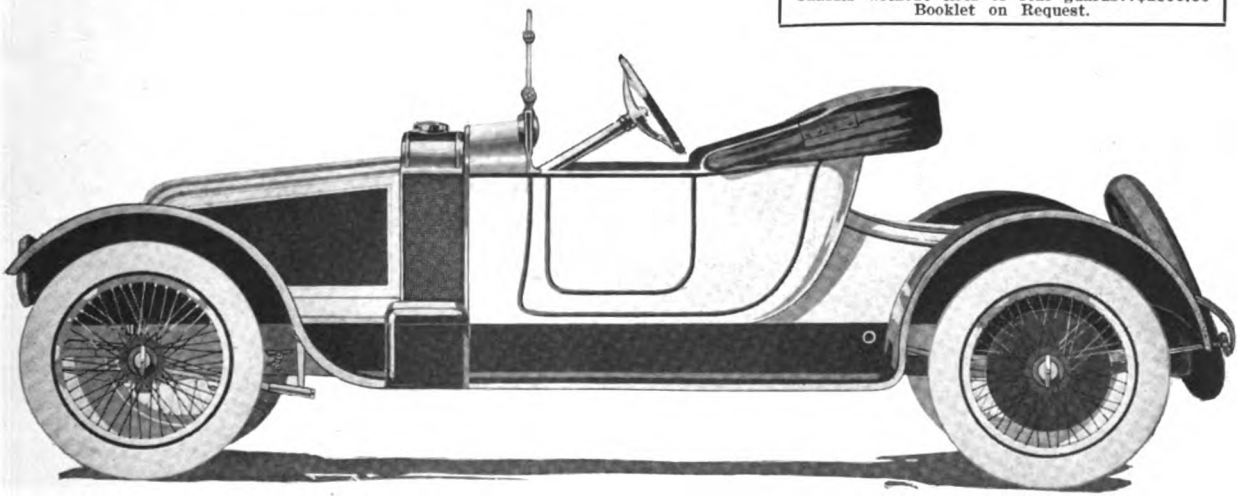
Electric starting and lighting system with 12½-inch headlights, dash lamps and tail lamp with license holder; 80-mile speedometer and eight-day clock combined with electric light; lamp for changing tires at night, with extension cord; dynamo electric horn; robe and foot rails; silk mohair top, with self-contained folding curtains and slip cover; double acting rain vision wind shield; option of wire wheels with extra detachable wire wheel or wood wheel with extra demountable rim; wheel or tire carrying irons; full set of tools; pump; jack and tire repair outfit; all touring bodies have two auxiliary seats.

THREE EXCELLENT MODELS

Prices F. O. B. Detroit.

Riverside Touring Car, 7 passenger, completely equipped.....$3250.00
Meadowbrook Roadster, completely equipped.....$3250.00
Tuxedo Coupe, completely equipped....$3500.00
Chassis without tires or rear guards..$2500.00

Booklet on Request.



"Six-48" Meadowbrook Roadster

KEETON MOTOR COMPANY

LAWTON AND BUCHANAN AVENUES DETROIT, MICH.

KEETON MOTORS, LTD. BRANTFORD, CANADA

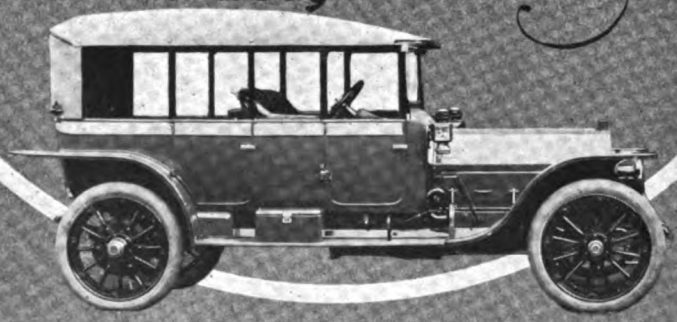
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SPRINGFIELD METAL BODY CO



Springfield Convertible Bodies
A Construction Giving the Qualities of a Limousine & Touring Equipment That May Be Converted as Quickly as a Folding Top Can be Raised or Lowered. When Folded the Full Space of the Touring Car is Available — When Raised It is a Regular Top or It Can Be Glass Enclosed.

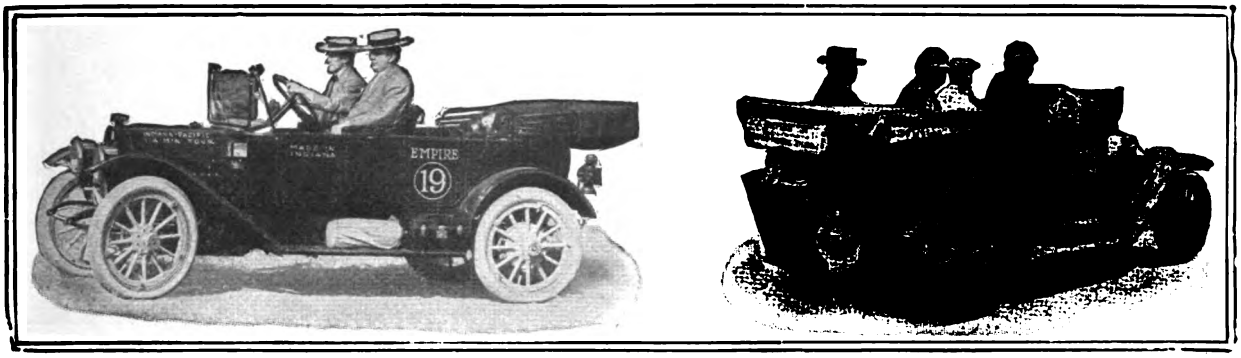
Dealers, Who Insist on Quality Equipment, Specify The Springfield Convertible Body.



SPRINGFIELD, MASSACHUSETTS

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The Touring Success of the EMPIRE



EMPIRE, the Lightest Entry in the Indiana-Pacific Coast Tour. Started July 1

The Empire five-passenger touring car now on its way from Indianapolis to the Pacific Ocean is the lightest car of the Indiana Manufacturing contingent making this 3575 mile tour. It is the only popular priced car of the tour. It sells completely equipped for $950.00.

EMPIRE, Official Pathfinder and Pilot of the Little Glidden Tour. Started June 23

The Empire was selected to blaze the trail for Iowa's Little Glidden. Through gumbo mud it plowed on schedule time. On June 23d it started the tour proper as the official pilot of this important endurance tour run under strict A. A. A. reliability rules.

It was the sturdy reliability and touring excellence of the Empire and its economy of up-keep and operation that brought the great flood of orders.

It is largely because of this that we are quadrupling our output for next season: and the increased production is under way right now.

Keep Your Eye on the EMPIRE---"The Little Aristocrat"

5-Passenger Touring Car, Completely Equipped, $950.00.

Demountable Rims	Windshield	Prest-O-Lite Tank	Speedometer
Mohair Top	Robe and Foot Rails	Gas Head Lights	Oil Sight Feed
Top Envelope	Oversize Tires	Oil Side and Tail Lamps	Rear Double Tire Irons
Enclosing Curtains	Tool and Tire Kits	Pump and Jack	Horn under Hood
Shock Bumpers	Extra Rim	Dash Air Adjustment	Eisemann Magneto

Empire Automobile Co., Indianapolis, U.S.A.

When Writing to Advertisers, Please Mention The Automobile Journal.

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"The right way to light the way."

Penetrates fog, mist and rain with a strong, far-reaching ray

APLCO

Get Aplco Electric Lights now

YOU must understand clearly that it's very easy to have your car equipped with the] Aplco electric lighting system.

It isn't in any sense a serious operation and it doesn't cost much; it's worth what it does cost in freedom from anxiety when you are driving at night.

Your car can be Aplco equipped in no time, without disturbing its motive power, "messing up" the engine installation, consuming any of its present horse power or laying up the car for any length of time. It makes no difference whether you are using the old style gas lamps, or whether you have electric lights supplied by a storage battery; the complete Aplco system can be installed quickly, easily and at a low cost.

When you once have the Aplco System on your car you're ready to really enjoy night driving; no gas tanks to exchange or batteries to have recharged, to say nothing of being caught without gas or juice just when you need it most.

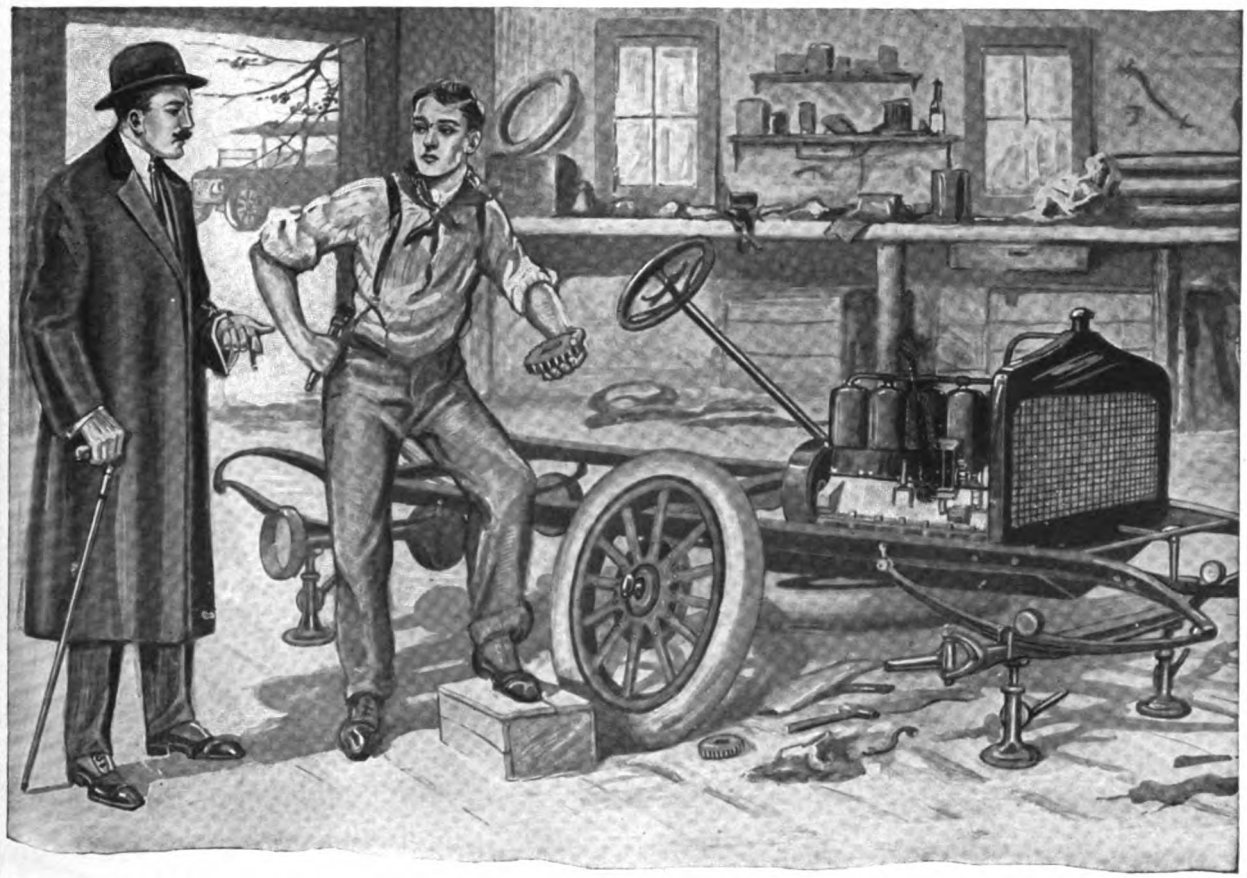
There's a good dealer near by who handles Aplco lighting outfits and the famous Apiglow lamps which throw a light that penetrates fog and dust as well as darkness, and can be turned down like a gas light. If you don't know who he is—you should, and we will tell you if you ask.

You will want more details and information than we can give you in this advertisement; better send at once for bulletins and other useful facts that will show you how effective the Aplco equipment can be in your present car; why you will want it in your new car.

Drop us a line. We will tell you what equipment you need, send you descriptive matter and give you the name of the nearest dealer handling Aplco devices.

The Apple Electric Company 74 Canal Street Dayton, Ohio

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When the Repair man performs the Autopsy

he finds, nine times out of ten, that ***poor lubrication*** has caused all the costly havoc. Then he asks the simple question,



"Why don't you use

TRADE MARK REGISTERED IN
NON-FLUID OIL ?"
UNITED STATES PATENT OFFICE



and he tells in his honest way what he, as a mechanic, knows about the depredations of cheap lubricants.

Why don't you use NON-FLUID OIL?

Get the genuine in orange colored cans.

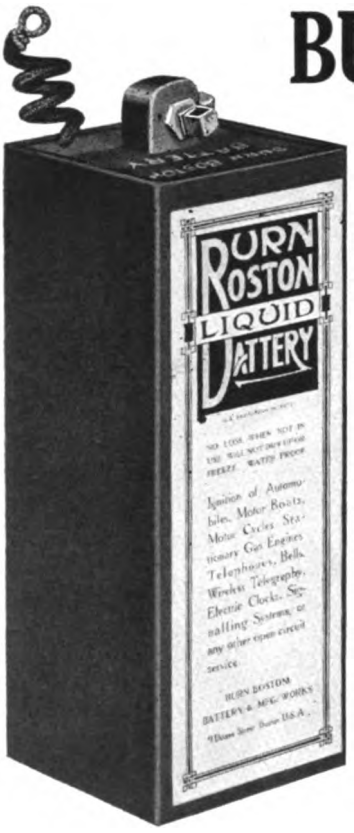
New York & New Jersey Lubricant Co.,

165 Broadway, New York

Chicago, 1430 Michigan Ave. **Philadelphia, 1431 Vine St.**

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BURN-BOSTON BATTERY



One-third size.
Use them exactly like dry cells.

A Message to Motorists!

Cut your battery cost.

Raise your battery efficiency.

BURN-BOSTONS will do for you from three to twelve times the work of dry cells.

They will do it more cheaply and more efficiently.

The manufacturers of the Klaxon horn write:

> "We are accustomed to recommend ——————storage battery and **your liquid cell.**"

The reason is that while (we quote them again) "the ordinary dry cell lasts four to six weeks for ordinary touring purposes before the voltage runs too low"—Burn-Bostons on two test runs conducted by the Klaxon people sounded 35,980 and 50,000 calls respectively on six cells. 36,000 is equivalent to fifty calls per day for two years.

On May 31st last we renewed a set that had been in use on Klaxon and Gauge Light since April, 1909.

What about the ignition? F. R. Parker, the Elmore agent in Boston, writes of his experience with six Burn-Boston Batteries used on a four cylinder car with Atwater Kent coil, and without other ignition. He concludes thus:

> "This makes a total distance to date of approximately 14,000 miles, distributed through a period of more than one year and two months, without attention to batteries and yet running strong."

The Burn-Boston Battery is firing the coast defense guns of the United States from Eastport to Cavite.

Why? Because until Burn-Bostons are worn out in service they never fail to respond, no matter what their age or the conditions of storage.

Six of them will run you a full season. Ten of them will start you, run you, light your small lights, and warn for you a full season.

Get them from your dealer before you begin that tour. In the unlikely event of your dealer not having the Burn-Boston Battery order of us direct—mentioning your dealer's name—and we will see that you are supplied promptly.

BURN-BOSTON BATTERY, 19 Doane St., Boston, Mass.

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BOWDENISM

The Science of Simple Control.

—

We feel a particular gratification in the fact that our earliest conviction with regard to the control of motor cars, motor cycles and aeroplanes—that they would eventually be controlled from the steering wheel and handle-bar through flexible wires—has come true.

During the early days of pioneer work the inestimable advantages of Bowden Wire control were so palpable to us that we steadily and confidently persisted, and from the moment when manufacturers began to adopt our method, up to the present time of its universality, it has been our pleasure to supply to the trade, and to the public, every fitment pertaining to these controls.

Trade and public will readily appreciate the value to themselves of these years of concentration and experience.

—

J. S. BRETZ COMPANY

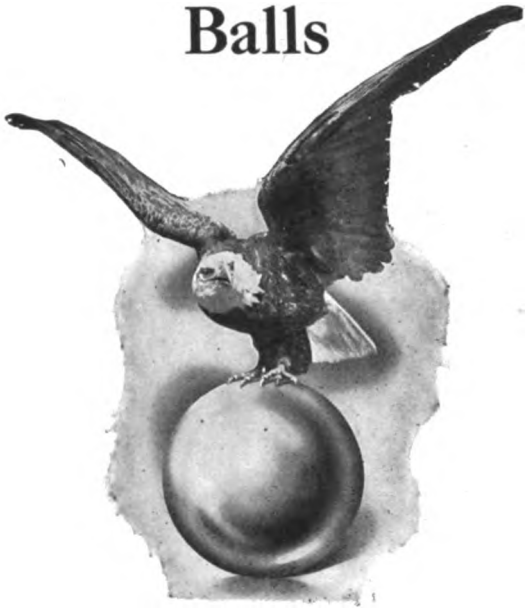
SOLE IMPORTERS

BOWDEN WIRE

(MADE IN ENGLAND)

250 WEST FIFTY-FOURTH STREET NEW YORK

German Chrome Steel Balls



THESE balls are of extreme accuracy, both as to size and sphericity, and are of high finish. They are the product of the largest Steel Ball plant in Continental Europe.

The grade of balls which we import is that employed exclusively by Fichtel & Sachs in their well-known and established product known as the "F. & S. Annular Ball Bearings."

We particularly call attention to the fact that the steel balls which we import are made of the finest chrome steel, and that the great ball making plant we represent is equipped with the latest and best of modern machinery for turning out steel balls, producing only the finest, and that today none in the industry can compete with this plant in either quality or quantity production.

During a score of years, the twenty years of time in which the plant has been thoroughly established, it has always been its aim to produce the best output possible, to make balls of superior hardness and extreme accuracy, and of the finest polish and finish, and that it has reached the highest possible point in this respect is evident from the fact that the best and greatest ball bearing makers all over the world use and recommend its steel balls; and these ball bearing makers have for many years been steady customers, taking nearly the whole of the big output.

We also call your attention to the fact that this already large and exclusively ball making plant has just been greatly enlarged, so that we are now more able than ever to guarantee prompt deliveries at all times.

J. S. BRETZ COMPANY

SOLE IMPORTERS

F & S Ball Bearings

250 West Fifty-fourth, New York

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Your Protection

against poor lubrication is in insisting on having an oil with an established reputation. That is why you should insist on having Colonial, because it is made by a firm with a reputation of over thirty years standing for high-class products.



Use COLONIAL and NOTE the DIFFERENCE

COLO GREASE

A real transmission grease

Will make your gears run smoo... and quietly because it is made especi...lly for gear lubrication.

COLONIAL Timing Gear Oil

overcomes all trouble with your timing gear. Use it and

NOTE the DIFFERENCE

SILEX GREASE

The greasiest grease made

The real test of a grease is not its looks or the feeling but its lubricating properties. Silex is made to lubricate and last.

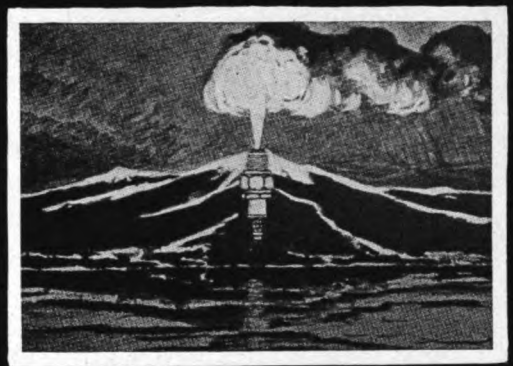
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STOP !!!!!

Imagine a plug that will last forever

ATCH !!!!!

Mosler
Vesuvius
Plug



AS POWERFUL AND AS INDESTRUCTIBLE AS THE FIRES OF VESUVIUS

WE CARRY IN STOCK A PLUG FOR EVERY
Internal Combustion Engine Built

A. R. MOSLER & CO.
P.O. Box "M," MT. VERNON, N. Y.

490

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INVA

DISPUTES end where figures begin, and differences of opinion can exist only when the thing differed about is incapable of being reduced to measurable dimensions.

¶ An automobile manufacturer, for instance, will exhaust his vocabulary in a glowing description of the magnificence of his upholstery or the easy riding qualities of his springs, while he will not exaggerate by so much as a hair the size of his wheels. Why? Simply because wheels can be measured and their size expressed in definite terms, while "easy riding" qualities cannot be so expressed and any exaggerations therefore are not so apt to get him into trouble.

¶ It is a fact not generally appreciated that all lubricating oils can be definitely tested and their relative fitness for automobile cylinder lubrication accurately ascertained and definitely expressed in figures that cannot be contradicted.

¶ It is a well-known fact, for instance, that an oil should have a high fire test to enable it to withstand, so far as possible, the heat generated by the exploding gases, yet many oils are being advertised and sold today with a fire test far below the required standard. It is a well-known fact that light gravity oils contain less carbon than heavy gravity oils—yet many heavy gravity oils are being marketed which are so full of carbon as to be practically unfit for use.

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DER OIL

¶ Just as long as an oil company can take an ordinary heavy gravity machinery oil and get automobilists to buy it through the simple expedient of advertising it in general terms as a "perfect" motor oil, whose "body" is just suited to the requirements of their particular car, just so long will motors wear out before their time. But, if the many oils now being advertised in such general terms were to be presented for your consideration in specific terms of their comparative physical tests, more good oils would be used and less poor oils would be advertised.

¶ *Invader Oil has the lightest gravity. It contains the least carbon. It is best because its physical tests are best*

INVADER OIL COMPANY

(LESSEES OF CHAS. F. KELLOM & CO.)

MAIN OFFICE:
76 Broad St., New York

FACTORIES:
New York and Philadelphia

BRANCHES:

Philadelphia, 113 Arch St. and 719 Broad St. Boston, 284 Columbus Ave. Washington, 3627 New Hampshire Ave., N. W.

TERRITORIAL AGENTS:

Boyer-Campbell Company, Detroit, Mich.
Beck & Corbitt Iron Co., St. Louis, Mo.
Electric Mfg. Company, St. Paul, Minn.
The Lee Hardware Co., Salina, Kans.
James Bailey Company, Portland, Me.
American Lubricating and Supply Co., Kansas City, Mo.
Motor Car Supply Co., Chicago, Ill.

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The 8-DAY HIGH GRADE } "BOSTON" AUTO CLOCKS

☞ These superbly built 8-day, high-grade clocks have seven-jeweled escapements, Breguet hairsprings, cut steel pinions, compensation balances, dust and water proof cases, etc., and are dealt in and used by those demanding a first-class article.

QUALITY and PRICE — UNAPPROACHABLE

Ask Your Dealer for the "BOSTON" AUTO CLOCK

MODEL B



MODEL C



Adjustable to various angles by Ratchet and Nut at back. In general appearance it closely matches many makes of speedometers.

MODEL D



MODEL E



PRICE LIST—PER CLOCK	SIZE (Dial)	MODELS A, B, C.	MODEL D	MODEL E
	3-inch	$18.00	$21.00	$24.00
	3 1-2-inch . . .	20.00	24.00	27.00
	4-inch	22.00	27.00	30.00

For (Patent Applied for) Outside Stem Winding and Stem Setting Device, ADD $3.00 to above prices.

Superior to other devices. A great convenience for winding clock and setting the hands without opening the clock case.

☞ All sizes stated are the approximate diameters of the dials

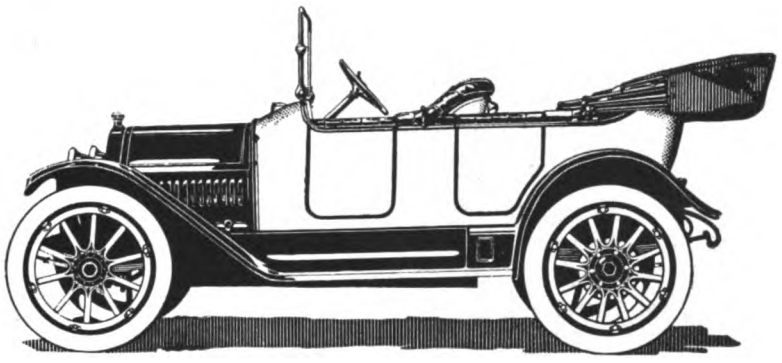
The 8-Day High Grade } "BOSTON" AUTO CLOCK { For AUTOMOBILES and MOTOR BOATS

On Sale By Leading Jobbers and Dealers.
If Not With Your Dealer Sent on Receipt of Price.

BOSTON CLOCK CO., 16 State St., Boston, Mass.

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Cartercar



"Gearless" Means Satisfied Owners!

And you know that the best advertising, the best selling force you can have is satisfied owners. A satisfied owner will bring in sales—will increase your profits—will build for you a permanent business. This fact, that the Cartercar does satisfy, is the reason why the Cartercar has so many unchanged agencies today.

THERE'S NOTHING TO BREAK— a Cartercar has no gears—no clutch—and consequently when it gets in a tight place there is nothing to cause trouble.

A CARTERCAR WILL CLIMB steep hills—go through bad sand and mud— and do it continually, whithout any bad effects upon the car. The driver has the satisfaction of knowing that his car will go anywhere—and that it will come back again.

UNLIMITED SPEEDS—is another valuable feature of the Cartercar. Ail controlled by a single lever. Simple driving, quietness, and smoothness in running have made this car remarkably popular with ladies.

NO JERKS NOR JARS in starting and changing speeds; gives you about twice the usual tire mileage. This must also mean less upkeep expense for all parts.

YOU AT ONCE REALIZE the advantages of being the representative of such a remarkable service car. You can readily see the opportunities for building a good business for the future.

THE CARTERCAR ANSWERS every requirement of those buyers who demand full value for their money—the people who must get service. And you know that nine-tenths of the buyers today are in this class.

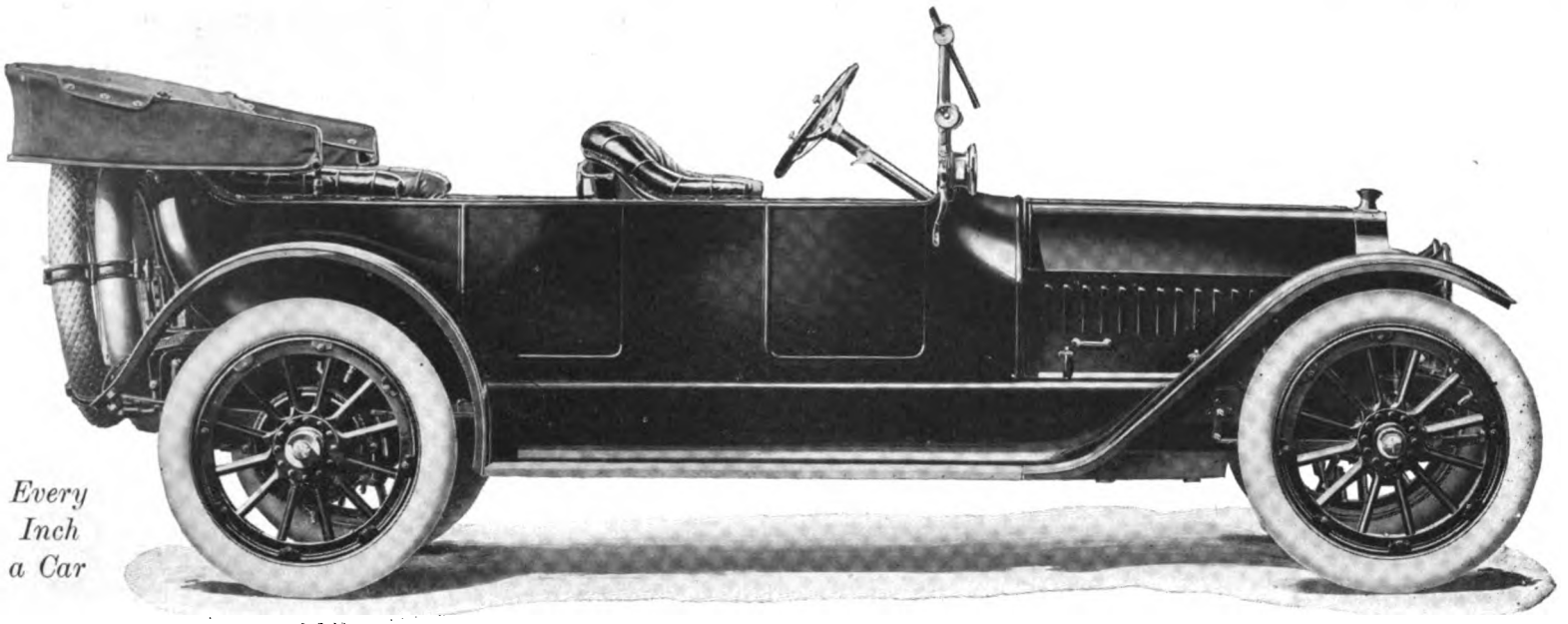
Ask us for Dealer Proposition

If we are not represented in your territory, write us. We are looking for good representatives in open territory, and you may be the man we want for your vicinity.

Cartercar Company

Pontiac, Michigan.

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Every Inch a Car

A striking new "Six" at $2350

A new model has been added to the KisselKar line—THE 48 "SIX"—a silent, powerful, well groomed thoroughbred, that sets a new level of comparison and is bound to turn discriminating automobile buyers in the direction of the KisselKar.

The announcement of this new KisselKar model is of greater significance than an ordinary announcement because it carries with it a notice of changing conditions in automobile making—the establishment of values and prices upon a more solid and settled manufacturing basis.

A few years ago, when the KisselKar 60 "Six" was announced, it was at once acclaimed the sensational value in "Sixes". It was the first "Six" to respond to the demand for a high powered six cylinder automobile at a moderate price. HISTORY IS NOW REPEATING ITSELF.

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KISSELKAR

Electric Lighted and Started 48 "Six" Left-hand Drive—Center Control

In presenting the new KisselKar 48 "Six" at $2350, the Kissel Motor Car Company is again making automobile history as it did with the big KisselKar 60 "Six" five years ago.

The KisselKar 48 "Six" is the latest big thing in six cylinder automobiles. Point for point, it challenges comparison—in construction, performance, comfort and refinement.

The design is strikingly handsome and original, representing the very best ideas of American and European body construction—a design we expect to see freely copied a year hence. In the 48 "Six" we have succeeded in producing a liberally designed, roomy five passenger, six cylinder automobile of medium size that fills the gap between the so-called "little sixes" and the high powered "big sixes."

It requires but a slight study of the KisselKar 48 "Six" to prove it a worthy exponent of all that is best in automobile construction. Its smooth running, silent, powerful and flexible motor has loads of excess power, and is responsive to every demand. Clean, graceful lines, low hanging body, perfect poise and balance, big roomy tonneau, extra long wheelbase, big tires, extra deep luxuriously upholstered seats combine to make the KisselKar 48 "Six" a car of superlative beauty and riding comfort.

TO OWNERS

The KisselKar line now comprises three striking pleasure car models—the new 48 "Six" at $2350, the 60 "Six" at $3150 and the 40 "Four" at $1850—each an unsurpassed value in its class. An illustrated portfolio giving all details of each model will be sent on request.

TO DEALERS

Our recently acquired Milwaukee plant will be devoted exclusively to the manufacture of the KisselKar 48 "Six." As this gives us a largely increased output, we are in position to add to our list of desirable distributors. If interested, write.

KisselKar Trucks—1500 lbs. to 6 tons—are used in over 200 distinct lines of business. Write for Truck Catalog.

KISSEL MOTOR CAR CO., 174 Kissel Avenue, Hartford, Wis.

BOSTON, NEW YORK, CHICAGO, MILWAUKEE, KANSAS CITY, MINNEAPOLIS, ST. PAUL, DALLAS, SAN FRANCISCO, LOS ANGELES, OAKLAND, Philadelphia, Detroit, Houston, El Paso, Washington, Baltimore, Nashville, Duluth, Buffalo, Pittsburg, Cincinnati, Hartford, Conn.: New Haven, Newark, Troy, Rochester, Providence, Montreal, Quebec, Toronto, Winnipeg, Calgary and 200 other principal points throughout America.

Features of the New KisselKar 48 "Six"

An entirely new model in design of chassis and body along the very latest ideas of motor car building.

Specially constructed frame hung close to the ground, with large "kick-up" in front and rear—providing plenty of spring clearance and allowing more flexible springs and riding comfort.

Clean and simple construction—at a glance you are impressed with the few number of parts.

Tonneau without boxes or brackets to mar the effect of simple completeness.

Rakish new design fenders with rounding tops instead of flat.

Front axle of foreign design with the castor principle, which allows easy turning of car and avoids accidents as the wheels are always kept in line. The construction of this axle also adds strength to the knuckles and main parts.

Large doors 21" wide and 5 passenger tonneau with room to spare.

Deep, low, properly proportioned seats. Backs pitched for extreme comfort—and cushioned with the finest upholstery.

Patented Golde top, which eliminates front brackets. This top is used only on the very best cars and is remarkably easy to put up and take down.

The "cowl" is equipped with a mahogany board on which all instruments are placed—accessible and convenient to line of vision.

Large 4½"x36" tires—giving the car oversize tires for its weight.

Special flexible spring construction which takes up the jolts and jars.

Extra long wheelbase, 132"—which provides space for roomy tonneaus and contributes to riding comfort.

Large gasoline tank (24 gal.) and tire irons in the rear.

Left-hand drive and center control.

Electric started. A simple and positive system that makes starting easy and sure.

Electric lighted. Big powerful electric lights of twice the candle power of average cars.

Powerful, easily accessible, long stroke motor, with large crank shafts carefully balanced—capable of developing plenty of excess power. Silent, smooth running, responsive.

Four speed transmission—direct drive on third.

Cone leather faced clutch can be disassembled without removing transmission or motor.

The KisselKar 48 "Six" is fully equipped in every detail and embodies every desirable feature for the comfort and convenience of the car owner.

KisselKar Service

The KisselKar is sold under a written guarantee of service to owners—a tangible, definite and specific contract that clearly stipulates the scope of KisselKar Service and provides for care that forestalls trouble and retards depreciation.

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The King of TIRES
CATARACT



Supremacy Due To Service Alone

No costly advertising campaign or corps of silver-tongued salesmen have enabled the

Cataract Tires

to reach their position of Supremacy.

Tire Service to the owner alone has caused them to forge ahead. We build them right, of the best materials and workmanship, with the result that they cost less per mile than any other tire produced.

Equip To-day with Cataract Tires and Eliminate Your Tire Troubles.

4,000 Mile Guarantee

CATARACT RUBBER COMPANY
WOOSTER, OHIO
New England Branch—66 Hereford Street
BOSTON, MASS.
NEW YORK PROVIDENCE, R. I.

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Do You Want To Double Your Tire Mileage?

That's what you will do if you ride on wire wheels instead of on wooden wheels. There are many reasons why the car owner who is looking for the utmost in motor car construction should insist upon wire wheels—such as ease of riding, ease of steering, lengthening of the life of the car itself, etc.—but the prime essential of all these considerations, obviously, is the fact that wire wheels increase the life of the tire anywhere from 25 to 50% or more.

By actual tests conducted over a period of six months, a saving of 68.75% was shown by the use of wire wheels compared with wooden wheels under exactly similar conditions.

Wire wheels save tires because they are light at the periphery, thereby reducing the road pound at point of contact. Wire wheels also radiate external and internal frictional heat which is held in the wall of the tire by wooden wheels because of the non-heat conductivity of the wooden bands.

If you are interested in this all important subject, write us for further details.



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Car Coming!!

Hear the Clear Tones of the *Jericho* and the *Jubilee* Horns.



The rich, melodious notes of warning that requests a clear road without insult.

"Warns without Offense"

Protect yourself by equipping your car with a *JERICHO* or *JUBILEE*----it means auto insurance. Guaranteed for the life of the car.

Over 100,000 in use

Randall-Faichney Company
Boston Mass.

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Raybestos REG. U.S. PAT. OFF.

A SENSE OF SECURITY

Is Yours If Your Brakes Are Lined With

TRADE MARK Raybestos REG. U.S. PAT. OFF.

"THE ORIGINAL AND BEST ASBESTOS BRAKE LINING"

It grips and holds—not only when new, but after months of hard service.

The vital element in stopping a car is the brake lining. Down steep hills—in an emergency—when collision is imminent—your safety and that of others depends entirely upon the action of your brakes. Brakes lined with RAYBESTOS are positive!

RAYBESTOS has longer life than any other lining. It is woven of genuine long fibre asbestos—the best raw material money can buy. Every inch is tested to make sure of quality, heat resistance and co-efficient of friction.

RAYBESTOS is the standard brake lining of the industry. The name is stamped on every foot for your protection.

THE ROYAL EQUIPMENT COMPANY

Railroad and Bostwick Aves. **BRIDGEPORT, CONN.**

We also make Duplex and Raymond Brakes and Gyrex the Mixer

When Writing to Advertisers, Please Mention The Automobile Journal.

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EAGLEINE the
NO-KARBON CYLINDER OIL
PROVEN PRODUCT

A few letters that back up our claim that EAGLEINE NO-KARBON OIL is the best oil produced for water-cooled motors.

"19,000 MILES—NOT AN OUNCE OF CARBON"

Salt Lake City, Utah, May 8, 1913.

I have just turned 19,000 miles with my car, which still delivers its maximum power and speed, although the valves have never been ground or an ounce of carbon taken out of the motor. I have never used a drop of any but Eagleine NO-KARBON oil in the car, and I will bet any man $50.00 that I haven't got two ounces of carbon in the four cylinders today.

C. R. PEARSALL.

"1,000 MILES—AND CLEAN PLUGS"

Kenosha, Wis., July 3, 1913.

After running 1000 miles I removed spark plugs, they were not even black with soot. That is the best I ever saw, by far; no other oil for me.

JOS. J. QUISMET.

"1,500 MILES—NEVER TOUCHED PLUG OR VALVE"

Los Angeles, Cal.

I am pleased to state that on my trial trip, which covered nearly 1500 miles, in which I used Eagleine NO-KARBON, I never touched a Spark Plug or Valve. This is the first severe test I have put your oil to, and it has answered in every respect.

ROGER W. STADLMAN.

The above letters are but several picked at random from a large number which we have received from satisfied users of EAGLEINE NO-KARBON OIL. Are you interested? If so drop us a line and we will be pleased to send you some copies of these letters.

EAGLE OIL & SUPPLY COMPANY
104 BROAD STREET, BOSTON, MASS.

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ONE of the greatest pleasures of touring is quick relief from all mishaps. One of the most frequent and disagreeable mishaps is tire-trouble. And the quickest relief from tire-trouble is obtained by Stanweld demountable rim equipment.

So, to be assured of a pleasant trip no matter where or how far, be sure your car is equipped with Stanweld demountable rims.

Stanweld demountable rims prevent tire-wobbling---one of the prime causes of excessive tire-wear. They require no special tools. They have a solid base excluding dirt and moisture. They accept either straight-side or clincher tires. They have both the quick-detaching and demountable features---operating independently.

They are safe, easy, and quick to operate---requiring fewer manipulations than any other demountable rim.

One manufacturer will use nearly 50,000 sets during the coming year.

The Standard Welding Company, Cleveland



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COES

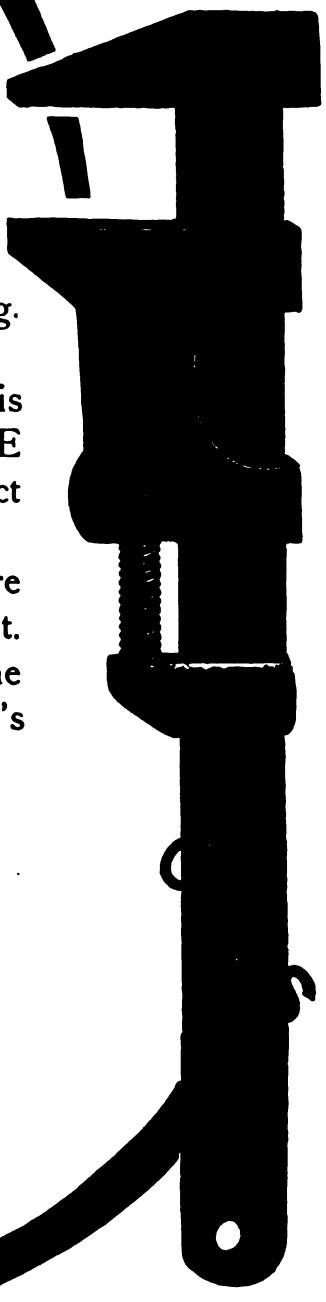
THE
Wrench Supreme

Strength without bulk or clumsiness.
Ease of handling without slipping or bruising.
Perfect balance and right grip

Everything the motorist desires in a wrench is to be found in the "COES" AUTOMOBILE MODEL, and you will never know perfect wrench service until you pin your faith to it.

It stands to reason that the 5 per cent. more you pay for a "COES" wrench goes for 60 per cent. more quality and service—put this wrench in the tool kit and shop. You will get your money's worth.

Send for Literature Now.

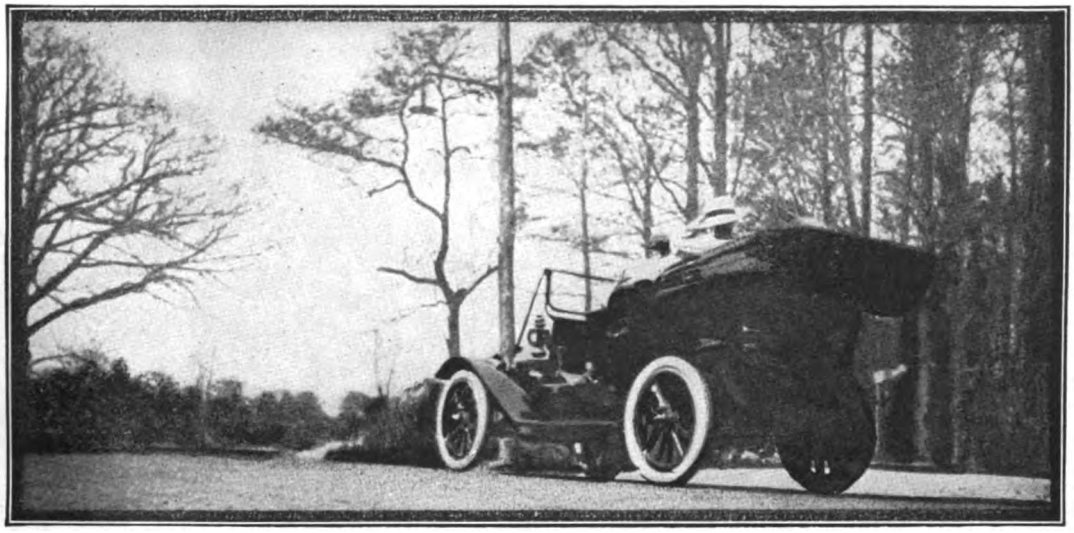


Coes Wrench Co.

WORCESTER, MASS.

J. C. McCARTY & CO.,
21 Murray St., New York City
JOHN H. GRAHAM & CO.,
113 Chambers St., New York City

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The Joy of a Ride

is complete when you don't have to worry about what's happening under the hood. Use

Polarine

It eliminates friction, wear and worry.
It cuts out carbon troubles.
It burns freely, yet never thins out.

SOCONY PETROLEUM PRODUCTS

Standard Oil Company's Gasoline gives best results

For sale by all dealers, and

STANDARD OIL COMPANY

OF NEW YORK

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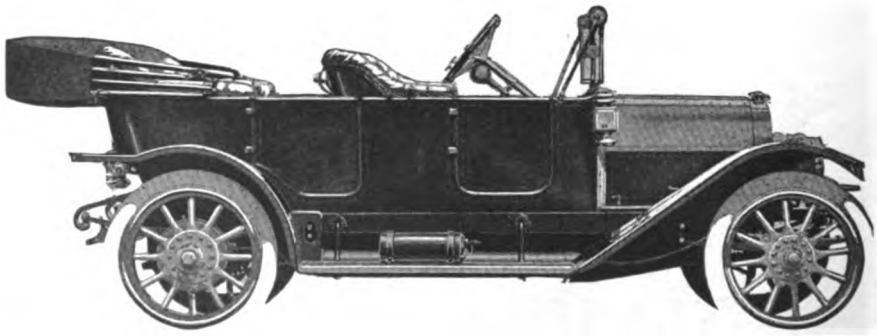
Overland

COMPLETELY comfortable, a masterpiece mechanically, the big, sturdy, thirty horsepower, five passenger Overland touring car furnishes daily motor car gossip as the greatest value for the least money.

Catalogue on request. Please address Dept. 52.

The Willys-Overland Co., Toledo, O.

$985 Completely Equipped—F. O. B. Toledo, Ohio



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At Critical Times You Can Depend On

Multibestos BRAKE LINING

ON the steep hills and narrow, rock-strewn roads of country districts where danger lurks at every turn, it is of vital importance that your brakes be responsive and that you have the most perfect control over your car.

The rounding of any corner may bring you "head on" with a fellow motorist or heavy country wagon with scarcely room to pass and with the clearance of a bare few inches on the edge of a steep incline.

At times like this your brake lining carries the full load of responsibility and literally decides your fate.

It should be equal to such great responsibility.

It should be reliable and dependable in any emergency.

It should be Multibestos, the Brake Lining of Quality, with the Grip that Grips and with a strength which never fails in tight places.

Send for booklet
"Safe Within the Grip of Multibestos"

Standard Woven Fabric Company

Worcester, Mass.

SALES BRANCHES

NEW YORK, 276 Canal St.
BOSTON, 903 Boylston St.
PHILADELPHIA, 1427 Vine St.
CHICAGO, 1430 Michigan Blvd.
SAN FRANCISCO, Fred Ward & Sons, Inc.

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—Why Dealers Lose Money

By C. P. Henderson

Years of concentrated study of conditions the automobile dealer faces have taught the faults that cost dealers their profits—how these things can be avoided—dealers who work for the manufacturer, not for themselves.



89% of all automobile dealers work for the manufacturer, not for *themselves.*

At the height of the selling season they sell cars the manufacturer can't deliver.

Some cars have chronic defects—the public learns them—dealers lose sales.

Some cars selling today are in reality 1911 models—not salable—yet they are crowded onto dealers. Eventually they go at a sacrifice of several hundred dollars. The manufacturer has *his profit,* the dealer *his loss.*

Every dealer should be selling and delivering 1914 models *today.*

There are myriads of other reasons why dealers lose, selling the average car, *even though it has a large sale.*

How We Conquered Resistance

But we have conquered every resistance in the Henderson car. Our 1914 models are out today—Henderson dealers are *selling* them—and *DELIVERING* them.

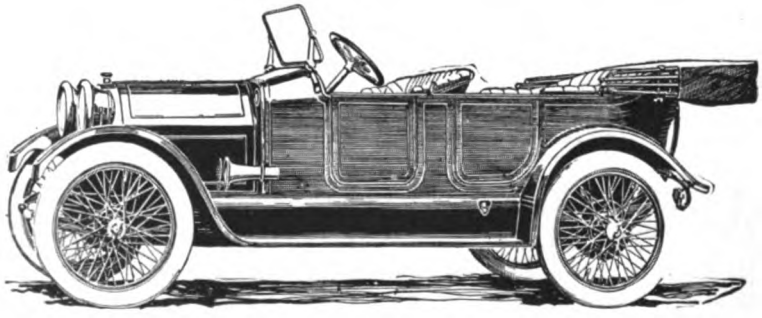
We build one year ahead of average cars—for instance, today a prospect can purchase a kerosene-burning car, a wire-wheeled car, the cowl dash, the cowl gasoline tank, left drive, center seat control and, of course, electric self-cranking system and electric lights on the Henderson.

Buyers can get Hendersons *Now.*

These facts are vital to every dealer—they mean dealer *profit.* Is not such a line of cars exactly what you must have to make money, or to make *more* than you made last year? Other dealers in your territory are reading this article. They will write us about the line. *You* write *today.*

The New Henderson Six, Touring or Roadster, $2285

Henderson Motor Car Company, Indianapolis, Indiana



The New Henderson De Luxe, Fully Equipped, $1785

HENDERSON

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Big Doings for Haynes Dealers

Three new models; greatly increased output;

beautified body lines; complete electric control—electric starting, electric lighting, *electric gear shift;* many other new selling points in the car; new selling punch back of the car; new blood in the manufacturing, sales and advertising departments; big advertising campaign to help Haynes dealers

New Opportunity to a Few More Dealers to Handle the Haynes

"There's something doing in Kokomo"—you have doubtless heard this remark passed dozens of times among automobile men, who have been watching the recent developments at the Haynes Automobile Company.

With the same spirit of progress which created the First American Car and has always kept the Haynes in the foremost rank, the Haynes Company has added some top-notch men to an already efficient organization.

The new members of the executive staff were *picked* from the entire field. No one in the automobile business knows better how to build a car as it ought to be built, than Mr. A. G. Seiberling. He has an enviable record of over 25 years in important executive and purchasing positions—over a third of which have been spent in the automobile field. Mr. Seiberling has been acting as factory manager for the Haynes for a number of months back, and now takes up the work as general manager, pledged not only to keep the Haynes *always ahead* in the race, but to make an even greater increase in the output of Haynes cars for 1915. Mr. Seiberling's interest in the Haynes is more than impersonal, for he is a heavy stock holder.

In Mr. Geo. H. Strout, Haynes has a General Sales Manager who needs no introduction to the trade. There is probably no better known or more successful manager of automobile sales. Hundreds of dealers know him personally as a pace-making salesman, service-man, field-man, etc. With such a wonderful car as the Haynes to push, the work of Mr. Strout will be watched with much interest by his many friends. Dealers who wish to secure a part of the 1914 output of the Haynes should lose no time in communicating with Mr. Strout.

The new Advertising Manager of the Haynes, Mr. Robert Crawford, comes from the Chicago Portland Cement Company. Flattering offers were made to hold Mr. Crawford, but he had definitely decided to enter the automobile business over a year ago. He accepted his present position in preference to other automobile connections, because he *believes* in the Haynes car, and feels he can do his very best work for it—and Mr. Crawford's work has already made Haynes competition take notice. "Watch his smoke."

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Elwood Haynes, President

Elwood Haynes started his career of invention at fifteen. After completing courses at Worcester Polytechnic Institute and Johns Hopkins University, he was constantly engaged in scientific work up to 1891, when he conceived the idea of the "horseless carriage." Preparing drawings, he employed two Kokomo machinists to assist in working out his plans. He made his first trip July 4, 1894. The original Haynes car is now an exhibit at Smithsonian Institute, Washington, D. C., and the placard authentically gives full credit to Elwood Haynes as its creator and builder.

The New Haynes Models

by Elwood Haynes

Creator of the First American Gasoline Car

THE new Haynes models demonstrate that our organization will always be ahead of the times—never a back number. We have always paid more attention to making a good car than to achieving a big output. This very fact has created a self-advertised demand which has required a constantly increasing production. The 1914 output will show a good healthy increase over 1913—and a still bigger production is already planned for 1915.

The new cars—both sixes and fours—are so good that I am satisfied with them. I have never been more enthusiastic over new Haynes models than I am over these.

The new cars have the most graceful lines possible, giving the long, sweeping appearance which suggests class and distinction. The lines of the back of the tonneau are especially handsome. The body lines of the sixes and fours are the same. One car is simply larger than the other.

Wonderful new conveniences have been added to the latest Haynes, which, backed by the prestige and reputation it already enjoys, makes it without a doubt the strongest selling proposition in the whole automobile field.

All New Haynes Models Will Be Standard Equipped With the Vulcan Electric Gear Shift

This is the most remarkable advance in automobile equipment that has ever been made. With the electric self-starter and lighting system it completes the electric control of the Haynes—makes it the most up-to-date car in the whole field.

Every modern development, every convenience that makes a car easy to run, pleasant to ride in and economical to finance, you find in the 1914 Haynes.

And back of all the convenience and up-to-dateness, the same sturdy, dependable quality that is keeping those good, old-time Haynes cars still on the road after years of service, will be always found in every car bearing the Haynes name.

We know absolutely the materials that go into every part of the Haynes. The entire car is made at our factory or under our supervision. We know the materials are right and the testing is thorough and dependable.

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A. G. Seiberling, General Manager

Mr. Seiberling's business experience of over a quarter of a century ideally equips him for his duties as general manager of the Haynes. He knows how to purchase—he knows how to direct. He has held the important position of purchasing agent for such concerns as the Pittsburgh Plate Glass Co., Great Western Plate Glass Co. He organized the Peoria Rubber & Manufacturing Co. in 1896, and engineered a fortunate consolidation with another concern. He comes to the Haynes after ten successful years in the automobile field in important executive capacities.

Epoch-Making Wonder in Auto History—Electric Gear Shift and Starter

Combined in Standard Equipment on All New Haynes

Driving the latest Haynes car is a simple performance. After setting the spark and throttle levers in proper position, move the ignition switch to the button on the battery side. Push starter button marked "S" and hold down until motor starts. Removing pressure from starter button automatically breaks connection. Next throw ignition switch onto magneto button.

To start, press the low speed button No. 1, until it locks, pushing foot clutch forward to its furthest position. This produces an electrical contact that causes desired shift of gear instantly.

Second, High Gear, Reverse

To go into second gear, press button No. 2, repeating clutch movement. To go into third gear do likewise. To make car go backward when moving forward, bring to stop, then push button marked "R" and operate the clutch.

Driver Can Anticipate Gear Changes

With the electric gear shift, the driver can anticipate or select any gear change desired. For example, if car is going up a steep grade that may necessitate dropping into second gear before top is reached, button No. 2 can be pressed at any time and when car has slackened speed and motor is about to labor, the clutch lever can be pressed, completing connection and instantly throwing gear into second speed.

Arrangement of Gear Shift

The dial or round switch board containing the buttons which operate the gear shift is located at top of steering post. There are seven buttons marked as follows: "N" for neutral, "1," "2" and "3" for low, intermediate and high gears, "R" for reverse. "S" is the starting button, the central, unmarked button operates electric horn.

Changing From One Gear to Another

Pressing button "N" entirely clears the switch board, but not until driver has thrown out clutch to the limit. By pushing the clutch lever forward to a limited degree, the clutch can be slipped in the usual manner without in any way affecting the gear shift. When clutch has been pushed about half way out, any gear that is being used is brought into neutral position and by pushing the clutch pedal to the extreme limit, the gear is shifted into any other gear ratio that has been selected.

Perfectly Simple and a Proven Success

The Vulcan Electric Gear Shifting outfit is decidedly simple, both electrically and mechanically. Has been used on a Haynes Six for a long time. Never necessary to shift gears by hand.

Emergency Hand Gear Lever

Is provided the same as a crank is provided for emergency use, with any self-starter. Quickly attached, but unlikely to be needed.

The Mechanical Principle of the Vulcan Gear Shift

Is so simple as to be readily understood at once when it is seen at work. We'll be glad to send full particulars to any one desiring them.

Briefly, Solenoid coils or electromagnets are used to make the shift. These are energized by the battery which furnishes current for the electric starter and lights. The amount of current used is so small that it scarcely can be measured. The current is thrown from battery only for fractions of seconds, while gears are being shifted.

Advantages of Electric Gear Shift

Unnecessary to remove hands from wheel.

Driver can always anticipate speed changes before throwing out clutch pedal.

Clutch always disengaged, and gears drawn to neutral mechanically before a shift, rendering it impossible to strip a gear.

Gear changes made with great rapidity.

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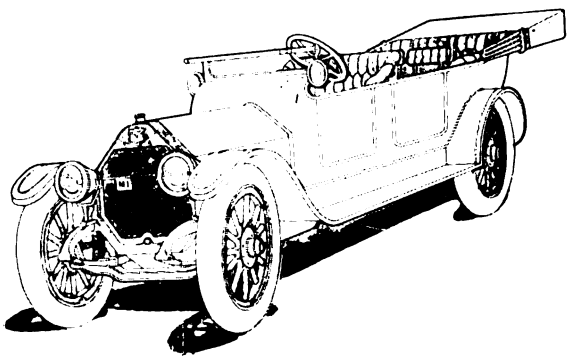


Frank N. Nutt, Chief Engineer

For ten of his fourteen years with Haynes, Mr. Nutt has been Engineer—first, Assistant then Chief. A born mechanic, at the early age of eight, he was spending his spare hours at his home-made draughting board or in the neighboring machine shop. Naturally he learned the machine trade at the first opportunity—and learned it well—of a painstaking French machinist. Mr. Nutt manufactured bicycles a few years, and has been with Haynes ever since. Mr. Nutt is well known as a driver in automobile contests and has long been identified with the S. A. E.

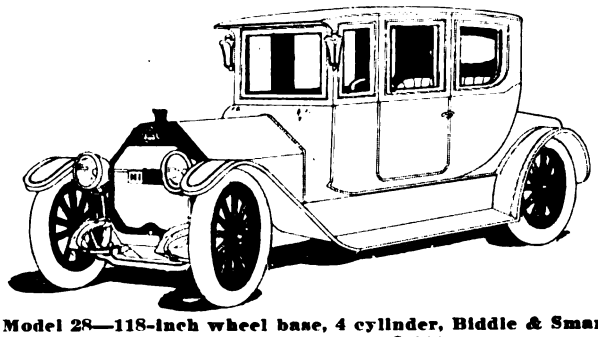
The Greatest Line-up of Specifications From a Selling Standpoint Ever Offered in Any Car at Any Price

Motor—4¼-inch bore, 5½-inch stroke, L-head Haynes design, cylinders cast in pairs. Enclosed valves.
Cooling—Centrifugal pump and pressed steel fan.
Wheel base—Model 26, 130 ins.; Model 27, 136 ins.; Model 28, 118 ins.
Ignition—American Simms magneto with patent pole shoe producing hot spark at full retard. Perfect synchronism, greater horsepower and more perfect running motor.
Lubrication—Splash and gravity feed to main bearings and idle gear, also constant feed to oil basins in lower base.
Control—Left hand drive. Vulcan electric gear shift, dispensing with hand lever and enabling driver to shift gears electrically with an instantaneous shift.
Transmission—Selective type, three speeds forward, one reverse. Timken roller bearings.
Steering Column—Worm and worm gear type.
Clutch—Haynes contracting steel band on steel drum. Supported by crank shaft. Easily adjustable with single set screw. Applies the power gradually.
Rear Axle—Timken full floating on Models 26 and 27. McCue axles on Model 28 with Gourney bearings.
Front Axle—I-beam, single piece, O. H. steel heat treated. 1¼-inch spindles of chrome nickel.
Wheels—Artillery type with Funk demountable rims.
Tires—Model 26, 36x4½ ins.; Model 27, 36x4½ ins.; Model 28, 34x4 ins.
Springs—Front, semi-elliptic. 39⅛ inches long, 2 inches wide; rear, 48 inches long, 2 inches wide.



Model 27—136-inch wheel base, 6 cylinder, 7 passenger body. Price, $2785.

Brakes—Contracting internal, expanding internal. Diameter 15½ external and 15 internal on Models 26 and 27, 12 and 16 on Model 28, both internal.
Finish—Body; Indiana dark blue, black gear and wheels—Pacific Tour gray body, black gear and wheels, optional. All metal equipment, gun metal, black enamel and nickel.
Gasoline Feed—Pressure feed. Storage tank holds 20 gallons gasoline. At rear of car where easily filled.
Upholstery—Models 26 and 27, hand buffed leather, Model 28, machine buffed. Cushions deep.
Starting and Lighting—Leece-Neville electrical system. A separate unit system embracing a generator for charging battery and motor for cranking engine. Has proved 100 per cent. efficient under all conditions. Exceedingly simple.
Cowl Board Equipment—Electric lights, sight oil feed, automatic cut-out for electric light, auxiliary air pressure pump with gauge, speedometer. Models 26 and 27 have rim wind clock.
Other Standard Equipment—Top, top cover of silk mohair, mechanical tire pump, rain vision ventilating wind shield, Vulcan electric gear shift, two large electric head lights, electric side lights, electric tail light, full cowl board equipment, electric starter, generator, 80 ampere hour storage battery, coat and foot rails, speedometer, horn, tire irons, full tool equipment, and one extra demountable rim.



Model 28—118-inch wheel base, 4 cylinder, Biddle & Smart Coupe body. Price, $2700.

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"Wilhelm the First," Factory Manager

Germany has her Kaiser Wilhelm, but America has her A. N. Wilhelm, presiding genius at the Haynes factory. You'll find Mr. Wilhelm in overalls. He is literally "on the job," constantly going through the factory, taking in everything with a pair of penetrating steel gray eyes, stopping a man here and there with a pertinent query, always the master of the situation. Mr. Wilhelm is another born mechanic. "Kaiser" Wilhelm as factory superintendent of the Haynes has things moving with a smoothness and a precision that mean mechanical nicety and dependability in the finished cars.

Big Advertising Campaign

THE advantages of owning a Haynes Car will be advertised from now on in magazines, newspapers and farm papers, more aggressively and extensively than ever before.

The opening gun of our advertising campaign will be a two-page spread to appear in the Aug. 2nd issue of the Saturday Evening Post, to be closely followed by advertisements of similar size in Collier's Weekly, Harper's Weekly and big announcements in other magazines, newspapers and farm papers. Later on we will give you a glimpse of some of the great ads we are preparing.

Tens of thousands of dollars will be spent in the newspapers in the cities and towns *where our dealers do business.* We have a most liberal plan for co-operative local advertising campaigns, whereby we share the expense while the direct benefits go straight to the dealer.

Our advertising and sales departments will not only give efficient assistance in locating prospective purchasers, but will furnish dealers with selling suggestions which have been found by wide experience to be the most effective.

Great Book for Prospective Buyers

Written by Elwood Haynes

That Will Put Haynes Dealers in Touch With Thousands Who Are Going to Buy

No book has ever been written about the automobile that will be so valuable and so much wanted as this, written by the man who created the American Motor Car. This book will be offered to motorists in the magazines, farm paper and newspaper advertising. It will locate prospects for our dealer.

The Advertising Department will issue each month a magazine, "The Haynes Pioneer," full of selling punch and topics of live interest to Haynes dealers and owners.

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Geo. H. Strout, General Sales Manager

As a lad in school and a college student, Mr. Strout was always a leader. Upon entering business his quality of leadership was so quickly apparent that within two years he was made Branch Manager for the Monarch Bicycle at New York. It was a logical step from the wheel to the automobile and in 1903 he formed the Western Automobile Company, St. Paul, and sold it in 1905 at a highly remunerative figure. Since then, in executive selling capacities with automobile concerns, he has become known to every automobile dealer, big and small, from coast to coast.

The Haynes Car is the Strongest Selling Proposition in the Field

There is no car on the market that is so brim full of strong talking points as the Haynes. In previous years, with its fame of being America's First Car, its 20 year record of reliable service, its strength, simplicity, symmetry, surety and satisfaction, it made the strongest kind of a selling proposition. The new models, with everything new in equipment, including the wonderful Electric Gear Shift, will coin money for Haynes dealers.

It Has a Strong Appeal to Every Member of the Family

Women Fall in Love With the Haynes at First Sight

The long, sweeping, beautiful lines of the new Haynes model compel admiration. The wide doors, the foot deep cushions, the liberal foot room of the tonneau, the roominess of the seats and the smooth-riding qualities of the car, captivate the ladies.

The new limousine and coupe bodies, with the graceful slope of roof and dome, and their exquisite finish, will have no superior.

Women who want to share the exhilaration of driving find the Haynes the car of their dreams. The complete control is centered on top of steering column in a fixed position and entirely operated by electricity. Think of it! Press a button and the starting motor begins to purr—press No. 1 button of the gear shift, and you're off on first speed, with every variation of speed under the absolute control of the finger tips.

Every convenience is found on the dash. There is the rim wind clock, switch for the electric lights, oil sight feed, ignition, automatic cut out for the lights, dash light, speedometer and auxiliary air pressure pump with air gauge.

The regular equipment includes mechanically operated tire pump—really a greater improvement than the self-starter.

The Haynes gasoline supply is pressure-feed. This means that the Haynes climbs grades of any pitch without trouble. Grades that are impossible to gravity feed type cars are easy for the Haynes. The storage tank holds twenty-one gallons of gasoline—three more than the usual size—and is at the rear of the car where it is easily refilled without disturbing occupants. This arrangement also leaves full carrying space under front seat.

Power, Dependability and Economy, Plus the Qualities Before Mentioned, Win Men to the Haynes

No man, whether he knows much or little about automobile engines, can fail to be impressed with the power plant of the Haynes. It is L-Head type—the type which most foreign cars now use, and extensively used by many of America's leading manufacturers.

The dependability of the Haynes car is proverbial. The most careful buyer feels safe in buying it. The Haynes is a whole car—a complete car—nothing in it for the sake of novelty—but everything for efficiency and economy.

The amount of gasoline required to run a Haynes, and cost of upkeep are convincing arguments in its favor. We furnish our dealers abundant proofs of this kind.

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Robert Crawford, Advertising Manager

Mr. Crawford is best known for his work in the cement industry. First with the Universal Portland Cement Company, then as advertising manager of the Chicago Portland Cement Company, he won the reputation of getting more publicity for cement in general and for his own company in particular, than anyone else in a similar capacity. Mr. Crawford has achieved a considerable reputation for his exhibits at the Cement Shows and can be depended upon to even better this successful record of the past in his work for Haynes.

The Haynes Has Always Been a Good Money-maker—It Will Be a Money-coiner This Year

The Haynes has been piling up prestige for 20 years. It is always spoken of as a good car. It is a car that people are proud to own and proud to talk about—a car that attracts buyers and is easily sold. Every Haynes owner is enthusiastic over his car and boosting it continually to his friends. Most Haynes owners are friends of previous Haynes owners.

The Haynes for 1914 will be all this and more—in addition it will be the first car to have the wonderful electric gear shift—the first car entirely controlled by electrically operated devices.

Stays Sold—Real Profits

The Haynes is an easy car to sell—economical of salesmen's time. Once sold it stays sold. It is so simply and dependably made that trouble of any kind is almost unknown. The Haynes dealer is not continually pestered by the complaints of disgruntled owners, not driven to distraction by tales of twisted frames, broken springs, self-starters that won't start, engines that balk, and the hundred and one other things that take time and cut down profits.

Our Branches send out letters periodically to their list of Haynes owners in the cities and neighborhoods where they do business, to inquire if everything is all right and offer their service, if any is needed. 176 answered the last letter sent out by our Chicago Branch, and only two needed any service in connection with their car.

No Unkept Promises—Square Deal For All

Haynes dealers are not going to lose money through inability to get promised cars. We are careful not to promise beyond our output, or to take more dealers than we can provide cars for. We know it pays to play fair with our dealers.

Connect Up With Haynes—and You Do Business With a Concern That Is Firmly Established

A connection with Haynes means a permanent possession. The Haynes Automobile Company is a permanent institution. Solidly grounded. Conducted along safe lines. Believes in making a profit each year, not trusting to the future to come out from under tremendous overhead expenses and attain a hazardous success. Hundreds of automobile manufacturers have come and gone during the 20 years that the Haynes has been enjoying its steady, healthy growth. We contend that our policy of natural, steady growth is the safe, profitable way.

Connect up with Haynes, and you will not face the possibility of having to take up the sale of another make of car inside of a year or two, with all that means in the way of lost prestige and effort. Connect up with Haynes and you will be dealing with a concern that has proved itself substantial, and a money-maker—and whose dealers are making money, too.

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Many Dealers Prize the Haynes Account as Their Most Valued Asset

The Increased Haynes Output Puts This Prize Within Your Reach—If You Act at Once

If you would like to line up with a car of established reputation, a car that is always spoken of highly, a car whose name as the first car carries with it no little degree of distinction, a car whose owners are boosters and always plugging the game of the Haynes dealer—if you would like to connect up with a manufacturer who believes in playing the game safe, whose credit is good, whose reputation for fair play is well known, whose prospects for the future show every indication of the same steady progress as in the past, who has been in business ever since the automobile business started in America—and will be in business, no doubt, as long as it lasts—if you want to handle a real car, with a real reputation and real selling merit, a car that fairly bristles with strong selling points, that again comes to the front as a pioneer in the use of *the electric gear shift*—here is your chance to get some of the increased output of the Haynes. The opportunity is so good that you had better wire your reservation. At least fill out the coupon, slip it in an envelope and send it under special delivery postage.

The Haynes Automobile Co.

6 River Street **Kokomo, Ind.**

The Haynes Automobile Co.
6 River Street, Kokomo, Ind.

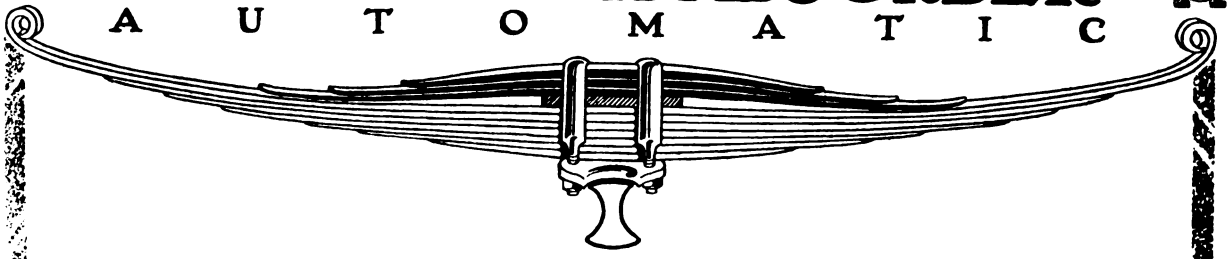
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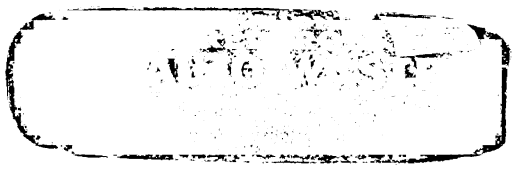
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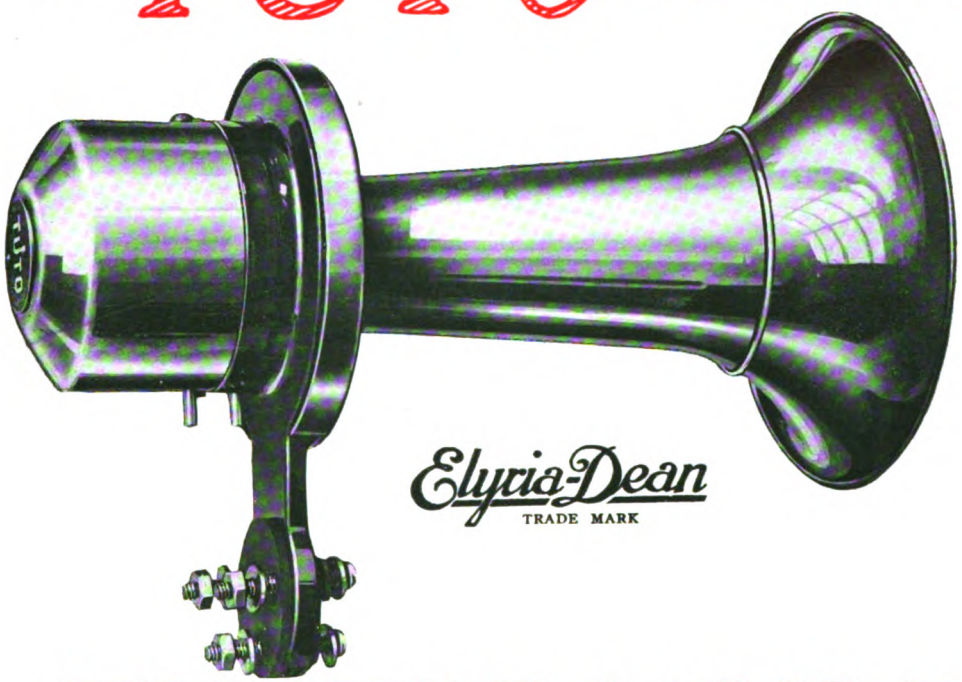
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Directory of Touring Information

TOURISTS desiring to obtain the fuliest benefit from the routing directions presented in the American section of this Seventh Annual Touring Number, will find the information listed on the succeeding pages of the utmost value. The various itineraries have been prepared primarily to afford vacation tours, radiating from several important centres throughout the country, and it will be found that in most instances the routings bring the tourist back to the starting point. This does not apply to some of the tours in the South and the Far West.

However, a larger object is sought in providing itineraries that form a network of tours covering the entire country and portions of Canada. By careful study of the maps and routing directions it ought not to be difficult for the motorist to plan additional tours including any particular section or sections desired.

The information contained in this directory has been compiled with a view to affording assistance in this regard. The first four pages present a detailed index of prominent vacation spots, night stops and principal centres, with the route, page and map location for each, so that it is possible for the tourist to determine how best to reach any particular point.

In addition, there is presented a key to the route index, wherein is suggested a number of combinations, indicating the manner in which the various itineraries may be utilized. No attempt has been made to exhaust this phase of the subject, but it is assumed that with these examples the tourist will experience little difficulty in making such combinations as will meet with his needs.

IN LAYING OUT THE TOUR, ALWAYS USE THE KEY.
IT WILL MAKE THE SELECTION OF ROUTES
EASIER AND SIMPLIFY THE PLANNING
TO THE LAST DEGREE.

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Directory of Touring Information

THE following index presents the tour, page and map location for all the principal vacation spots, night stops and chief centres throughout the country, as listed in the itineraries presented in the American touring section of this number:

	Tour	Page	Map
Abilene, Tex	151	67	66
Albany, N. Y.	14	23	23
Albany, N. Y.	30	34	34
Albany, N. Y.	40	37	41
Albuquerque, N. M.	155	73	66
Alexandria, Minn.	153	71	66
Alexandria, Va.	100	53	56
Alpine, Tex.	151	67	66
Altoona, Penn.	50	46	47
Amherst, Mass.	21	30	32
Anderson, S. C.	100	54	56
Ann Arbor, Mich.	125	59	61
Ardmore, Penn.	50	46	47
Arkadelphia, Ark.	151	67	66
Arlington, Mass.	11	16	17
Arlington, Vt.	1	9	10
Arlington, Vt.	30	34	34
Asbury Park, N. J.	52	51	47
Ashtabula, O.	125	58	61
Atlanta, Ga.	100	54	56
Atlanta, Ga.	101	56	56
Atlantic City, N. J.	52	51	47
Auburn, Me.	12	19	17
Auburn, N. Y.	41	41	41
Augusta, Me.	12	18	17
Ausable Forks, N. Y.	40	37	41
Austin, Nev.	150	65	66
Baltimore, Md.	53	52	47
Bangor, Me.	1	10	10
Bangor, Me.	2	14	14
Barre, Vt.	21	30	32
Barrington, R. I.	13	21	17
Batavia, N. Y.	40	39	41
Bath, Me.	1	10	10
Bath, N. Y.	50	47	47
Baton Rouge, La.	102	57	56
Battle Creek, Mich.	125	59	61
Becket, Mass.	14	23	23
Bedford, Penn.	50	46	47
Belfast, Me.	1	10	10
Belgrade, Me.	12	18	17
Bellows Falls, Vt.	21	29	32
Bennington, Vt.	1	9	10
Berthold, N. D.	153	71	66
Bethlehem, N. H.	1	9	10
Bethlehem, N. H.	21	30	32
Bethlehem, Penn.	50	47	47
Bethlehem, Penn.	51	50	47
Biddeford, Me.	1	10	10
Big Spring, Tex.	151	67	66
Binghamton, N. Y.	41	41	41
Binghamton, N. Y.	42	43	41
Birmingham, Ala.	100	55	56
Blacksburg, S. C.	100	54	56
Bloomington, Ill.	127	61	61
Bolton, Vt.	1	9	10
Boonville, Mo.	152	69	66
Boscawen, N. H.	11	17	17
Boston, Mass.	1	10	10
Boston, Mass.	11	16	17
Boston, Mass.	13	21	17
Bowling Green, O.	126	60	61
Branford, Conn.	1	10	10
Brantford, Ont.	125	59	61
Brattleboro, Vt.	21	29	32
Brattleboro, Vt.	30	34	34
Bretton Woods, N. H.	1	9	10
Brewer, Me.	2	14	14
Bridgeport, Conn.	1	10	10
Bridgeport, Conn.	15	26	23
Bridgeport, Conn.	30	34	34
Bridgeport, Conn.	51	49	47
Bridgewater, Me.	2	14	14
Bristol, Conn.	15	26	23
Bristol, N. H.	11	17	17
Bristol, R. I.	13	21	17
Brookfield, Mass.	14	24	23
Brunswick, Ga.	101	56	56
Brunswick, Me.	1	10	10
Bryn Mawr, Penn.	50	46	47
Buffalo, Ky.	100	55	56
Buffalo, N. Y.	40	39	41
Buffalo, N. Y.	50	46	47
Buffalo, N. Y.	125	59	61
Burlington, Vt.	1	9	10
Burlington, Vt.	21	29	32
Butler, Ind.	125	58	61
Butler, Penn.	50	46	47
Buzzard's Bay, Mass.	13	21	17
Calais, Me.	2	14	14
Cambridge, Mass.	1	10	10
Cambridge, Mass.	11	16	17
Camden, N. J.	51	49	47
Camden, N. J.	52	51	47
Canaan, Conn.	1	9	10
Canaan, Conn.	51	49	47
Canaan, Me.	1	10	10
Cape Girardeau, Mo.	154	72	66
Cape May, N. J.	52	51	47
Cascade Lake, N. Y.	40	38	41
Castleton, Vt.	1	9	10
Cazenovia, N. Y.	41	41	41
Cedar Rapids, Ia.	150	63	66
Center Harbor, N. H.	12	19	17
Chambersburg, Penn.	50	46	47
Charlotte, N. C.	100	54	56
Chautauqua, N. Y.	50	46	47
Chehalis, Wash.	156	74	66
Cheyenne, Wyo.	150	64	66
Chicago, Ill.	125	58	61
Chicago, Ill.	127	61	61
Chicago, Ill.	150	63	66
Chicago, Ill.	153	70	66
Chico, Cal.	156	75	66
Chocorua, N. H.	12	19	17
Cincinnati, O.	100	55	56
Cincinnati, O.	126	60	61
Clarendon, Ark.	151	67	66
Clear Lake, Minn.	153	71	66
Cleveland, O.	125	58	61
Clinton, Conn.	1	10	10
Clinton, Conn.	15	26	23
Clinton, Ia.	150	63	66
Clintonville, N. Y.	40	38	41
Clyde, O.	125	58	61
Coatesville, Penn.	50	46	47
Cohoes, N. Y.	30	34	34
Cohoes, N. Y.	40	37	41
Colby, Kan.	152	70	66
Colebrook, N. H.	12	19	17
Colfax, Cal.	150	65	66
Colliers, N. Y.	41	41	41
Colorado Springs, Col.	155	73	66
Columbia, Mo.	152	69	66
Commerce, Ga.	100	54	56
Concord, Mass.	11	16	17
Concord, N. H.	11	17	17
Connersville, Ind.	126	60	61
Conway, N. H.	12	19	17
Cooperstown, N. Y.	41	41	41
Corning, N. Y.	50	47	47
Cottage Grove, Cal.	156	74	66
Council Bluffs, Ia.	150	64	66
Culbertson, Mont.	153	71	66
Cumberland, Md.	100	56	56
Dallas, Tex.	151	67	66
Danbury, Conn.	1	9	10
Danbury, Conn.	15	26	23
Dayton, O.	126	60	61
Decatur, Ga.	101	56	56
Dedham, Mass.	1	10	10
Dedham, Mass.	13	21	17
Deerfield, Mass.	21	29	32
Deerfield, Mass.	30	34	34
Delaware Water Gap, Penn.	42	43	41
Delaware Water Gap, Penn.	51	50	47
Deming, N. M.	151	68	66
Denver, Col.	150	64	66
Denver, Col.	152	70	66
Denver, Col.	155	73	66
Detroit, Mich.	125	59	61
Detroit, Mich.	126	60	61
Devil's Lake, N. D.	153	71	66
Dingman's Ferry, Penn.	51	50	47
Dixfield, Me.	12	19	17
Dixville Notch, N. H.	12	19	17
Durham, Conn.	15	26	23
Easthampton, Mass.	30	34	34
Eastport, L. I.	15	26	23
East Rindge, N. H.	11	16	17
Edwardsville, Ala.	100	54	56
El Centro, Cal.	151	68	66
Elisabeth, N. J.	51	49	47
Elisabeth, N. J.	52	52	47
Elisabethtown, N. Y.	40	38	41
Elkhart, Ind.	125	58	61
Elkhart, Ind.	126	60	61
Elko, Nev.	150	65	66
Ellenville, N. Y.	51	50	47
Ellsworth, Kan.	152	69	66
Ellsworth, Me.	2	14	14
Elmira, N. Y.	50	47	47
El Paso, Tex.	151	67	66
Elyria, O.	125	58	61
Emigrant Gap, Cal.	150	65	66
Emmittsburg, Md.	53	53	47
Enosburg Falls, Vt.	21	30	32
Erie, Penn.	125	58	61
Evanston, Ill.	153	70	66
Fairfield, Conn.	1	10	10
Fairfield, Conn.	30	34	34
Fairfield, Conn.	51	49	47
Fall River, Mass.	13	21	17

(Continued on Page 50.)



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Directory of Touring Information

	Tour	Page	Map
Fargo, N. D.	153	71	66
Farmington, Conn.	30	34	34
Farmington, Conn.	51	49	47
Farmington, Me.	2	14	14
Fergus Falls, Minn.	153	71	66
Findlay, O.	126	60	61
Fitchburg, Mass.	14	23	23
Flagstaff, Me.	1	10	10
Forrest City, Ark.	151	67	66
Forrest City, Ark.	154	73	66
Fort Kent, Me.	2	14	14
Fort Stockton, Tex.	151	67	66
Fort Worth, Tex.	151	67	66
Franconia, N. H.	12	19	17
Franklin, Ky.	100	55	56
Franklin, N. H.	11	17	17
Frederick, Md.	53	53	47
Fredericksburg, Va.	100	53	56
Fredericton, N. B.	2	14	14
Fredonia, N. Y.	50	46	47
Fredonia, N. Y.	125	58	61
Fremont, O.	125	58	61
Fryeburg, Me.	12	19	17
Geneva, N. Y.	41	41	41
Gettysburg, Penn.	50	46	47
Gettysburg, Penn.	53	53	47
Gilead, Me.	1	9	10
Glasgow, Mont.	153	71	66
Glens Falls, N. Y.	40	37	41
Glen Summit, Penn.	50	47	47
Globe, Ariz.	155	74	66
Gorham, N. H.	1	9	10
Goshen, N. Y.	42	43	41
Gouldsboro, Me.	2	14	14
Gouldsboro, Penn.	42	43	41
Grafton Notch, Me.	12	19	17
Granby, Conn.	30	34	34
Granby, Que.	22	32	32
Grand Falls, N. B.	2	14	14
Grand Forks, N. D.	153	71	66
Grand Forks, N. D.	153A	72	66
Grand Island, Neb.	150	64	66
Grand Junction, Ia.	150	64	66
Great Barrington, Mass.	1	9	10
Great Falls, Mont.	153	71	66
Greenfield, Mass.	14	23	23
Greenfield, Mass.	21	29	32
Greenfield, Mass.	30	34	34
Greenport, L. I.	15	26	23
Green River, Wyo.	150	64	66
Greensboro, N. C.	100	54	61
Greenville, S. C.	100	54	61
Groton, Mass.	11	16	17
Guild, N. H.	11	17	17
Guild, N. H.	21	30	32
Guilford, Conn.	1	10	10
Guilford, Conn.	15	26	23
Hackensack, N. J.	42	43	41
Hacketstown, N. J.	42	43	41
Hagerstown, Md.	127	61	61
Hamilton, Ont.	40	38	41
Hamilton, Ont.	125	59	61
Hammondsport, N. Y.	41	41	41
Hampton, Me.	1	10	10
Hartford, Conn.	15	26	23
Hartford, Conn.	30	34	34
Hartford, Conn.	51	49	47
Havre, Mont.	153	72	66
Helena, Mont.	153	72	66
Henderson, N. C.	100	53	61
Herkimer, N. Y.	40	39	41
Hingham, Mass.	13	21	17
Holderness, N. H.	11	17	17
Holyoke, Mass.	21	29	32
Hot Springs, Ark.	151	67	66
Houlton, Me.	2	14	14
Hudson, N. Y.	30	34	34
Indianapolis, Ind.	126	60	61
Indianapolis, Ind.	127	61	61
Ipswich, Mass.	1	10	10
Jackson, Mich.	125	59	61
Jackson, Miss.	102	57	56
Jacksonville, Fla.	101	56	56
Jaffrey, N. H.	11	17	17
Jamaica, Vt.	30	34	34
Jamestown, N. Y.	50	46	47
Jay, N. Y.	40	38	41
Jonesburg, Ark.	154	73	66
Julesburg, Col.	150	64	66
Kalamazoo, Mich.	125	59	61
Kansas City, Mo.	152	69	66
Kearney, Neb.	150	64	66
Keene, N. H.	11	17	17
Keene, N. H.	21	30	32
Keene, N. Y.	40	38	41
Keeseville, N. Y.	40	38	41
Kelton, Utah	150	65	66
Kennebunk, Me.	1	10	10
Kent, Conn.	1	9	10
Kingston, Ont.	40	38	41
Kittery, Me.	1	10	10
La Crosse, Wis.	153	70	66
Lafayette, Ind.	127	61	61
Lake George, N. Y.	40	37	41
Lake Hopatcong, N. J.	42	43	41
Lakeport, N. H.	11	17	17
Lakeville, Conn.	51	49	47
Lakewood, N. J.	52	51	47
Lancaster, O.	100	55	56
Lancaster, Penn.	50	46	47
Las Vegas, N. M.	155	73	66
Lavonia, Ga.	100	54	56
Lawrenceburg, Tenn.	100	55	56
Lee, Mass.	14	23	23
Lenox, Mass.	1	9	10
Lenox, Mass.	14	23	23
Leominster, Mass.	14	23	23
Lewiston, Me.	12	19	17
Lexington, Mass.	11	16	17
Lima, O.	126	60	61
Limon, Col.	152	70	66
Lincoln, Me.	2	14	14
Litchfield, Conn.	15	26	23
Little Rock, Ark.	151	67	66
Littleton, N. H.	1	9	10
Littleton, N. H.	12	19	17
Littleton, N. H.	21	30	32
Livingston Manor, N. Y.	42	43	41
Logansport, Ind.	126	60	61
London, Ont.	125	59	61
Long Branch, N. J.	52	51	47
Los Angeles, Cal.	151	68	66
Los Angeles, Cal.	157	75	66
Louisville, Ky.	100	55	56
Lowell, Mass.	11	17	17
Lynchburg, Miss.	102	57	56
Lynn, Mass.	1	10	10
Machias, Me.	2	14	14
Madison, Conn.	1	10	10
Madison, Conn.	15	26	23
Madison, Wis.	153	70	66
Malta, Mont.	153	71	66
Mammoth Cave, Ky.	100	55	56
Manchester, N. H.	11	17	17
Manchester, Vt.	1	9	10
Manchester, Vt.	30	34	34
Marlboro, Mass.	14	24	23
Marshalltown, Ia.	150	63	66
McCarty, N. M.	155	74	66
Medford, Ore.	156	74	66
Memphis, Tenn.	102	57	56
Memphis, Tenn.	151	67	66
Meredith, N. H.	11	17	17
Meriden, Conn.	51	49	47
Merrimac, N. H.	11	17	17
Middlebury, Vt.	1	9	10
Middletown, Conn.	15	26	23
Middletown, N. Y.	42	43	41
Milledgeville, Ga.	101	56	56
Milwaukee, Wis.	153	70	66
Minneapolis, Minn.	153	70	66
Mishawaka, Ind.	126	60	61
Montpelier, Vt.	1	9	10
Montpelier, Vt.	21	29	32
Montreal, Que.	22	23	32
Montreal, Que.	40	38	41
Morrisburg, Ont.	40	38	41
Nanuet, N. Y.	30	34	34
Nanuet, N. Y.	51	49	47
Narragansett Pier, R. I.	1	10	10
Nashua, N. H.	11	17	17
Nashville, Tenn.	100	55	56
Naugatuck, Conn.	30	24	34
Nazareth, Penn.	50	47	47
Nazareth, Penn.	51	50	47
Newark, N. J.	51	49	47
Newark, N. J.	52	52	47
New Bedford, Mass.	13	21	17
New Brunswick, N. J.	51	49	47
Newburyport, Mass.	1	10	10
Newfane, Vt.	30	34	34
New Haven, Conn.	1	10	10
New Haven, Conn.	51	49	47
New Haven, Ky.	100	55	56
New London, Conn.	1	10	10
New Milford, Conn.	15	26	23
New Orleans, La.	102	57	56
New Paltz, N. Y.	51	50	47
Newport, Me.	1	10	10
Newport, N. H.	11	17	17
Newport, N. H.	21	30	32
Newport, R. I.	13	21	17
Newport, Vt.	21	30	32
Newport, Vt.	22	31	32
New Preston, Conn.	15	26	23
Newry, Me.	1	9	10
Newry, Me.	12	19	17
New York, N. Y.	1	9	10
New York, N. Y.	30	34	34
New York, N. Y.	52	51	47
Niagara Falls, N. Y.	40	39	41

(Continued on Page 52.)

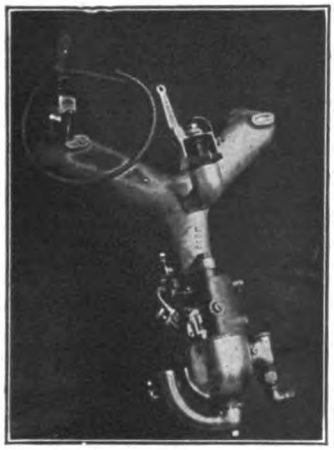


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CUT YOUR GASOLINE BILL IN HALF BY USING THE THE M&M ECONOMIZER

HOW ABOUT THIS LETTER!

Pat. Europe Pat. America



Showing M&M attached with 1-2" elbow

Temple, Texas, April 11th, '13.

Moller Brothers, Philadelphia, Penna.

Gentlemen:—On Mar. 17th, I noticed your advertisement of the M&M, and I immediately ordered one of them for my car. After receiving it, I immediately installed it on my U Light Six Stevens-Duryea car. I have given it what I call every test, and I certainly find it O. K. I would not be without this Economizer, as it certainly does everything you claim for it, and I am recommending it to my friends. Several of them will give you an order right away if they have not already done so. It pays to read advertisements as well as it does to advertise.

Yours very truly, A. E. NOBLE.

What You Can Do With the M&M Economizer

YOU can save from 40 to 50% of gasoline.

YOU can obtain 20% more speed and power than you can without it.

YOU can keep the cylinders clean, and cool your engine at all times.

YOU can use it just like the coaster brake on a bicycle.

YOU can develop more power in high altitudes.

YOU can use it as an air-brake in descending grades, at the same time taking off your ignition.

YOU can immediately secure the proper mixture for all weather conditions without re-adjusting your carburetor.

YOU can set the throttle at 12 miles per hour, and increase your mileage to eighteen or twenty miles, with the same amount of gasoline, and less carbon.



THE M&M WILL WORK ON ANY MAKE OF AUTOMOBILE OR MOTORCYLE ON THE MARKET, and it makes no difference what make of carburetor your car may have. **IF YOU KNEW THE AMOUNT OF AUXILIARY AIR YOUR MOTOR WOULD TAKE AT THE SPEED OF TWELVE MILES PER HOUR, YOU WOULD NOT HESITATE TO PURCHASE AN M&M.**

The M&M is made with one ground valve and six portholes, which when open admits auxiliary air into the manifold. The gas coming from the carburetor is broken up and sprayed by the incoming air, so that when it reaches the cylinders, **IT IS A GAS OF THE GREATEST EXPLOSIVE POWER.**

The M&M is nickel plated and highly polished. The automobile size requires a 3-4" pipe tap to insert into manifold, but same can be reduced to 1-2" if necessary. It is controlled by friction foot pedal, or steering post control which includes flexible shaft and wire. The motorcycle size is 1-4".

Price of Automobile Size, $3.50 and 17c extra for postage.
Price of Motorcycle Size, $1.25 prepaid.

WE GUARANTEE ABSOLUTE SATISFACTION. If the M&M should prove unsatisfactory in 30 days, **WE WILL POSITIVELY REFUND YOUR MONEY.** (Reference—Citizens National Bank, Lewistown, Pa.) No dealer, jobber or agent is allowed to sell without a guarantee.

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Directory of Touring Information

	Tour	Page	Map
Niagara Falls, N. Y.	125	59	61
North Adams, Mass.	14	23	23
Northampton, Mass.	21	29	32
Northampton, Mass.	30	34	34
North Anson, Me.	1	10	10
North Attleboro, Mass.	1	10	10
Northeast, Penn.	125	58	61
Northfield, Mass.	21	30	32
Norwalk, Conn.	1	10	10
Norwalk, Conn.	30	34	34
Norwalk, Conn.	51	49	47
Norwalk, O.	125	58	61
Oakland, Cal.	150	65	66
Ogden, Utah.	150	65	66
Ogunquit, Me.	1	10	10
Oldtown, Me.	2	14	14
Olympia, Wash.	156	74	66
Omaha, Neb.	150	64	66
Onset, Mass.	13	21	17
Ottawa, Ont.	40	38	41
Palmer, Mass.	14	23	23
Paso Robles, Cal.	157	75	66
Passaic, N. J.	51	49	47
Paterson, N. J.	42	43	41
Paw Paw, Mich.	125	59	61
Pawtucket, R. I.	1	10	10
Pawtucket, R. I.	13	21	17
Pembina, N. D.	153A	72	66
Penacook, N. H.	11	17	17
Penn Yan, N. Y.	41	41	41
Perth Amboy, N. J.	52	51	47
Peru, N. Y.	40	38	41
Peru, Vt.	30	34	34
Philadelphia, Penn.	50	46	47
Philadelphia, Penn.	51	49	47
Philadelphia, Penn.	52	51	47
Philadelphia, Penn.	53	53	47
Phoenix, Ariz.	151	68	66
Phoenix, Ariz.	155	74	66
Pittsburg, Penn.	50	46	47
Pittsburg, Penn.	100	56	56
Pittsfield, Mass.	1	9	10
Pittsfield, Mass.	14	23	23
Pittsfield, Me.	1	10	10
Plainville, Conn.	15	26	23
Plainville, Conn.	30	34	34
Plainville, Mass.	1	10	10
Plattsburg, N. Y.	46	38	41
Plymouth, Mass.	13	21	17
Plymouth, N. H.	11	17	17
Plymouth, N. H.	12	19	17
Poland Spring, Me.	12	19	17
Portageville, N. Y.	50	47	47
Portchester, N. Y.	1	9	10
Portchester, N. Y.	30	34	34
Portchester, N. Y.	51	49	47
Port Elizabeth, N. J.	52	51	47
Port Jefferson, L. I.	15	26	23
Port Jervis, N. Y.	51	50	47
Portland, Me.	1	10	10
Portland, Ore.	156	74	66
Portsmouth, N. H.	1	10	10
Poughkeepsie, N. Y.	30	34	34
Poughkeepsie, N. Y.	51	49	47
Pownall, Vt.	1	9	10
Pownall, Vt.	14	23	23
Prairie du Sac, Wis.	153	70	66
Prescott, Ont.	40	38	41
Princeton, N. J.	51	49	47
Princeton, N. J.	52	52	47
Providence, R. I.	1	10	10
Providence, R. I.	13	21	17
Provincetown, Mass.	13	21	17
Pueblo, Col.	155	73	66
Quebec, Que.	22	31	32
Quincy, Mass.	13	21	17
Rangeley, Me.	1	10	10
Rawlins, Wyo.	150	64	66
Rector, Ark.	154	72	66
Redding, Cal.	156	75	66
Reno, Nev.	150	65	66
Revere Beach, Mass.	1	10	10
Richfield Springs, N. Y.	41	41	41
Richmond, Va.	100	53	56
Riddle, Ore.	156	74	66
Ridgefield, Conn.	1	9	10
Roanoke Rapids, N. C.	100	53	56
Rochester, Minn.	153	70	66
Rochester, N. Y.	40	39	41
Rockland, Me.	1	10	10
Rockport, Me.	1	10	10
Roosevelt, Ariz.	155	74	66
Rumford, Me.	12	19	17
Rumford Point, Me.	1	9	10
Rumford Point, Me.	12	19	17
Rutland, Vt.	1	9	10
Saco, Me.	1	10	10
Sacramento, Cal.	150	65	66
Sacramento, Cal.	156	75	66
Sag Harbor, L. I.	15	26	23
Salem, Mass.	1	10	10
Salem, Ore.	156	74	66
Salina, Kan.	152	69	66
Salisbury, Conn.	51	49	47
Salisbury, N. H.	1	10	10
Salt Lake City, Utah	150	65	66
Santa Barbara, Cal.	157	75	66
Santa Clara, Cal.	157	75	66
Santa Cruz, Cal.	157	75	66
Santa Fe, N. M.	155	73	66
San Diego, Cal.	151	68	66
San Francisco, Cal.	150	65	66
San Francisco, Cal.	157	75	66
San Jose, Cal.	157	75	66
Saratoga, N. Y.	30	34	34
Saratoga, N. Y.	40	37	41
Savannah, Ga.	101	56	56
Schenectady, N. Y.	40	39	41
Scranton, Penn.	42	43	41
Seattle, Wash.	156	74	66
Seneca Falls, N. Y.	41	41	41
Seymour, Conn.	30	34	34
Sheffield, Ala.	100	55	56
Sheffield, Mass.	1	9	10
Sheffield, Penn.	50	46	47
Shelburne, Mass.	14	23	23
Shelburne, N. H.	1	9	10
Shelburne, Vt.	1	9	10
Shelbyville, Ky.	100	55	56
Sheldon, Vt.	21	30	32
Sierra Blanca, Cal.	151	67	66
Sisson, Cal.	156	75	66
Skowhegan, Me.	1	10	10
Somerville, Mass.	1	10	10
South Bend, Ind.	125	58	61
South Bend, Ind.	126	60	61
South Hadley, Mass.	21	30	32
South Londonderry, Vt.	30	34	34
Southwick, Mass.	30	34	34
Springerville, Ariz.	155	74	66
Springfield, Ill.	127	61	61
Springfield, Mass.	14	23	23
Springfield, Mass.	21	29	32
Springfield, Mass.	51	49	47
St. Albans, Vt.	21	30	32
St. Cesaire, Que.	22	32	32
St. Francois, Mo.	154	72	66
St. George, N. B.	2	14	14
St. John, N. B.	2	14	14
St. Johns, Que.	40	38	41
St. Johnsbury, Vt.	1	9	10
St. Johnsbury, Vt.	21	30	32
St. Joseph, Mich.	125	59	61
St. Joseph, Minn.	153	71	66
St. Louis, Mo.	127	61	61
St. Louis, Mo.	152	69	66
St. Louis, Mo.	154	72	66
St. Paul, Minn.	153	71	66
St. Pauls, Que.	40	38	41
St. Stephen, N. B.	2	14	14
Ste. Genevieve, Mo.	154	72	66
Stamford, Conn.	1	9	10
Stamford, Conn.	30	34	34
Stamford, Conn.	51	49	47
Stockbridge, Mass.	1	9	10
Stockton, Cal.	150	65	66
Stonington, Conn.	1	10	10
Stratford, Conn.	1	10	10
Stratford, Conn.	30	34	34
Stroudsburg, Penn.	50	47	47
Suffield, Conn.	51	49	47
Sumner, Miss.	102	57	56
Sunapee, N. H.	11	17	17
Sunapee, N. H.	21	29	32
Syracuse, N. Y.	40	39	41
Syracuse, N. Y.	41	41	41
Tacoma, Wash.	156	74	66
Tarrytown, N. Y.	51	49	47
Terre Haute, Ind.	127	61	61
Texarkana, Ark.	151	67	66
The Weirs, N. H.	11	17	17
Thomaston, Conn.	15	26	23
Thomaston, Me.	1	10	10
Three Rivers, Que.	22	32	32
Toledo, O.	125	58	61
Toledo, O.	126	60	61
Topeka, Kan.	152	69	66
Toronto, Ont.	40	38	41
Towner, N. D.	153	71	66
Townshend, Vt.	30	34	34
Trenton, N. J.	51	49	47
Trenton, N. J.	52	52	47
Trinidad, Col.	155	73	66
Troy, N. Y.	14	23	23
Troy, O.	126	60	61
Tucson, Ariz.	151	68	66
Tunkhannock, Penn.	50	47	47
Tuscumbia, Ala.	100	55	56
Tuscumbia, Ala.	102	56	56
Upton, Me.	12	19	17
Utica, N. Y.	40	39	41
Vergennes, Vt.	1	9	10

(Continued on Page 54.)



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Largest Exclusive Automobile Supply House in New England

Motorists before touring and while en tour can secure from our stock anything from a cotter pin to the finest made accessory or attachment.

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Directory of Touring Information

	Tour	Page	Map
Wakefield, R. I.	1	10	10
Wallingford, Conn.	51	49	47
Waltham, Mass.	14	23	23
Wareham, Mass.	13	21	17
Warren, Penn.	50	46	47
Warren, R. I.	13	21	17
Warsaw, N. Y.	50	46	47
Washington, D. C.	53	52	47
Washington, D. C.	100	53	56
Washington, Penn.	100	56	56
Waterbury, Conn.	30	34	34
Waterbury, Vt.	1	9	10
Waterbury, Vt.	21	29	32
Waterloo, Ind.	125	58	61
Watkins, N. Y.	41	41	41
Waukeeney, Kan.	152	69	66
Waukesha, Wis.	153	70	66
Weld, Me.	1	10	10
Wells River, Vt.	21	30	32
Westerly, R. I.	1	10	10
Westfield, Mass.	14	23	23
Westfield, Mass.	30	34	34
Westfield, N. Y.	50	46	47
Westfield, N. Y.	125	58	61
West Point, N. Y.	30	34	34
West Rindge, N. H.	11	17	17
Westwood, N. Y.	30	34	34
Wethersfield, Conn.	15	26	23
Wheeling, W. Va.	100	56	56
White River Junction, Vt.	21	29	32
Wilkesbarre, Penn.	50	47	47
Willcox, Ariz.	151	68	66
Williamstown, Mass.	1	9	10
Williamstown, Mass.	14	23	23
Williston, N. D.	153	70	66
Wilmington, Del.	53	53	47
Winchester, Va.	100	56	56
Windgap, Penn.	50	47	47
Windgap, Penn.	51	50	47
Windsor, Conn.	51	49	47
Windsor, Ont.	125	59	61
Winnipeg, Man.	153A	72	66
Winnisquam, N. H.	11	17	17
Winooski, Vt.	21	30	32
Winston-Salem, N. C.	100	54	56
Winterport, Me.	1	10	10
Woodstock, N. B.	2	14	14
Woodstock, N. H.	12	19	17
Woonsocket, R. I.	13	21	17
Worcester, Mass.	13	21	17
Worcester, Mass.	14	24	23
Wurtsboro, N. Y.	42	43	41
Wurtsboro, N. Y.	51	50	47
Yarmouth, Mass.	13	21	17
Yarmouth, Me.	1	10	10
York, Penn.	50	46	47
Ypsilanti, Mich.	125	59	61
Ypsilanti, Mich.	126	60	61
Yuma, Ariz.	151	68	66
Zanesville, O.	100	55	56

KEY TO ROUTE INDEX.

AS EXPLAINED elsewhere, the itineraries listed in this Seventh Annual Touring Number have been prepared with a view to connecting all sections of the country, so that it should be possible to start from any point and reach any other point. The several routings presented below indicate the manner in which the itineraries in this number may be utilized in planning additional tours. Obviously, it would prove impracticable to list more than a very small proportion of the possible tours which might be arranged in this manner, and it is assumed that with this guide the tourist will have no difficulty in making his own plans as he desires. However, The Automobile Journal is prepared to lend every assistance upon request.

TRANSCONTINENTAL TOUR A.

New York to	Route	Page	Miles
Albany	30R	34	157.7
Buffalo	40R	39	307.6
Chicago	125	58	580.0
San Francisco	150	63	2766.7
Total Mileage			3812.0

TRANSCONTINENTAL TOUR B.

New York to	Route	Page	Miles
Nanuet	30R	34	28.5
Suffern	51R	50	8.3
Binghamton	42	43	161.0
Elmira	..	..	63.5
Buffalo	50R	46	154.6
Chicago	125R	59	609.0
St. Louis	127R	62	433.8
Denver	152	69	973.8
San Francisco	150	64	1634.1
Total Mileage			4066.6

TRANSCONTINENTAL TOUR C.

New York to	Route	Page	Miles
Philadelphia	52R	52	96.9
Washington	53R	52	152.4
Tuscumbia	100	53	1114.7
Memphis	102	56	159.4
Los Angeles	151	67	2423.7
Total Mileage			3947.1

TRANSCONTINENTAL TOUR D.

New York to	Route	Page	Miles
Philadelphia	52R	52	96.9
Pittsburg	50	46	355.9
Cincinnati	100R	55	287.7
Indianapolis	126	60	130.1
St. Louis	127	61	243.5
Denver	152	69	973.8
Phoenix	155	73	942.0
Los Angeles	151	68	569.2
Total Mileage			3599.1

ALBANY, N. Y.-GETTYSBURG, PENN.-WASHINGTON, D. C.

Albany to	Route	Page	Miles
Poughkeepsie	30	34	74.5
Philadelphia	51	50	198.9
Gettysburg	50	46	118.7
Washington	53	53	77.7
Total Mileage			469.8

ALBANY, N. Y.-WHITE MOUNTAINS, N. H.-RANGELEY LAKES, ME.

Albany to	Route	Page	Miles
Springfield	14	23	93.7
Bethlehem	21R	30	217.1
Rangeley Lakes	1	10	129.3
Total Mileage			440.1

ATLANTA, GA.-CHICAGO, ILL.

Atlanta to	Route	Page	Miles
Louisville	100	54	670.5
Indianapolis	..	..	124.0
Chicago	127R	61	202.1
Total Mileage			996.6

ATLANTA, GA.-NIAGARA FALLS, N. Y.

Atlanta to	Route	Page	Miles
Washington	100R	54	785.5
Pittsburg	100R	56	270.4
Buffalo	50	46	252.3
Niagara Falls	40R	39	21.0
Total Mileage			1329.8

ATLANTA, GA.-WHITE MOUNTAINS, N. H.

Atlanta to	Route	Page	Miles
Washington	100R	53	785.5
Philadelphia	53	52	152.4
Springfield	51	49	270.7
Bethlehem	21R	30	217.1
Total Mileage			1425.7

(Continued on Page 56.)



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YOU SAVE as much money in the running of this car as you do in buying it

It is everyday testimony of owners of METZ cars that they make from 28 to 32 miles on ONE gallon of gasoline, a hundred miles on ONE pint of lubricating oil, and from 10,000 to 12,000 miles on ONE set of tires.

METZ "22"—$475

THE GEARLESS CAR

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Equipped with 4-cylinder 22½ H. P. water-cooled motor, *Bosch magneto*, wind shield, extension top and cover slip, full elliptic springs all around, standard artillery wheels, best quality *Goodrich olincher tires*, 5 lamps and gas generator, horn, pump and tool outfit.

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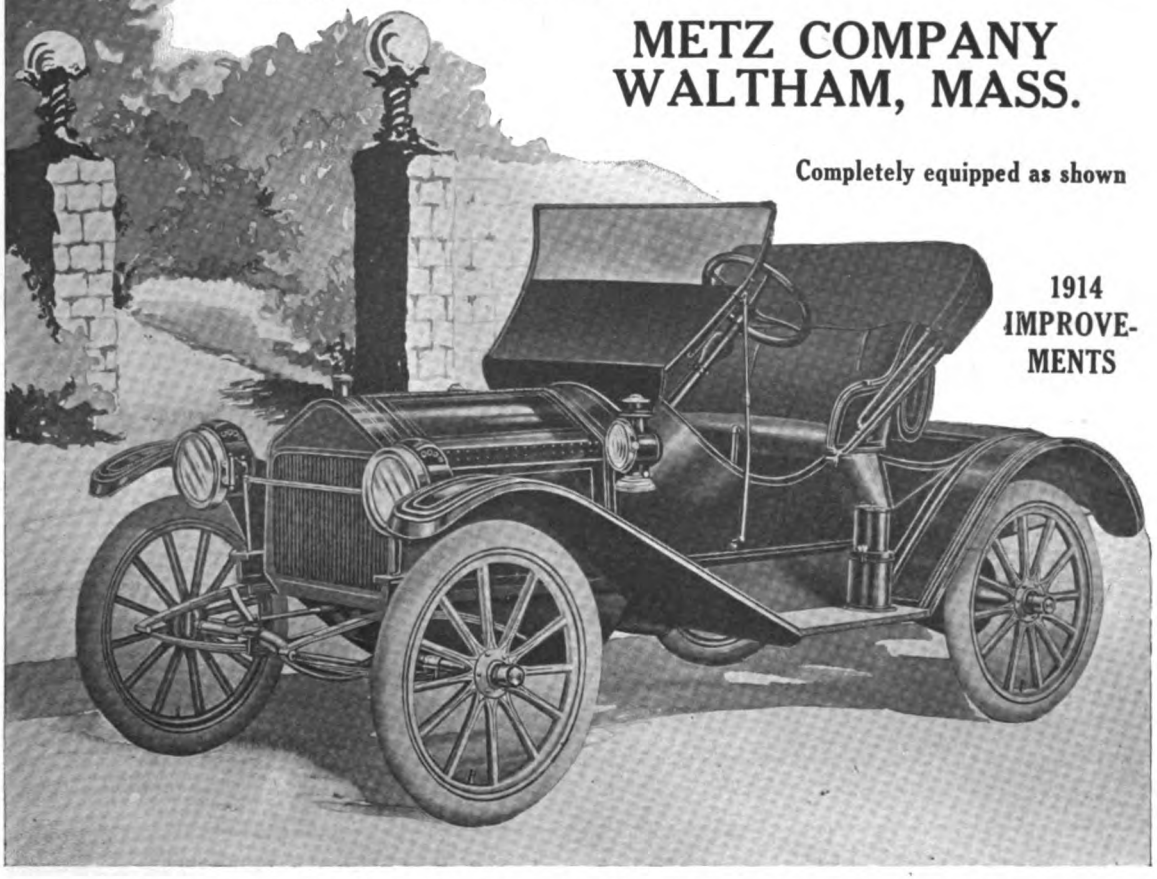
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Directory of Touring Information

BALTIMORE, MD.-BOSTON, MASS.

Baltimore to	Route	Page	Miles
Philadelphia	53	52	108.4
New York	52	51	96.9
Boston	1R	11	247.8
Total Mileage			453.1

BALTIMORE, MD.-BOSTON, MASS.

Baltimore to	Route	Page	Miles
Philadelphia	53	52	108.4
New York	52	51	96.9
Stamford	1	9	33.7
Springfield	51	49	104.7
Boston	14	23	95.1
Total Mileage			438.8

BALTIMORE, MD.-CHICAGO, ILL.

Baltimore to	Route	Page	Miles
Philadelphia	53	52	108.4
Pittsburg	50	46	355.9
Cincinnati	100R	55	287.7
Indianapolis	126	60	130.1
Chicago	127R	61	202.1
Total Mileage			1084.2

BINGHAMTON, N. Y.-ADIRONDACKS, N. Y.

Binghamton to	Route	Page	Miles
Richfield Springs	41	41	100.4
Utica	..	..	29.6
Albany	40	39	95.0
Cascade Lake	40	37	152.4
Total Mileage			377.4

BINGHAMTON, N. Y.-ATLANTIC CITY, N. J.

Binghamton to	Route	Page	Miles
Suffern	42R	43	161.0
Elizabeth	51R	49	46.0
Perth Amboy	..	..	13.1
Atlantic City	52	51	100.9
Total Mileage			321.0

BINGHAMTON, N. Y.-JACKSONVILLE, FLA.

Binghamton to	Route	Page	Miles
Delaware Water Gap	42	43	112.0
Philadelphia	51	50	90.3
Washington	53R	53	152.4
Atlanta	100	53	785.5
Jacksonville	101	56	476.3
Total Mileage			1616.5

BINGHAMTON, N. Y.-WHITE MOUNTAINS, N. H.

Binghamton to	Route	Page	Miles
Suffern	42R	43	161.0
Springfield	51	49	270.7
Bethlehem	21R	30	217.1
Total Mileage			648.8

BOSTON, MASS.-ADIRONDACKS, N. Y.

Boston to	Route	Page	Miles
Albany	14R	24	188.8
Cascade Lake	40	37	152.4
Total Mileage			341.2

BOSTON, MASS.-GETTYSBURG, PENN.-WASHINGTON, D. C.

Boston to	Route	Page	Miles
Springfield	14R	24	95.1
Philadelphia	51R	49	270.7
Gettysburg	50	46	118.7
Washington	53	53	77.7
Total Mileage			562.2

BOSTON, MASS.-JACKSONVILLE, FLA.

Boston to	Route	Page	Miles
Springfield	14R	24	95.1
Stamford	51R	49	104.7
New York	1	11	33.7
Philadelphia	52R	52	96.9
Washington	53R	53	152.4
Atlanta	100	53	785.5
Jacksonville	101	56	476.3
Total Mileage			1744.6

BOSTON, MASS.-ST. JOHN, N. B.

Boston to	Route	Page	Miles
Bangor	1R	10	267.8
St. John	2R	14	223.4
Total Mileage			491.2

BOSTON, MASS.-TRANSCONTINENTAL A.

Boston to	Route	Page	Miles
Albany	14R	24	188.8
Transcontinental	A	54	3654.3
Total Mileage			3843.1

BOSTON, MASS.-TRANSCONTINENTAL B.

Boston to	Route	Page	Miles
New York	1	10	247.8
Transcontinental	B	54	4066.6
Total Mileage			4314.4

BOSTON, MASS.-TRANSCONTINENTAL C.

Boston to	Route	Page	Miles
New York	1	10	247.8
Transcontinental	C	54	3947.1
Total Mileage			4194.9

BOSTON, MASS.-TRANSCONTINENTAL D.

Boston to	Route	Page	Miles
New York	1	10	247.8
Transcontinental	D	54	3599.1
Total Mileage			3846.9

BRIDGEPORT, CONN.-ADIRONDACKS, N. Y.

Bridgeport to	Route	Page	Miles
Dansbury	15R	26	25.1
Pittsfield	1	9	80.1
Albany	14R	23	36.7
Cascade Lake	40	37	152.4
Total Mileage			294.3

BRIDGEPORT, CONN.-GREEN MOUNTAINS, VT.

Bridgeport to	Route	Page	Miles
Danbury	15R	26	25.1
Rutland	1	9	159.7
Total Mileage			184.8

BRIDGEPORT, CONN.-LAKE HOPATCONG, N. J.

Bridgeport to	Route	Page	Miles
Suffern	51R	49	53.8
Lake Hopatcong	42R	43	76.1
Total Mileage			129.9

BRIDGEPORT, CONN.-WHITE MOUNTAINS, N. H.

Bridgeport to	Route	Page	Miles
Springfield	51	49	86.6
Bethlehem	21R	30	217.1
Total Mileage			303.7

BUFFALO, N. Y.-BOSTON, MASS.

Buffalo to	Route	Page	Miles
Albany	40	39	307.6
Boston	14	23	188.8
Total Mileage			496.4

BUFFALO, N. Y.-JACKSONVILLE, FLA.

Buffalo to	Route	Page	Miles
Philadelphia	50	46	381.6
Washington	53R	53	152.4
Atlanta	100	53	785.5
Jacksonville	101	56	476.3
Total Mileage			1795.8

(Continued on Page 58.)



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Publisher's Page

Within the past several weeks a number of publishers of motoring prints have compiled and published figures covering the amount of advertising copy appearing in leading motoring publications for certain stated periods, as compared with that for the same periods in 1912. Other publishers took exception to the facts as presented and in their zeal to make clear the status of their mediums immediately prepared tabulated statements giving similar information.

It would appear that such publishers believe that purchasers of advertising space are swayed solely by the amount of copy carried in the advertising sections of all trade prints. The tables presented did not indicate the amount of unpaid advertising, or the volume of dead copy carried for concerns that are known to be unable to pay for the service rendered. Furthermore, the amount of padded advertising copy that has been published was not designated. Nor did these tables show the enormous loss of advertising suffered by weekly automobile trade papers, and the gain made by monthly and semi-monthly publications in a business way, or the increased number of advertisers using such prints.

As a semi-monthly publication, The Automobile Journal is one of the magazines that is growing—gaining both in business and in circulation. It has but one rate, and it is giving better service to reader and advertiser than ever before. It carries no dead accounts, and permits no padding of its advertising section. It exends to all patrons, equal consideration. It does not now, nor never has, entered into the worst form of competition known to the industry—that of carrying what must be known as bad advertising accounts. Such procedure is often followed for no other purpose than to force reliable houses who do pay their bills to advertise extensively to protect their business interests.

The Automobile Journal is known as a strictly automobile owners' magazine, and less than eight per cent. of its distribution reaches any other clientele. Automobile owners constitute the market, as they are the men who spend the money. The Automobile Journal is an advertising medium that has always been productive of results, as is evidenced by the large number of the best known houses in all branches of the industry that are using this magazine regularly, and have been for a number of years.

Quality of contents means quality clientele. Magazines are read by subscribers only because of the value of what is presented in their editorial section. Exacting buyers of space are today using owners' publications. Figures prove this. There must be a reason.

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Directory of Touring Information

BUFFALO, N. Y.-NEW ORLEANS, LA.

Buffalo to	Route	Page	Miles
Cleveland	125	58	191.9
Lima	..	..	161.0
Cincinnati	126	60	130.1
Tuscumbia	100R	55	376.4
New Orleans	102	56	742.9
Total Mileage			1602.3

BUFFALO, N. Y.-NEWPORT, R. I.

Buffalo to	Route	Page	Miles
Albany	40	39	307.6
Worcester	14	23	144.7
Newport	13R	21	72.4
Total Mileage			524.7

BUFFALO, N. Y.-WHITE MOUNTAINS, N. Y.

Buffalo to	Route	Page	Miles
Albany	40	39	307.6
Springfield	14	23	93.7
Bethlehem	21R	30	217.1
Total Mileage			618.4

BURLINGTON, VT.-BOSTON, MASS.

Burlington to	Route	Page	Miles
Littleton	1	9	96.0
Plymouth	12	19	44.1
Boston	11	17	135.7
Total Mileage			275.8

BURLINGTON, VT.-GETTYSBURG, PENN.-WASHINGTON, D. C.

Burlington to	Route	Page	Miles
Canaan	1R	9	202.7
Philadelphia	51	49	250.7
Gettysburg	50	46	118.7
Washington	53	53	77.7
Total Mileage			649.8

BURLINGTON, VT.-JACKSONVILLE, FLA.

Burlington to	Route	Page	Miles
New York	1R	9	312.3
Philadelphia	52R	52	96.9
Washington	53R	53	152.4
Atlanta	100	53	785.5
Jacksonville	101	56	476.3
Total Mileage			1823.4

CHICAGO, ILL.-ATLANTIC CITY, N. J.

Chicago to	Route	Page	Miles
Buffalo	125R	58	580.0
Elmira	50	46	154.6
Binghamton	..	..	63.5
Suffern	42R	43	161.0
Elizabeth	51R	49	46.0
Perth Amboy	..	..	13.1
Atlantic City	52	51	100.9
Total Mileage			1119.1

CHICAGO, ILL.-BOSTON, MASS.

Chicago to	Route	Page	Miles
Buffalo	125R	58	580.0
Albany	40	39	307.6
Boston	14	23	188.8
Total Mileage			1076.4

CHICAGO, ILL.-GETTYSBURG, PENN.-WASHINGTON, D. C.

Chicago to	Route	Page	Miles
Indianapolis	127	61	202.1
Cincinnati	126R	60	130.1
Pittsburg	100	55	287.7
Gettysburg	50R	46	237.2
Washington	53	53	77.7
Total Mileage			934.8

CHICAGO, ILL.-JACKSONVILLE, FLA.

Chicago to	Route	Page	Miles
Indianapolis	127	61	202.1
Louisville	..	..	124.0
Atlanta	100R	55	670.5
Jacksonville	101	56	476.3
Total Mileage			1472.9

CHICAGO, ILL.-NEW ORLEANS, LA.

Chicago to	Route	Page	Miles
St. Louis	127R	62	433.8
Forrest City	154	72	392.0
Memphis	151R	67	48.0
New Orleans	102	57	582.5
Total Mileage			1456.3

CHICAGO, ILL.-WHITE MOUNTAINS, N. H.

Chicago to	Route	Page	Miles
Buffalo	125R	58	580.0
Albany	40	39	307.6
Springfield	14	23	93.7
Bethlehem	21R	30	217.1
Total Mileage			1198.4

CLEVELAND, O.-GETTYSBURG, PENN.-WASHINGTON, D. C.

Cleveland to	Route	Page	Miles
Pittsburg	..	..	128.9
Gettysburg	50R	46	237.2
Washington	53	53	77.7
Total Mileage			443.8

CLEVELAND, O.-JACKSONVILLE, FLA.

Cleveland to	Route	Page	Miles
Pittsburg	..	..	128.9
Washington	100	56	270.4
Atlanta	100	53	785.5
Jacksonville	101	56	476.3
Total Mileage			1661.1

CLEVELAND, O.-WHITE MOUNTAINS, N. H.

Cleveland to	Route	Page	Miles
Buffalo	125R	58	191.9
Albany	40	39	307.6
Springfield	14	23	93.7
Bethlehem	21R	30	217.1
Total Mileage			810.3

DANBURY, CONN.-ADIRONDACKS, N. Y.

Danbury to	Route	Page	Miles
Pittsfield	1	9	80.1
Albany	14R	23	36.7
Cascade Lake	40	37	152.4
Total Mileage			269.2

DANBURY, CONN.-LAKE HOPATCONG, N. J.

Danbury to	Route	Page	Miles
Stamford	1R	9	28.1
Suffern	51R	49	38.7
Lake Hopatcong	42R	43	76.1
Total Mileage			142.9

DANBURY, CONN.-WHITE MOUNTAINS, N. H.

Danbury to	Route	Page	Miles
Waterbury	..	..	29.3
Hartford	30	34	30.5
Springfield	51	49	27.8
Bethlehem	21R	30	217.1
Total Mileage			304.7

DENVER, COL.-ATLANTA, GA.-JACKSONVILLE, FLA.

Denver to	Route	Page	Miles
St. Louis	152R	70	973.8
Forrest City	154	72	392.0
Memphis	151R	67	48.0
Tuscumbia	102R	57	159.4
Atlanta	100R	55	329.2
Jacksonville	101	56	476.3
Total Mileage			2378.7

DENVER, COL.-BOSTON, MASS.

Denver to	Route	Page	Miles

(Continued on Page 60.)



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MOTOR PARTS CO

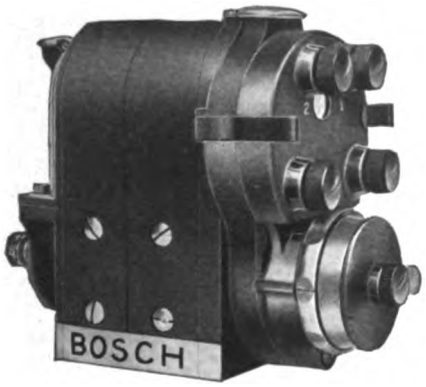
OFFICIAL BOSCH DISTRIBUTER

To the New England Motorists and Those Touring Through This Section:—

In order that you may have the best of Bosch service we have licensed the following companies in the various sections of New England as Bosch Sub-Stations. If you have ignition troubles, consult with them. At all times they carry a full and complete stock of BOSCH parts and their repair departments are absolutely guaranteed to do the best of work.

New England Licensed Sub-Stations

J. EDWARD NEWTON, Fall River, Mass.
AMERICAN BALL COMPANY, Providence, R. I.
NEWPORT ENGINEERING WORKS. Providence, R. I.
GEORGE B. WUESTEFELD, New Haven, Conn.
J. B. McCRILLIS & SON, Manchester, N. H.
Springfield, Mass.



We carry at all times a full and complete line of all Bosch Ignition Systems and Plugs. Our replacement department is at your immediate service for the duplication of all Bosch parts.

CONSULT US ON YOUR IGNITION PROBLEMS



MOTOR PARTS COMPANY

Boston Office
185-187 Columbus Ave.

Philadelphia Office
818 North Broad St.

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Directory of Touring Information

St. Louis	152R	70	973.8
Indianapolis	127R	61	243.5
Cincinnati	126R	60	130.1
Pittsburg	100	55	287.7
Philadelphia	50R	46	355.9
New York	52	51	96.9
Boston	1R	11	247.8
Total Mileage			2335.7

DENVER, COL.-BOSTON, MASS.

Denver to	Route	Page	Miles
Chicago	150R	64	1132.1
Buffalo	125R	58	580.0
Albany	40	39	307.6
Boston	14	23	188.8
Total Mileage			2208.5

DETROIT, MICH.-ATLANTA, GA.-JACKSONVILLE, FLA.

Detroit to	Route	Page	Miles
Cincinnati	126	60	268.3
Atlanta	100R	55	705.6
Jacksonville	101	56	476.3
Total Mileage			1450.2

DETROIT, MICH.-BOSTON, MASS.

Detroit to	Route	Page	Miles
Toledo	126	60	58.4
Buffalo	125R	58	312.9
Albany	40	39	307.6
Boston	14	23	188.8
Total Mileage			867.7

DETROIT, MICH.-BOSTON, MASS.

Detroit to	Route	Page	Miles
Buffalo	125	59	294.7
Albany	40	39	307.6
Boston	14	23	188.8
Total Mileage			791.1

DETROIT, MICH.-GETTYSBURG, PENN.-WASHINGTON, D. C.

Detroit to	Route	Page	Miles
Toledo	126	60	58.4
Cleveland	125R	58	121.0
Pittsburg	..	..	128.9
Gettysburg	50R	46	237.2
Washington	53	53	77.7
Total Mileage			623.2

DETROIT, MICH.-NEW ORLEANS, LA.

Detroit to	Route	Page	Miles
Cincinnati	126	60	268.3
Tuscumbia	100R	55	376.4
New Orleans	102	56	582.5
Total Mileage			1227.2

DETROIT, MICH.-NEW YORK.

Detroit to	Route	Page	Miles
Buffalo	125	59	294.7
Albany	40	39	307.6
New York	30	34	157.7
Total Mileage			760.0

DETROIT, MICH.-NEW YORK.

Detroit to	Route	Page	Miles
Buffalo	125	59	294.7
Elmira	50	46	154.6
Binghamton	..	..	63.5
Suffern	42R	43	161.0
Nanuet	51	49	8.3
New York	30	34	28.5
Total Mileage			710.6

DETROIT, MICH.-SAN FRANCISCO, CAL.

Detroit to	Route	Page	Miles
Chicago	125	59	314.3
San Francisco	150	63	2766.7
Total Mileage			3081.0

DETROIT-LOS ANGELES, CAL.

Detroit to	Route	Page	Miles
Indianapolis	126R	60	326.3
St. Louis	127	61	243.5
Denver	152	69	973.8
Phoenix	155	73	942.0
Los Angeles	151	68	569.2
Total Mileage			3054.8

HARTFORD, CONN.-ADIRONDACKS, N. Y.

Hartford to	Route	Page	Miles
Canaan	51	49	47.2
Pittsfield	1	9	32.3
Albany	14R	23	36.7
Cascade Lake	40	37	152.4
Total Mileage			268.6

HARTFORD, CONN.-ATLANTIC CITY, N. J.

Hartford to	Route	Page	Miles
Elizabeth	51R	49	158.6
Perth Amboy	..	..	13.1
Atlantic City	52	51	100.9
Total Mileage			272.6

HARTFORD, CONN.-GETTYSBURG, PENN.-WASHINGTON, D. C.

Hartford to	Route	Page	Miles
Philadelphia	51R	49	242.9
Gettysburg	50	46	118.7
Washington	53	53	77.7
Total Mileage			439.3

HARTFORD, CONN.-JACKSONVILLE, FLA.

Hartford to	Route	Page	Miles
Stamford	51R	49	76.9
New York	1	11	33.7
Philadelphia	52R	52	96.9
Washington	53R	53	152.4
Atlanta	100	53	785.5
Jacksonville	101	56	476.3
Total Mileage			1621.7

HARTFORD, CONN.-ST. JOHN, N. B.

Hartford to	Route	Page	Miles
Springfield	51	49	27.8
Boston	14	23	95.1
Bangor	1R	10	267.8
St. John	2R	14	223.4
Total Mileage			614.1

HARTFORD, CONN.-WHITE MOUNTAINS, N. H.

Hartford to	Route	Page	Miles
Springfield	51	49	27.8
Bethlehem	21R	30	217.1
Total Mileage			244.9

KANSAS CITY, MO.-BOSTON, MASS.

Kansas City to	Route	Page	Miles
St. Louis	152R	69	299.5
Chicago	127	61	433.8
Buffalo	125R	58	669.9
Albany	40	39	307.6
Boston	14	23	188.8
Total Mileage			1838.7

KANSAS CITY, MO.-BOSTON, MASS.

Kansas City to	Route	Page	Miles
St. Louis	152R	69	299.5
Indianapolis	127R	61	243.5
Cincinnati	126R	60	130.1
Pittsburg	100	55	287.7
Philadelphia	50R	46	355.9
New York	52	51	96.9
Boston	1R	11	247.8
Total Mileage			1661.4

MINNEAPOLIS, MINN.-BOSTON, MASS.

Minneapolis to	Route	Page	Miles
Chicago	153R	70	492.8
Buffalo	125R	58	669.9
Albany	40	39	307.6
Boston	14	23	188.8
Total Mileage			1598.2

(Continued on Page 62.)



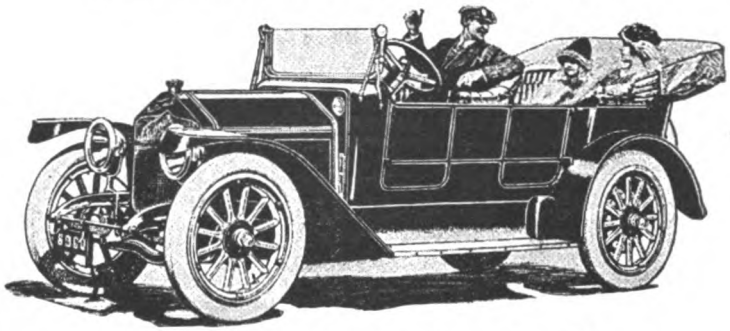
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National 40

The Unconquered Car

Still holds world's record for fastest competition 500 miles

NATIONAL 1912 78:72 miles per hour
1913 Winner - - 75:92 miles per hour
1911 Winner - - 74:61 miles per hour



Proud and Satisfied Owners

EVERY owner of a National car today has additional reason for pride. It is a satisfaction to own the unconquered car. The National year after year has consistently demonstrated its superiority. The National remains securely at the top of motor car achievements. There is genuine pleasure, confidence and comfort in driving a National, the champion car under any and all conditions and the one and only car that has made faster time in the 500-mile races than European cars.

The National knows no superior.

Long stroke motor (4⅞x6), left-side drive, center control, Gray & Davis electric starter, Gray & Davis dynamo electric lighting system, Bosch double dual magneto, multiple jet carburetor, 12-inch Turkish upholstery, tire pump integral part of motor, 128-inch wheelbase, full floating rear axle, concealed baggage compartments, tire carriers, full heavy nickel trimmings, powerful brakes, perfect oiling system, robe rail, foot rest, foot mat in running board, concealed tool box, electric horn, top, curtains, Truffault-Hartford Shock Absorbers in rear, adjustable ventilating and rain vision windshield and one extra Firestone demountable rim. Five models $2750 to $3400.

Write for copy of our story of the 500-mile race. Also ask for our illustrated catalog.

National Motor Vehicle Company, Indianapolis, Indiana

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Directory of Touring Information

MINNEAPOLIS, MINN.-GETTYSBURG-WASHINGTON, D. C.

Minneapolis to	Route	Page	Miles
Chicago	153R	70	492.8
Indianapolis	127	61	202.1
Cincinnati	126R	60	130.1
Pittsburg	100	55	287.7
Gettysburg	50R	46	237.2
Washington	53	53	77.7
Total Mileage			1427.6

MINNEAPOLIS, MINN.-JACKSONVILLE, FLA.

Minneapolis to	Route	Page	Miles
Chicago	153R	70	492.8
Indianapolis	127	61	202.1
Louisville	..	..	124.0
Atlanta	100R	55	670.5
Jacksonville	101	56	476.3
Total Mileage			1965.7

MONTREAL, QUE.-BOSTON, MASS.

Montreal to	Route	Page	Miles
Newport	22	32	102.8
Littleton	21	30	62.0
Plymouth	12	19	44.1
Boston	11	17	135.7
Total Mileage			344.6

MONTREAL, QUE.-JACKSONVILLE, FLA.

Montreal to	Route	Page	Miles
Albany	40R	37	281.7
New York	30	34	157.7
Philadelphia	52R	52	96.9
Washington	53R	53	152.4
Atlanta	100	53	785.5
Jacksonville	101	56	476.3
Total Mileage			1950.5

MONTREAL-ST. JOHN, N. B.

Montreal to	Route	Page	Miles
Quebec	22R	32	186.7
North Anson	..	..	175.9
Bangor	1	10	64.1
St. John	2R	14	223.4
Total Mileage			650.1

MONTREAL-ST. JOHN, N. B.

Montreal to	Route	Page	Miles
Newport	22	32	102.8
Bethlehem	21	30	67.0
Bangor	1	9	273.1
St. John	2R	14	223.4
Total Mileage			666.3

MONTREAL, QUE.-WINNIPEG, MAN.

Montreal to	Route	Page	Miles
Prescott	..	..	130.0
Hamilton	40	38	302.5
Chicago	125R	59	419.4
Grand Forks	153	70	852.5
Winnipeg	153A	72	158.5
Total Mileage			1862.9

NEW HAVEN, CONN.-ATLANTA, GA.-JACKSONVILLE, FLA.

New Haven to	Route	Page	Miles
New York	1	10	73.6
Philadelphia	52R	52	96.9
Washington	53R	53	152.4
Atlanta	100	54	785.5
Jacksonville	101	56	476.3
Total Mileage			1584.7

NEW HAVEN, CONN.-GETTYSBURG-WASHINGTON, D. C.

New Haven to	Route	Page	Miles
Philadelphia	51R	49	205.9
Gettysburg	50	46	118.7
Washington	53	53	77.7
Total Mileage			402.3

NEW HAVEN, CONN.-MONTREAL, QUE.

New Haven to	Route	Page	Miles
Springfield	51	49	64.8
White River Junction	21	29	132.2
Hanover	..	..	5.5
Littleton	21R	30	60.6
Newport	21R	30	62.0
Montreal	22R	32	102.8
Total Mileage			427.9

NEWPORT, R. I.-ADIRONDACKS, N. Y.

Newport to	Route	Page	Miles
Worcester	13	21	72.4
Albany	14R	24	144.7
Cascade Lake	40	37	152.4
Total Mileage			369.5

NEWPORT, R. I.-JACKSONVILLE, FLA.

Newport to	Route	Page	Miles
Ferry to Narragansett Pier.			
New York	1R	10	170.7
Philadelphia	52R	52	96.9
Washington	53R	53	152.4
Atlanta	100	53	785.5
Jacksonville	101	56	476.3
Total Mileage			1681.8

NEWPORT, R. I.-WHITE MOUNTAINS, N. H.

Newport to	Route	Page	Miles
Providence	13	21	28.2
Boston	1R	10	45.5
Plymouth	11R	17	135.7
Littleton	12R	19	44.1
Bethlehem	1	9	5.0
Total Mileage			258.5

PHILADELPHIA, PENN.-ADIRONDACKS, N. Y.

Philadelphia to	Route	Page	Miles
Poughkeepsie	51R	50	198.9
Albany	30R	34	74.5
Cascade Lake	40	37	152.4
Total Mileage			425.8

PHILADELPHIA, PENN.-CHICAGO, ILL.

Philadelphia to	Route	Page	Miles
Pittsburg	50	46	355.9
Cincinnati	100R	55	287.7
Indianapolis	126	60	130.1
Chicago	127R	61	202.1
Total Mileage			975.8

PHILADELPHIA, PENN.-CHICAGO, ILL.

Philadelphia to	Route	Page	Miles
Pittsburg	50	46	355.9
Cleveland	..	..	128.9
Chicago	125	58	388.1
Total Mileage			872.9

PHILADELPHIA, PENN.-JACKSONVILLE, FLA.

Philadelphia to	Route	Page	Miles
Washington	53R	53	152.4
Atlanta	100	53	785.5
Jacksonville	101	56	476.3
Total Mileage			1414.2

PHILADELPHIA, PENN.-WHITE MOUNTAINS, N. H.

Philadelphia to	Route	Page	Miles
Springfield	51	49	270.7
Bethlehem	21R	30	217.1
Total Mileage			487.8

(Continued on Page 64.)



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No-Rim-Cut Tires 10% Over-Capacity

Made In Secret

The essential feature in No-Rim-Cut tires is made under lock and key.

It cannot be copied. And a faultless tire without hooks on the base was never made without it.

That's why the legions who wish to end rim-cutting have come to No-Rim-Cut tires.

None Like It

Of course other makers try to end rim-cutting. It's the bugaboo of Tiredom.

More money has been spent on these attempts than on any other tire improvement.

But faults developed and tires came back. That's the only reason why any maker clings to clincher tires today.

We solved the problem by six flat bands of braided wires which we vulcanize into the tire base. We set them at certain angles.

This makes the hooked base unnecessary. It lets you turn your rim flanges outward. Not one of these tires has ever been rim-cut. And in seven years no fault has developed.

This is the feature which we control by secrecy.

Over Rated Capacity

No-Rim-Cut tires, compared with clinchers, are 10 per cent over-capacity. And that, on the average, adds 25 per cent to the tire mileage.

So we save rim-cutting and save overloading. And that means so much that Goodyear tires now far outsell all others. It means so much that last year's sales exceeded our previous 12 years put together.

GOODYEAR
AKRON, OHIO
No-Rim-Cut Tires
With or Without Non-Skid Treads

Write for the Goodyear Tire Book—14th-year edition. It tells all known ways to economize on tires

THE GOODYEAR TIRE & RUBBER CO., Akron, Ohio

Branches and Agencies in 103 Principal Cities—More Service Stations Than Any Other Tire.
We Make All Kinds of Rubber Tires, Tire Accessories and Repair Outfits.

Main Canadian Office, Toronto, Ont.—Canadian Factory, Bowmanville, Ont. (1178)

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Directory of Touring Information

PORTLAND, ME.-JACKSONVILLE, FLA.

Portland to	Route	Page	Miles
Boston	1	10	126.8
Springfield	14R	24	95.1
Philadelphia	51R	49	270.7
Washington	53R	53	152.4
Atlanta	100	53	785.5
Jacksonville	101	56	476.3
Total Mileage			1906.8

PORTLAND, ME.-NIAGARA FALLS, N. Y.

Portland to	Route	Page	Miles
Boston	1	10	126.8
Albany	14R	24	188.8
Niagara Falls	40R	39	329.2
Total Mileage			644.8

PROVIDENCE, R. I.-ATLANTIC CITY, N. J.

Providence to	Route	Page	Miles
New York	1R	10	202.3
Atlantic City	52	51	66.3
Total Mileage			268.6

PROVIDENCE, R. I.-CHICAGO, ILL.

Providence to	Route	Page	Miles
Worcester	13	21	44.2
Albany	14R	24	144.7
Buffalo	40R	39	307.6
Chicago	125	58	580.0
Total Mileage			1076.5

PROVIDENCE, R. I.-CHICAGO, ILL.

Providence to	Route	Page	Miles
New York	1R	10	202.3
Nanuet	30R	34	28.5
Suffern	51R	50	8.3
Binghamton	42	43	161.0
Elmira	..	..	63.5
Buffalo	50R	46	154.6
Chicago	125	58	580.0
Total Mileage			1198.2

PROVIDENCE, R. I.-GETTYSBURG-WASHINGTON, D. C.

Providence to	Route	Page	Miles
Stamford	1R	10	168.6
Philadelphia	51R	49	166.0
Gettysburg	50	46	118.7
Washington	53	53	77.7
Total Mileage			531.0

PROVIDENCE, R. I.-JACKSONVILLE, FLA.

Providence to	Route	Page	Miles
New York	1R	10	202.3
Philadelphia	52R	52	96.9
Washington	53R	53	152.4
Atlanta	100	53	785.5
Jacksonville	101	56	476.3
Total Mileage			1713.4

PROVIDENCE, R. I.-MONTREAL, QUE.

Providence to	Route	Page	Miles
Boston	1R	10	45.5
Plymouth	11R	17	135.7
Littleton	12R	19	44.1
Newport	21R	30	62.0
Montreal	22R	32	102.8
Total Mileage			390.1

PROVIDENCE, R. I.-MONTREAL, QUE.

Providence to	Route	Page	Miles
Worcester	13	21	44.2
Springfield	14R	24	51.0
Winooski	21	29	223.6
St. Pauls	..	..	60.6
Montreal	40	37	40.7
Total Mileage			420.1

SPRINGFIELD, MASS.-ATLANTIC CITY, N. J.

Springfield to	Route	Page	Miles
Stamford	51R	49	104.7
New York	1	11	33.7
Atlantic City	52	51	66.3
Total Mileage			204.7

SPRINGFIELD, MASS.-ADIRONDACKS, N. Y.

Springfield to	Route	Page	Miles
Albany	14R	24	95.1
Cascade Lake	40	37	152.4
Total Mileage			247.5

SPRINGFIELD, MASS.-GETTYSBURG-WASHINGTON, D. C.

Springfield to	Route	Page	Miles
Philadelphia	51	49	323.9
Gettysburg	50	46	118.7
Washington	53	53	77.7
Total Mileage			520.3

SPRINGFIELD, MASS.-JACKSONVILLE, FLA.

Springfield to	Route	Page	Miles
Stamford	51R	49	104.7
New York	1	11	33.7
Philadelphia	52R	52	96.9
Washington	53R	53	152.4
Atlanta	100	53	785.5
Jacksonville	101	56	476.3
Total Mileage			1649.5

SPRINGFIELD, MASS.-QUEBEC, QUE.

Springfield to	Route	Page	Miles
Newport	21R	30	284.2
Quebec	22	31	177.8
Total Mileage			462.0

SPRINGFIELD, MASS.-ST. JOHN, N. B.

Springfield to	Route	Page	Miles
Boston	14	23	95.1
Bangor	1R	10	267.8
St. John	2R	14	223.4
Total Mileage			586.3

WATERBURY, CONN.-ATLANTIC CITY, N. J.

Waterbury to	Route	Page	Miles
New York	30R	34	88.2
Atlantic City	52	51	136.9
Total Mileage			225.1

WATERBURY, CONN.-WHITE MOUNTAINS, N. H.

Waterbury to	Route	Page	Miles
Brattleboro	30	34	116.0
White River Junction	21	29	66.0
Hanover	..	..	5.5
Bethlehem	21R	30	65.6
Total Mileage			253.1

WORCESTER, MASS.-GETTYSBURG-WASHINGTON, D. C.

Worcester to	Route	Page	Miles
Springfield	14R	37	51.0
Philadelphia	51R	49	270.7
Gettysburg	50	46	118.7
Washington	53	53	77.7
Total Mileage			518.1

WORCESTER, MASS.-JACKSONVILLE, FLA.

Worcester to	Route	Page	Miles
Springfield	14R	37	51.0
Stamford	51R	49	104.7
New York	1	11	33.7
Philadelphia	52R	52	96.9
Washington	53R	53	152.4
Atlanta	100	53	785.5
Jacksonville	101	56	476.3
Total Mileage			1700.5

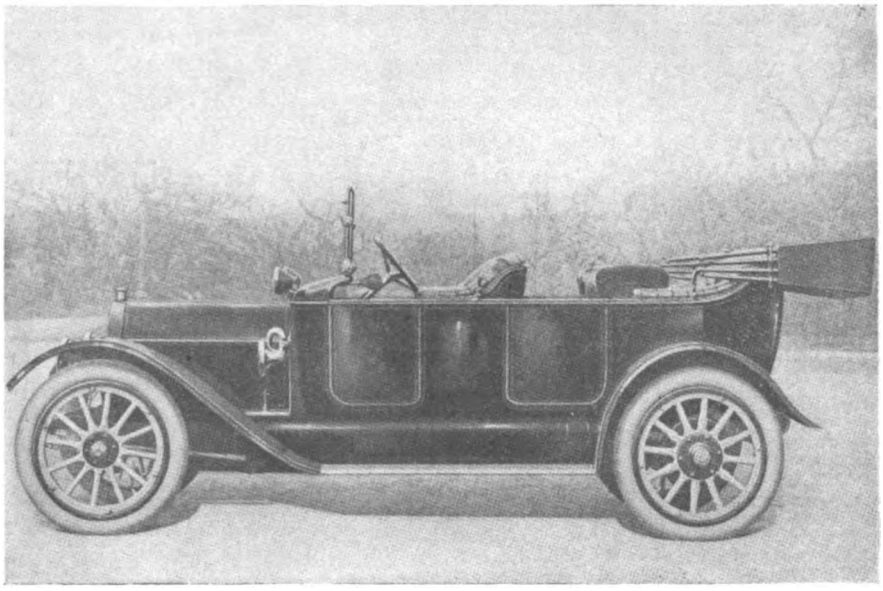


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LENOX

THE ONLY CAR
MADE IN BOSTON

LENOX



The 1913 Lenox "Six"

MR. PROSPECTIVE BUYER

Pause for a moment and consider how the Lenox Car has come to the front. In 1911 forty cars were built and sold. In 1912 this increased two hundred per cent. and in 1913 this same increase in output was maintained.

WHAT IS THE ANSWER?

There can be but one—the Lenox Motor Car Company in producing the Lenox Car have not only used the best of material possible, but also the most modern and up-to-date designs known to the Automobile World.

PERFECT CONSTRUCTION

"That is good enough," or, "That will get by" are phrases that are unknown in the Lenox Factory. In building Lenox Cars one goal only is kept in mind, that is **Perfection.**

A BIG, ROOMY, LUXURIOUSLY APPOINTED CAR

Every owner of an automobile to-day, be it a four or six-cylinder, large or small horse-power roadster, touring car or limousine, one thing they all insist upon, that is **Comfort.** The Lenox Cars, with their deep Turkish upholstering, 3-4 elliptic springs, long wheel-base, large tires, and well-balanced motor, are a source of wonder to all who ride in them.

COMPLETE EQUIPMENT

Lenox Cars are completely equipped from wind-shield to detachable demountable rims, self-starter to electric lighting—every equipment the up-to-the-minute man could ask for.

LENOX

Lenox Motor Car Co.

Salesroom: Motor Mart, 16 Columbus Avenue

BOSTON, MASS.

Factory: Hyde Park

LENOX

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Index To Advertisers

	Page
Abbott Motor Co.	157
American F. N. Company	138
Ames Shock Absorber	41
Anti-Rust Paint Co.	145
Apple Electric Co.	10
Approved Auto Specialties Co.	160
Austin Automobile Co.	4
Barrett Manufacturing Co.	133
Beach Co., T. C.	154
Borne, Scrymser Company	14
Bosch Magneto Company	3
Boston Clock Co.	18
Boyd, F. Shirley	162
Braender Rubber & Tire Co.	151
Bracelet Auto Lock Co.	Cover
Bretz Company, The J. S.	13
Brown Company	146
Burn-Boston Battery	12
Cameron Mfg. Co.	162
Campbell Mfg. Co.	152
Cartercar Company	19
Cataract Rubber Co.	22
Coes Wrench Company	28
Cole Motor Car Company	152
Cutter, Geo. A.	162
Dayton Rubber Mfg. Co.	149
Dean Electric Company	43
Detroit and Cleveland Navigation Co.	154
Dixon Crucible Co., Jos.	152
Dover Stamp. & Mfg. Co.	155
Eagle Oil & Supply Co.	26
Edison Storage Battery Co.	146
Edwards Mfg. Co.	154
Eiker Carbureter Co.	152
Eisner-Lenk Co.	144-148
Emery Mfg. Co.	153
Empire Automobile Co.	9
Federation Amer. Motorcyclists	138
Fisk Rubber Co.	2
Gaulois Tire Corp.	158
Geiszler Bros. Storage Bat. Co.	157
Gilbert Mfg. Co.	150
Goodyear Tire & Rubber Co.	63
Harris Oil Company, A. W.	159
Haynes Automobile Co.	33-40
Heinze Electric Co.	145
Henderson Motor Car Co.	32
Herreshoff Motor Co.	145
Herz & Co.	155
Hoffecker Company, The	153
Holtzer-Cabot Electric Co.	145
Hotel Lenox	162
Hoyt Elec. Instrument Works	161
Indian Refining Co.	151
International Metal Polish Co.	66
Invader Oil Co.	16-17
Invincible Tire Co.	158
Jackson Automobile Co.	152
Johns-Manville Co., H. W.	151-157
J. M. Shock Absorber Co.	147
Jones Speedometer Co.	143
Keeton Motor Co.	6-7
Kissel Motor Car Company	20-21
Knox Automobile Company	144
Kolb Sales Co.	45-67
K-R-I-T Motor Car Co.	160
Lenox Motor Car Co.	65
Marburg Bros.	49
McCue Co.	23
Mea Magneto	49
Mercer Automobile Company	151
Metz Co.	55
Miami Cycle & Mfg. Co.	137
Michigan Motor Car Co.	152
Miller, Chas. E.	Cover
Milwaukee Auto Specialties Co.	152
Moller Brothers Controller & Economizer Co.	51
Mosler & Co., A. R.	15
Motor Parts Co.	59
National Motor Vehicle Co.	61
New Departure Mfg. Co.	157
Nordyke & Marmon Co.	5
N. Y. & N. J. Lubricant Co.	11
Owen & Co., R. M.	155
Paige-Detroit Motor Car Co.	156
Peacock & Co., Clarence N.	41
Peerless Motor Car Co.	Cover
Perfection Spring Co.	160
Pilot Car Sales Co.	160
Pitless Auto Turntable Co.	153
Planhard Mfg. Co.	148
Pyrene Co. of N. E.	151
Randall-Faichney Co.	24
Remy Electric Company	143
Reo Motor Car Company	155
Royal Equipment Co.	25
Sager Company, J. H.	156
Shaler Co., C. A.	149
Splitdorf Electrical Co.	148
Springfield Metal Body Co.	8
Standard Co., The	150
Standard Oil Co.	29
Standard Welding Co.	27
Standard Woven Fabric Co.	31
Staybestos Mfg. Co.	162
Studebaker Corporation	158
Stutz Motor Car Co.	146
Sumner, George, Inc.	145
Taylor Mfg. Co.	143
Trail of the Bull Dog	147
Union Wadding Co.	42
United States Tire Co.	154
Vacuum Oil Co.	Cover
Valvoline Oil Company	145
Waite Auto Supply Co.	53
Wall, J. H.	143
Walpole Tire & Rubber Co.	69
Warner Speedometer Corp.	156
Weed Chain Tire Grip Co.	146
White Co., The	70
Willard Storage Battery Co.	1
Willys-Overland Company	30

EVERY CAR OWNER SHOULD USE ELECTRIC POLISHING CLOTHS. Keep the new car from looking old and shabby and make the old car look like new. No. 1 cloth removes all spots and stains. No. 2 cloth gives a hard dry polish that will not gather dust. Saves half the time in washing. Price 50 cents a set by Parcel Post. Order now. A. & R. Co., Wallingford, Conn.



Thousands of Car Owners All Over the World Are Using Blue Ribbon Goods

BLUE RIBBON METAL POLISH is the original "CREAM" Metal Polish and it still leads the procession.

BLUE RIBBON NICKEL POLISH is the result of 20 years' actual experience in manufacturing the finest gold and silver polishes. It is dangerous to use an experiment polish on fine nickel trimmings.

BLUE RIBBON AUTO BODY GLOSS revives and keeps the original factory finish and gloss on the body of the car—Shines like a mirror—No grease to catch dust—Leaves no coating.

BLUE RIBBON RADIATOR LEAK-PROOF CEMENT is a quick and permanent remedy for leaks. Does not clog the circulating system; prevents scale and rust; preserves the metal and increases the cooling capacity.

All **BLUE RIBBON** products strictly high class and fully guaranteed. **BLUE RIBBON** moves quick for the dealer—works fast for the consumer. **Ask for sample, giving us name of Dealer or Jobber.**

INTERNATIONAL METAL POLISH COMPANY

Quill and Naomi Streets, Indianapolis, Indiana
W. A. Blackburn, Eastern Distributor, 335 Broadway, Moffat Building, New York City

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RUBY Portable STEEL Houses



A Private Garage for the Price of Six Months' Storage

If the high cost of gasoline has been worrying you, here is a way of off-setting it—own one of our **Fire-proof, Weather-tight, Sectional All-steel Garages!** It will pay for itself in six months' time!

Besides saving you money you will get more out of your car. Think of having your car ready at a moment's notice any time you want to use it.

We make garages any desired size, and are producing them for a price which brings them within the reach of any car owner. Our buildings are furnished complete in every detail, from work-bench frame to locks on doors and windows.

Our buildings go together perfectly! The Fire-proof feature should appeal to your reason as a safe and economic proposition. It eliminates your risks of fire and saves useless high rate of insurance. You can erect your own building—no mechanic required. Easily put up and easily taken down.

Neat—Elegant—Durable—Can be painted any color.

Ruby Buildings come to you with a fifteen-year guarantee.

Our Special 10'x14' size for $120—other sizes in proportion.

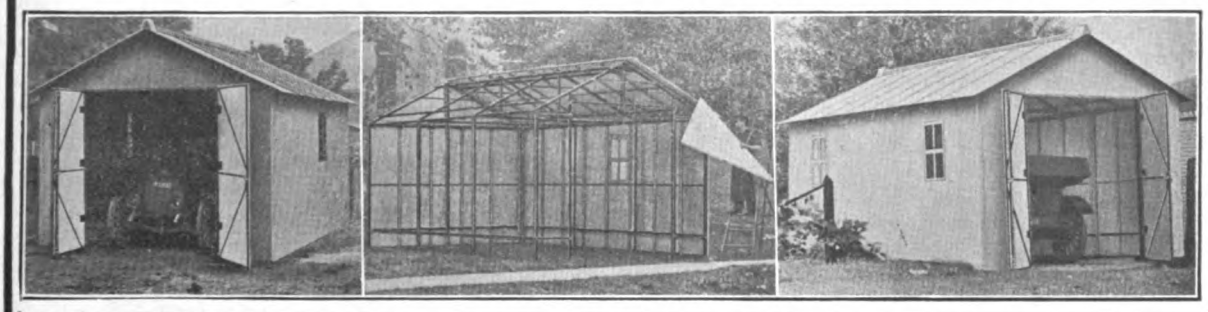
Our sectional steel construction is also furnished for Motor Cycle purposes, Boat Houses, Store Houses, etc. Catalogue sent upon request.

AGENTS, WRITE FOR OUR PROPOSITION.

KOLB SALES COMPANY

U. S. Rubber Building, 1790 Broadway, New York

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Frontispiece—Automobile Highway Through Virgin Forest in Glacier National Park, Montana.....Page 1

Page

*Seventh Annual Touring Number..... 2
*Encircling the New England States..... 3
*In the Heart of the Maine Woods..... 11
*Mountain Lakes of New Hampshire..... 15
*The Wonders of Dixville Notch..... 17
*New England's Most Historic Section..... 19
*Touring Among the Berkshire Hills..... 21
*Vacation Spots on Long Island..... 24
*In the Green and White Mountains..... 27
*Three Days in the Dominion of Canada..... 31
*Down the Valley of the Hudson..... 32
*The Adirondacks and Canadian Points..... 35
*The Lakes of Central New York..... 39
*Pocono Mountains and Suffern Hills..... 42
*Crossing Mountainous Pennsylvania..... 44
*Over the Hills into New England..... 47
*Encircling the State of New Jersey..... 50
*Crossing the Mason and Dixon Line..... 52
*Delightful Tours in the Southland..... 53
*Itineraries Covering the Middle West..... 57
*The Far West and the Pacific Coast..... 62
Digest of Motoring Laws..... 76
*A Week in the Chateaux District..... 78
*Ten-Day Tour of England and Wales..... 82
Canadian Customs and Motoring Laws..... 87
*Wolverine Automobile Club..... 87
*Preparing for the Foreign Tour..... 88
Sailing Dates for 1913 Season..... 90
*Short Tours and Camping Trips..... 92
*Overhauling the Car for the Tour..... 95
To Lecture on Advertising..... 98
*Touring Garments for Motoring Women..... 99
*Carburetion Troubles and Their Remedy.....102
*Knox Announces New Type of Body.....105
Race for Ancient Cars.....105

*Correspondence with the Reader—
Adjusting Pressure Feed.....106
Chauffeur's License.....106
Polish Formula.....106
Timing Magneto.....106
Timing Valves.....107
Auxiliary Mixing Devices.....107
Eisemann Magneto.....107

Effect of Interstate Touring, Editorial.....108
*Cleaning and Adjusting the Magneto, C. P. Shattuck 109
Cleaning Parts with Soda.....112
Interesting World Tour.....112

Page

To Reopen Recent Patent Decision.....113
Crow Company Expanding.....114
Selling Additional Stock.....115
Secures More Land.....115
Buys Another Plant.....115
*Joins Apperson Company.....115
*New 6-48 Added to KisselKar Line.....116
*Tire Equipment Is Important.....119
*Practical Garments for Motor Touring.....122
*The Reacto Horn.....124
*Edison Ignition Battery.....125
*Features of Cartercar Transmission.....126
Four vs. Six-Cylinder Cars.....127
Keeton in South America.....128
New KisselKar Line.....128
*An Octogenarian Tourist.....128
Mulford Wins at Columbus.....129
*Verbeck in California.....129
Around Lake Michigan.....129
*Gasoline Economy Contest.....130
*Indiana Manufacturers Off to the Coast.....131
Stutz Wins Twice at Tacoma.....134

*In the Realm of the Motorcyclists—
November Show in Chicago.....135
Manufacturers Donate Trophy.....135
Rules for Bosch Award.....135
New One-Hour Record.....136
Worcester to the White Mountains.....136
Elgin National Road Race.....136
New Official Repair Shops.....136
Constant a Consistent Winner.....137
State and Local Commissioners.....137
Merkel Retires from Miami Company.....137
Winners of Old Sol Lamps.....137
Goodyear Tires Cost Less.....137
Results at Bay State Meet.....138
Stewart-Warner Speedometer Prizes.....138
New Affiliated Clubs.....138

*National Reliability Tour.....139
*Ames Shock Absorber.....140
Special Weed Chain Prizes.....140
Bowers Carburetor.....140
Announces New Model.....141
*Detroit's First Cyclecar.....141
Joins the Cole Force.....142
Goodyear Electric Tire.....142

*Indicates article is illustrated.

For directory and index to American touring section see page 47 in advertising section.

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That and the scientifically-designed extra-tough tread are the real tire improvements of recent years.

They have added months and miles of service and greatly reduced the tire expenses per mile.

Walpole "No Stone Bruise" Tires are making and have made records that should interest every motorist.

What they will do for others they will do for you. Let the nearest Walpole Dealer show you, or write to us for facts, figures and catalog.

Walpole Tire & Rubber Company

757 Boylston Street, Boston. **Factories at Walpole and Foxboro, Mass. and Granby, Can.**

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EVERY WHITE RADIATOR
ONE MORE REASON

Watch the motor trucks go by.

Note what an impressive majority of the big houses have chosen the White Motor Truck as the best motor truck "buy."

Just count the motor trucks with the famous White radiator—shaped the same as the border of this advertisement.

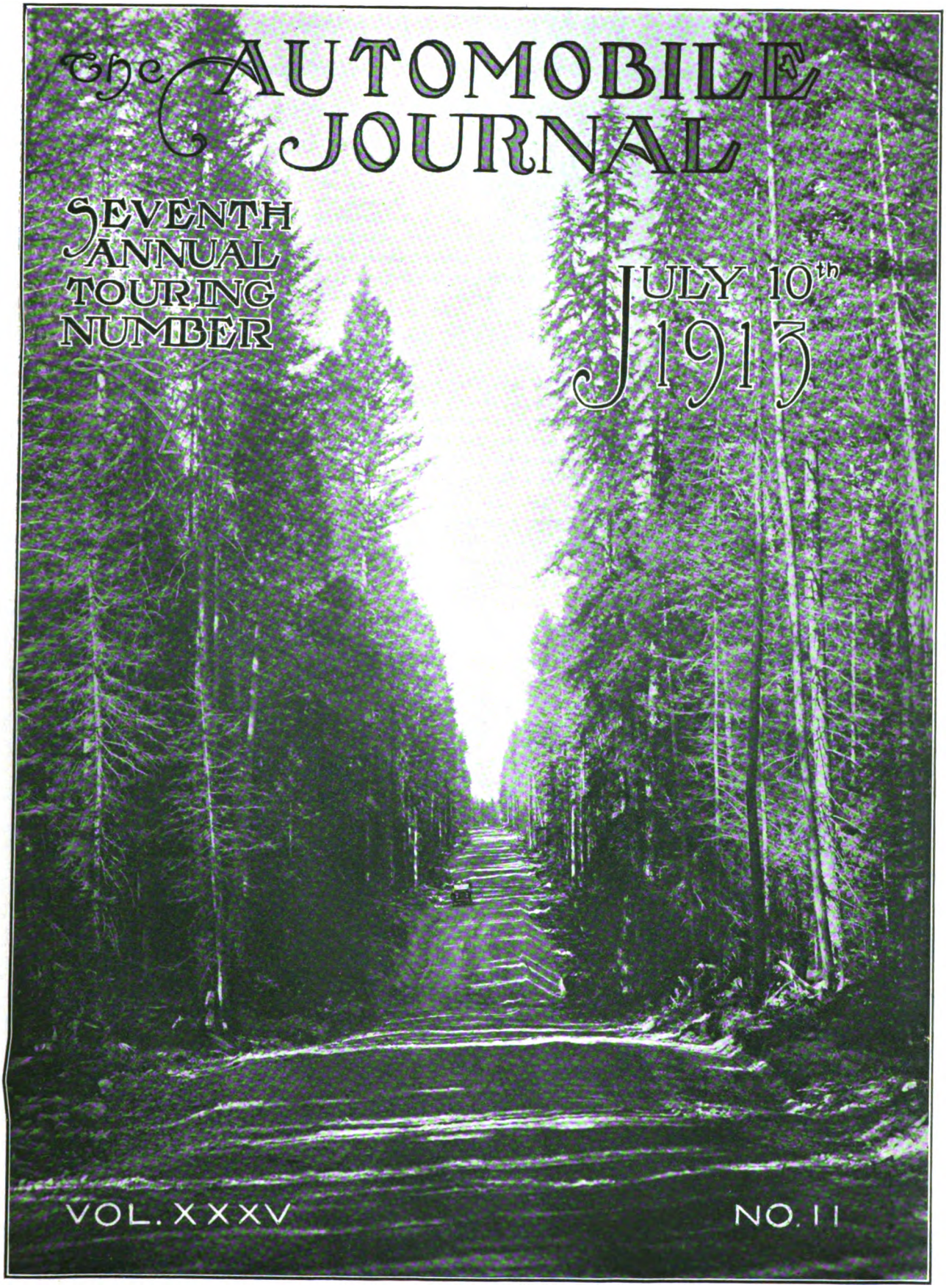
Every White radiator you see is one more reason why you should consider the White for your next Motor truck purchase.

3500 White Trucks in Service Today

THE WHITE COMPANY
CLEVELAND

Manufacturers of Gasoline Motor Cars, Trucks and Taxicabs

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Seventh Annual Touring Number

SINCE it has become quite conventional for those in the industry to recall the past, thereby noting the substantial progress which has resulted in the few short years of its history, The Automobile Journal, in presenting its Seventh Annual Touring Number, may be pardoned for a personal word. Nothing demonstrates more clearly the wonderful growth of automobile touring than this special number of this magazine.

Seven years ago it was considered quite sufficient to provide routing directions for a small portion of the New England States. That motor cars were owned and operated in other sections is true, but only the most venturesome were inclined to take advantage of the possibilities afforded to visit this splendid vacation country. It is only necessary to compare that early number with the present, giving complete information covering the entire country, to indicate the surprising change which the automobile has wrought in the lives of the American people.

The Automobile Journal has sought to keep pace with the expansion of the industry in every respect. "See America First" has been the slogan of the motorist, and the Annual Touring Number has been developed as a compendium of touring information worthy of being retained throughout the season as an authoritative compilation—a book of reference to be carried in the car continuously.

It is proper to call attention to several innovations which are expected to meet with the hearty approval of the reader. Each American itinerary has been prepared with a view to connecting with every other, so that the motorist may start from any section of the country and visit any other section. In the preceding pages will be found a directory of touring information, in which are presented some suggestions for combining the various itineraries which follow. In addition, there is a complete index to the more important vacation spots, night stops and principal centres, giving the route, page and map location for each. The routing directions are printed in bold face type, thereby making them easier to read while in the car on the road, and still another innovation is to be found in the listing of the reverse mileage, by means of which the tourist is enabled to follow each itinerary in either direction. And it is possible as well, at all times, not only to ascertain the number of miles that have been covered, but the number of miles yet to be covered before reaching the night stop.

While too much emphasis cannot be laid upon the value of routing directions, there are other features of almost, if not quite, equal importance. Considerable space has been devoted herein to the presentation of mechanical articles on subjects of direct, personal interest to the touring motorist. They have been prepared with a view to offering exactly the advice required, when it is needed the most. With the possession of a modern car and the information contained in these discussions no motorist should hesitate to undertake a long distance tour of substantial proportions.

It is impossible to enumerate all the several departments. It seems quite sufficient to state that an effort has been made to foresee every need and offer a compilation of touring information that should present the utmost practicability in every respect. The entire work has been thoroughly revised and represents the very latest information concerning the subjects treated, as well as the territory covered.

Particular attention is drawn to the illustrations, and in this connection The Automobile Journal is indebted to a large number of parties for courtesies extended. So far as possible an attempt has been made to give credit in each instance, but a list of those who have rendered valuable assistance would include the leading railroad companies in the country, the boards of trade and chambers of commerce in practically all of the cities of the West and Pacific Coast, many automobile clubs and individuals.

THE EDITOR.

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ENCIRCLING THE NEW ENGLAND STATES.

A Nine-Day Tour Through the Housatonic Valley, the Litchfield and Berkshire Hills, Green and White Mountains and Famous Rangeley Lake District.

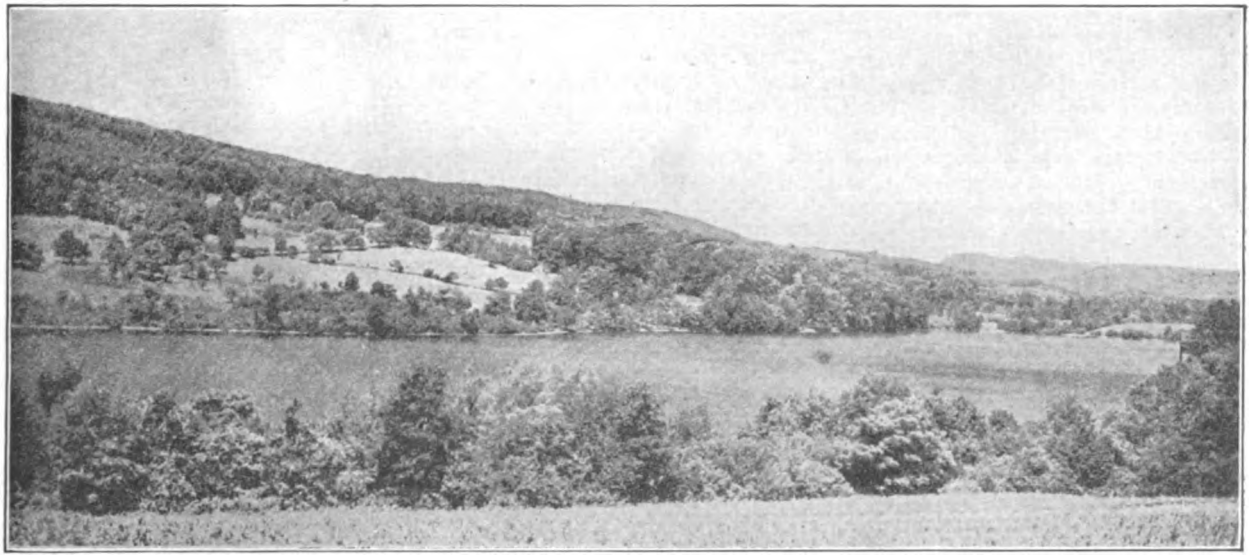
IN NO other section of the country is it possible to combine so much that is rich in natural beauty and historic associations as in New England. While it may be regarded as the original touring ground of the American motorist, the charm of its mountains, lakes, rivers and valleys is such that visitors come again and again, apparently finding it impossible to exhaust its resources. It has proven the mecca for tourists from all parts of the Union, even from those sections noted for their scenic grandeur. A large proportion of those who come from a distance will find it desirable to enter this district through New York City, and this has impelled the preparation of an itinerary practically encircling the New England states, starting from and returning to that centre. Other tours will be listed herein, giving optional routes, and as each itinerary may be used in connection with any other the reader will be able to arrange his plans as best meets his wishes.

Leaving New York the first day, the route lies through the metropolitan residential suburbs of New Rochelle, Larchmont, Mamaroneck, Rye and Portchester to Greenwich, Conn., which, with its many splendid homes, is also a suburb of New York. At Stamford, a pretty little city with handsome drives, the tourist turns northward into the Litchfield foothills. Ridgefield is well known to New York people as a summer place. It gains its name because of a lofty ridge, called by the Indians Caudatowa. In May, 1777, a little band of militiamen here cost Gen. Tryon 170 men before he was able to capture the defense. On the way to Danbury, is to be seen the monument raised to Gen. Wooster, the commander of the Continental forces, by the Masons, who have a particular regard for his memory, because of the fact that he instituted the first lodge in the state, Hiram of New Haven.

Danbury is the home of the hat industry, the first American hat factory being located here in 1780, when Zadoc Benedict, with three men, was able to produce three hats a day. The town was destroyed by Gen. Tryon in his memorable raid of May, 1777, and with it a large quantity of army supplies stored there by the colonists. The road now makes a descent into the Housatonic valley.

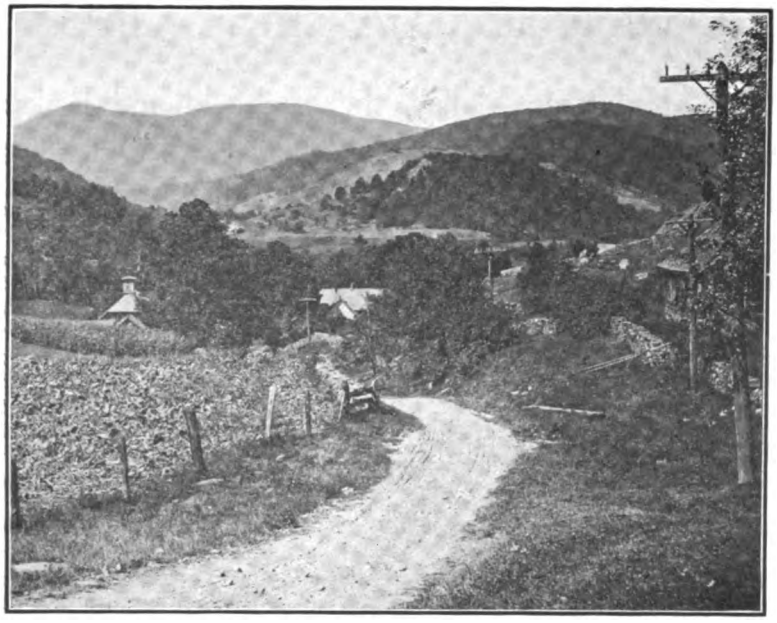
At Brookfield, north of Danbury, hills, high and steep, characterize the landscape, and this condition continues for some distance. Above New Milford, the hills and mountain ranges recede from the river on either side, and the river bottoms broaden into the most delightful intervales and meadow lands. Beyond New Milford lies Kent, having all the dignity of a respectable New England village, besides a great deal of scenic beauty and fine natural situations that are not always found in connection with dignified and eminently respectable towns, even in New England.

West Cornwall is the gateway to a wild and picturesque region traversed by the Cornwall range. Curiously tumbled about, rocky and broken, are these mountains and they possess a charm all their own. Lime Rock is sufficiently suggestive of the region in its neighborhood, for here ledges of the whitest limestone, seamed with lines of gray and black, show gleaming in the sunlight, or as white and gray patches among the shadows of the woods.



Prospect Lake, One of the Pretty Little Sheets of Water That Dot the Berkshire Hills.

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Pleasing Mountain Scenery in the Vicinity of Jamaica, Vt.

At Falls Village, the Housatonic takes a series of tumbles from a primeval rock dam, extending almost across the river bed, as a beginning of the descent, thence over a succession of natural terraces, alternating at no great distance, rushing and foaming and boiling among thickly strewn boulders, until it has fallen 130 feet. The falls not only form one of the most picturesque scenes on the whole trip, but furnish power for extensive manufacturing operations.

At Great Barrington, a side trip may be taken to Purgatory, a curious rock formation. Monument mountain is on the way to Stockbridge. On the east side is a white quartz cliff of considerable depth, detached from which is Pulpit rock. On the north side of the mountain is the Profile. A short distance beyond Stockbridge is Lake Mahkeenac, a beautiful calm sheet of water, surrounded by hills, with the village and spires of Curtisville peering over the trees toward the south.

Stockbridge and Lenox are known for the singular purity of their air. Many summer homes of wealthy people are located in this immediate vicinity, and add their beauty to that of nature. From Bald Head is gained a splendid view of the Berkshires and the well-known Housatonic valley.

Pittsfield, the Heart of the Berkshires, is the first night stop. It commands a view of the Lebanon valley which is unsurpassed. Balanced rock, near by, is one of the Berkshires' greatest natural curiosities. Its height is 18 feet and its estimated weight 150 tons. Resting upon one square foot of surface, this immense boulder is so evenly balanced that it may be swayed readily with a lever or by a man's weight. A number of interesting lakes are in this vicinity, including Pontoosuc, Ashley, Silver, Morewood and some others.

Pontoosuc lake is near Lanesboro, which is reached early on the second day. This town possesses beds of snow white granular quartz, used in the manufacture of superior cylinder glass. Variegated marble also is obtained here. Savage mountain and Constitution hill are picturesque heights a short distance away. Lanesboro was the birthplace of H. W. Shaw, known throughout the world as Josh Billings.

Midway between Mt. Greylock and Berlin mountain, is a pretty rural hamlet, South Williamstown, seat of the Greylock Institute for boys. Five miles further along is Williamstown, the reason for the existence of which is Williams College. The tour enters Vermont at Pownal, and approaches Bennington passing the famous battle monument on the way.

Beyond Arlington, the highway passes through the Sandgate notch, a remarkable cut in solid rock, 30 feet high, 800 long and 12 wide. Manchester is a quiet town at the base of Mt. Equinox. The sidewalks are of marble from the inexhaustible quarries on the mountains nearby. The route now enters a valley between the Green mountains on one side and the marble hills on the other, and slowly climbs up into the former. At Danby and beyond at Walling-



A Glimpse of the Mountains on the Way to Manchester, Vt.

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ford the lofty ridge of White Rocks is reached. Clarendon is passed on the way to Rutland.

The principal marble quarries and sawmills are at West Rutland, whence immense quantities of white marble is shipped to all parts of the world. Large gangs of saws, without teeth and cutting by means of sand poured in from above, are constantly running. A little further along the tourist reaches Castleton, where there are extensive marble and slate quarries, and at which point an excellent imitation of marble is produced by coating the slate with marble deposit. Much of this stone is taken from quarries on the banks of Lake Bomoseen, a sheet of water eight miles long and from one to 2.5 in width.

At Hubbardton, an obelisk, near the Baptist church, marks the battlefield of July 7, 1777, soon after the evacuation of Fort Ticonderoga. Rich lake views are obtained from many points on the way past Lake Champlain, with glimpses of the Adirondacks in the distance. The night stop, as outlined, is at Burlington, the Queen City of Vermont. Here are several fine buildings, among them St. Paul's Episcopal church of blue limestone and with beautiful stained glass windows. The University of Vermont occupies a commanding position on a high hill, and near this is Green Mountain cemetery, in which lies the body of Ethan Allen, under a Tuscan column 42 feet high.

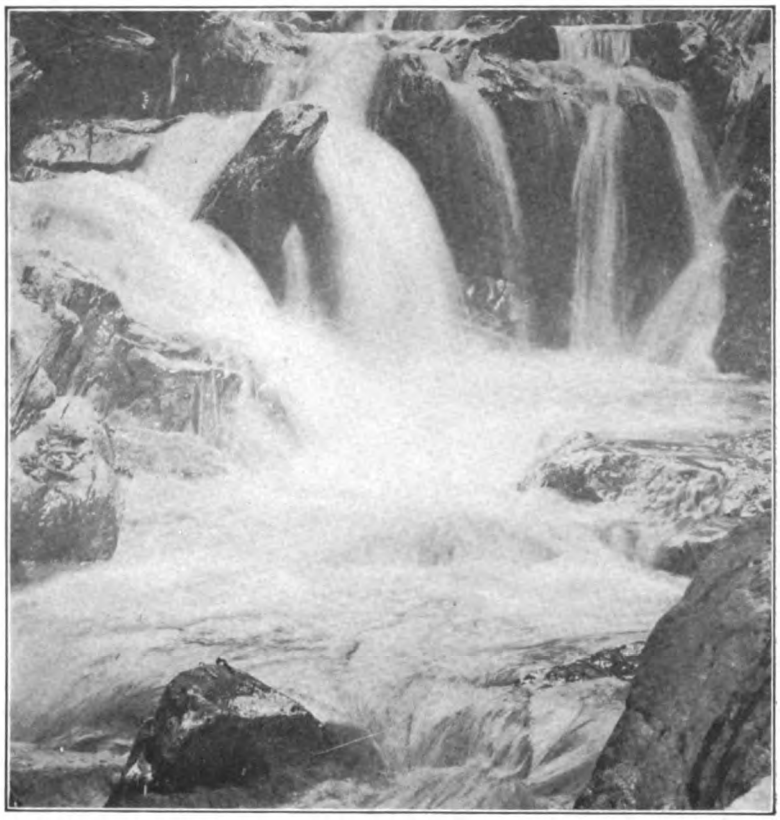
The way now leads along the valley of the Winooski river. Waterbury abounds with pleasant rambles and drives, with frequent glimpses of Camel's Hump and Mt. Washington, while Boston falls are near by. In the vicinity of Middlesex the river passes through a gorge 30 feet deep, 60 wide and 1300 long. Montpelier is the capital of the state and is situated on a plain near the river, surrounded by fertile farms. Under the portico of the State House are two cannons taken from the Hessians in the battle of Bennington in 1777, after a desperate struggle. The British got them back, but they were retaken by the Americans during the Canadian campaign and were presented to the state by Congress.

After leaving Montpelier, the route leads down into the valley of the Passumpsic, with its black, rock banks, which is crossed at St. Johnsbury. At the latter place considerable interest attaches to the works of the Fairbanks scales concern, particularly those which are made for use in Oriental countries, with their Chinese and Turkish numerals marked thereon.

From the hills in the vicinity of Littleton, N. H., may be had a fine panorama of the White mountains, and a little later the tourist enters the White mountain region at Bethlehem. No more beautiful view of the entire range can be secured from any other point. To the north and west are the mountains of Lancaster, the Percy peaks, the Pilot mountains and the great Presidential range. The night stop is at Bretton Woods, the very centre of the entire district.

The fourth day gives ample chance to test the car on mountain roads, but if additional trials are desired it is possible to connect with the road to the summit of Mt. Washington at Cherry Mountain or Gorham. For river scenery, combined with the impressive mountain forms, the vicinity of Gorham surpasses all the other districts from which the highest peaks are visible.

The drive to Gilead, Me., is along the river, with ever changing hill scenery on either hand. This continues through Mayville, North Bethel and Newry to Rumford Falls. Here the descent of the Androscoggin is over 150 feet in three or four plunges over ragged granite ledges. The third fall has a nearly perpendicular drop of over 70 feet, and its roaring is heard at a great distance.



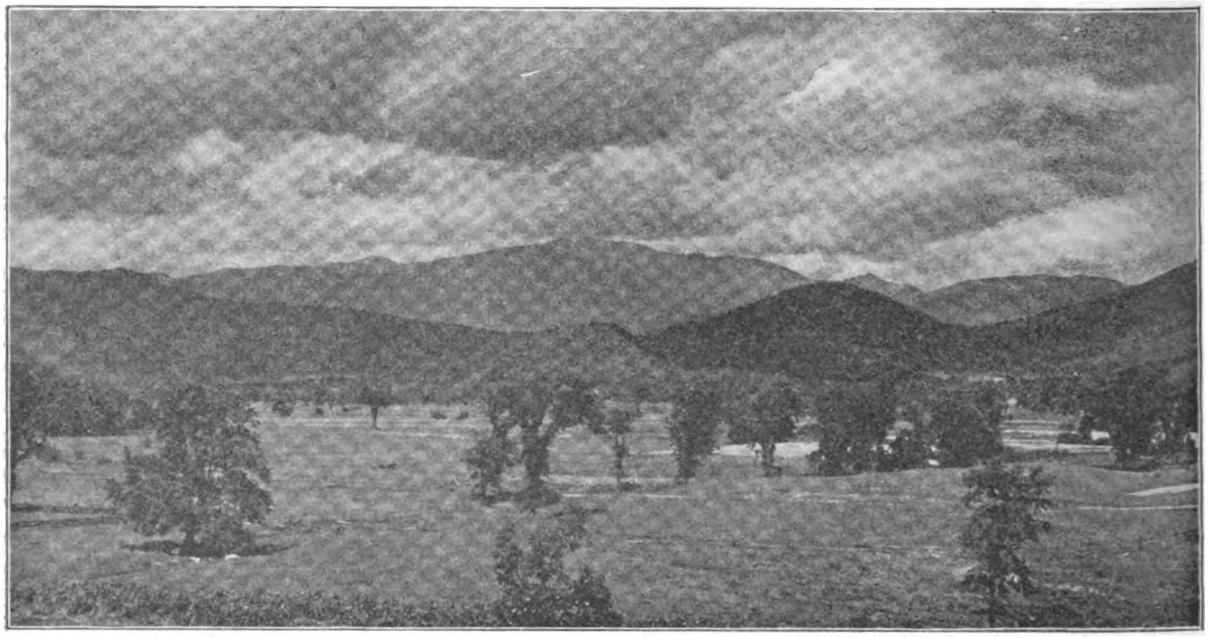
View of Little River as It Tumbles Over Bolton Falls, Vermont.

From this point the route enters the Maine woods on the way to Rangeley lakes, passing through Mexico, Dixfield, Weld, Webb and Madrid. Many summer camps and once in a while a farm house serve to break up the monotony of the continual forest, of which there are nearly 100 square miles in this region. The trip is by no means uninteresting, however, for something new in the way of scenery is being spread out before the tourist all of the time. The

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elevation of the lakes is about 2000 feet, and the pure air and sparkling water make it a most desirable spot in which to spend a summer's vacation.

During the fifth day, the tourist has many more miles of Maine woods before him. The route from Rangeley lakes to Skowhegan, by way of Dead River, Green Farm, Stratton, Flagstaff, North New Portland and North Anson, is somewhat better known by automobilists than that over which the tour reached Rangeley. The scenery, still that of the woods, interspread with numerous ponds and lakes, is fully as inspiring as any to be seen in New England.



One of the Views of the White Mountains from Bethlehem, N. H.—Mt. Washington in the Distance.

After leaving Skowhegan, fine fishing country is visited on the way to Pittsfield and Newport, the latter town being located on the shores of East Pond, which is 15 miles in circumference and affords most excellent fishing. The night stop is at Bangor, in size the second city of the state, and the second lumber mart in the world. The approach to the city, by way of Etna, Carmel and Hermon, gives commanding views of the hills at head of navigation on the Penobscot. The tributaries of this river penetrate the great Maine forest in every direction, and bear downward to this city immense quantities of lumber, work on which may be seen at numerous places on the route.

The river is quite as picturesque below Bangor. During the war of 1812, the British attacked Hampden, plundered and overran the town for three days. Between Winterport and Frankfort may be seen the granite quarries around the base of Mt. Waldo. Belfast is a handsome little city built on a declivity which slopes to the water, with wide shady streets.

The route now passes along the Penobscot bay, with its views of Mt. Desert in the distance. Camden is a pretty little town, with the two Megunticook peaks and a number of other smaller mountains to complete a picturesque group. Hills continue to furnish the change of scenery through Rockport and Rockland, the latter situated on Owl's Head bay. Here ship building is carried on, but the chief industry is lime burning. The kilns should be seen at night, and make a splendid addition to the hill and marine scenery about the city.

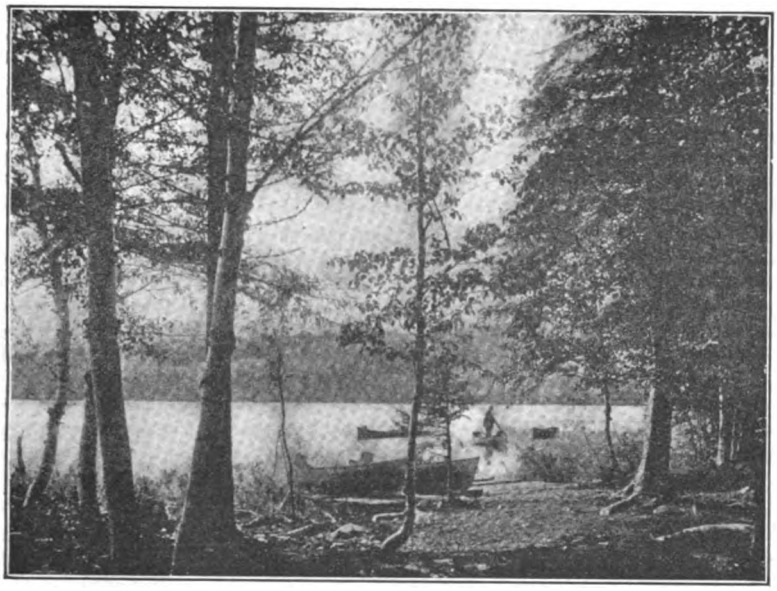
Thomaston is located on a deep, narrow harbor, and is the site of the Maine state prison, established in 1824. This was the scene of a sharp naval battle in 1724, when a fleet of 24 vessels, composed for the most part of captured fishing boats, engaged the colonial relief ships, which were forced to retire, greatly damaged by the Indian artillery. The fort which was built in 1720 withstood all attacks and was still standing during the Revolution.

Warren, another ship building town, was settled by Scotch and Irish in 1736. Waldoboro was settled by 1500 Germans in 1753, and some of their descendants still remain. Woolwich was founded in 1638, its Indian name being Naquasset, but was depopulated by an attack in 1696. It was rebuilt in 1759. William Phips was born in this town in 1651, and was a shepherd on its rocky hills. Later he learned the art of ship carpentry and in 1687, he succeeded in locating a Spanish treasure ship near the Bahamas, recovering something like $1,500,000 worth of jewels and bars of gold and silver. For this he was knighted by the king and received $80,000 of the treasure.

Bath was once a wealthy city, until the decline in American commerce seriously affected its ship building industry. It has a fine harbor, rarely bothered with ice, and the Kennebec at this point is very beautiful. The river is half a mile wide, and is rapid and deep. Some of the best shipbuilding lumber is floated down from its head waters.

Brunswick is a prosperous town at the falls and the head of the tidewater on the Androscoggin.

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Loon Lake, One of the Small Bodies of Water in Rangeley Lake Region.

The river falls 41 feet in three pitches and furnishes power for numerous factories. The town is also the seat of Bowdoin College. The pine groves in the rear of the college buildings are widely known for their sombre beauty.

Portland is the night stop. The city is situated on a high peninsula at the southwest end of Casco bay. Its harbor is deep, well sheltered, and is defended by powerful forts, while its numerous islands afford favorite resorts during the summer season. Portland has been devastated by fire several times. It was burned by the Indians and British, and several large fires have destroyed portions of it since.

Near Biddeford, may be seen the ruins of Fort Mary, built in 1708. A quaint old house of the 17th century is also of interest. Between Saco and Kennebunk the tour crosses the Saco river, and at Biddeford may be seen the falls, which furnish power for a number of towns in that vicinity. Several of the famed Maine beaches are passed as the tourist proceeds on his way to Portsmouth, N. H.

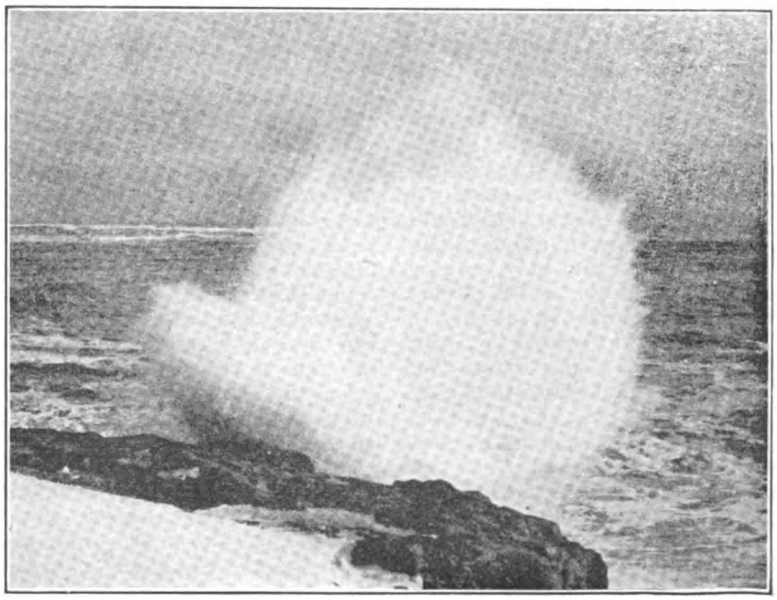
This is a quaint and pleasant old city, with some very remarkable examples of colonial architecture. The old Church of St. John is worthy of a visit, as well as the Gov. Wentworth mansion at Little Harbor. This latter is a large, irregular building, dating from 1750, and contains the old provincial council chamber, as well as many quaint relics of the past.

The tour is arranged to visit the beaches in this immediate vicinity, all of which are famed for their beauties. The old chain bridge, three miles west of Newburyport, is the second suspension bridge in the world and the first in America. The Newburyport silver mines, which were opened in 1875 and for a time yielded richer ore than those of Nevada, are also near the city. Newbury was settled in 1635, and for many years was noted for the wealth and aristocracy of its residents.

Rowley is a town composed largely of salt marsh. It was settled in 1638 by a nomadic church, led by Ezekiel Rogers. In 1650, he died, leaving his library to Harvard College. The first cloth made in America was turned out by these early settlers. Ipswich was the home of Cotton Mather. The town was purchased from the Sagamore Masconmet for $100 in 1633 by John Winthrop, the first governor of Connecticut.

Wenham lake has a world-wide reputation for its ice, which is shipped to remote parts. This ice is kept entirely free from snow and is harvested when about a foot thick, yielding about 1000 tons to the acre. Beverly was known as the summer capital during the administration of former President Taft. Other North Shore towns passed on the way to Boston, are Salem, home of Salem witchcraft, with its witch's hill, the East India Marine Hall, Plumber Hall and other historic associations; Lynn, with its first shoe factory in America, its Dungeon rock, where pirates are said to have held sway, and the home of Molly Pitcher; Revere Beach, a favorite summer amusement park; Somerville, one of the richest suburbs of Boston; and Cambridge with its Harvard University, Washington elm and Longfellow's home.

Boston is filled with points of interest, but a bare mention of



Where the Surf Beats High at Popham Beach, Near Bath, Me.

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some of them will suffice. These would include the Old South church, Paul Revere's home, the old State House, Faneuil Hall, the Public Gardens, the library, the Christian Science church, the Museum of Fine Arts, and other equally famous buildings and places. From this city to Providence the way is over macadam for its entire distance.

The wide streets of Dedham are over-arched with handsome elms, and the sidewalks are fringed with arbor-vitae. Among the points of interest may be mentioned St. Paul's church, a handsome Gothic structure, and the ancient cemetery alongside it. The town has many old mansions in wide and pleasant grounds, and is considered by many as the most beautiful in eastern Massachusetts.

Brown University and others.

On the way to Apponaug, the tour passes Roger Williams park, given to the city by Betsy Williams, great-great-granddaughter of the man whose name it bears. It includes 100 acres of beautifully diversified land and the venerable gambrel roofed home of the donor. At Wickford may be seen the curious old square Episcopal church built in 1707, the block house erected for defense in 1641, and the rolling rock, where Roger Williams and Canonicus signed their compact.

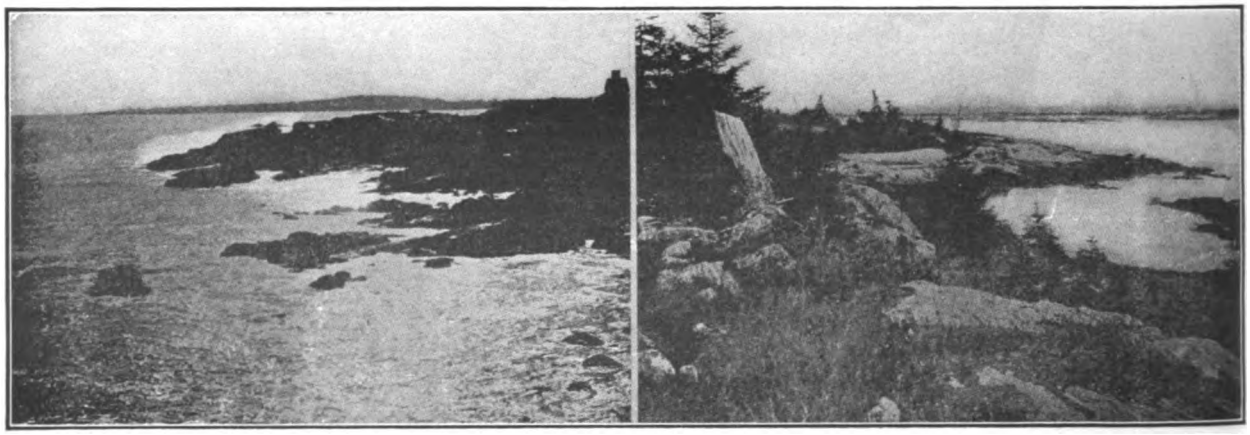
This is all historic country, and recent discoveries in the hieroglyphics on some of the rocks proclaim that it was at this point Norsemen first landed to communicate with the Indians hundreds of years before the discovery of America by Columbus. On the way to Saunderstown are the ruins of the old Narragansett fort on the edge of the pine and cedar swamp.

Narragansett Pier is one of the best known shore resorts in the country. It is at the height of its glory during the touring season, when its many large hotels are filled with prominent people. Then comes Wakefield, Charlestown and Westerly, the latter the home of the Seventh Day Adventists. If the tourist happens to reach this town on Saturday, he will find little business going on and the church bells ringing.

Of Stonington it was once written that it "suffers in religion because of its nearness to Rhode Island." However true that may have been at that time, it certainly suffers nothing because of being pleasantly situated with a fine outlook upon Long Island sound. Its quiet streets are embellished here and there by iron relics of 1814.

Near Mystic, is Pequot hill, the scene of the battle between the allied English and Indian forces against the Pequots. Upon arriving at the Indian fort the allies of the English at first declined to aid in the attack and the colonists decided to make the attempt alone. As they were kneeling in prayer, the sachem Wequash was so impressed with the sight that he became converted and preached Christianity throughout New England until he suffered martyrdom.

New London is the last night stop and there are several points of interest in and about the city, among which may be mentioned the only house still standing,



Shore at Cliff Island, Casco Bay, Me. Sunrise at Cape Elisabeth, Portland Harbor.

Pawtucket, R. I., was the scene of the total destruction of Capt. Pierce and his 70 men in 1676. Surprised by the Indians he was driven back to the river by a shower of arrows, and when help came not one man was left. It is the home of the first cotton mill in the country, a building which is still standing and may be seen above the falls of the Blackstone river in the centre of the city.

Providence was settled by Roger Williams, after being driven out of Salem. The city abounds with memorials to him, and his body rests in North cemetery. There are many places of interest, includ the State House, with its handsome portrait of Washington; the ancient First Baptist church, founded by Roger Williams; the Athenaeum, with its wealth of fine paintings; and the buildings of

which was left by Benedict Arnold when he burned the town during the Revolution; the building in which Nathan Hale taught school, now standing near "Ye Anctientist Burying Ground," and others.

The way back to New York, the last day, is over the so-called shore line route, along the Long Island sound. Lyme is a venerable hamlet, buried in foliage, its main street lined with old trees and historic mansions. At Saybrook Point was an old fort, built in 1635, which was destroyed in 1871 in order that the railroad might be cut through. It was in a fair state of preservation, and its long history should have deserved for it a more noble end. The new bridge over the Connecticut river at Saybrook makes it unnecessary to utilize the ferry as was formerly the case.

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Westbrook, Clinton and Madison are pretty summer shore resorts, still untouched by the trolley and lacking the noisy amusement parks of those nearer the Elm City. Guilford was the hiding place of the regicides for a time. Between Guilford and Madison is Sachem's Head, so named because during the extermination of the Pequots, Uncas, the Mohegan sachem, pursued and shot a Pequot chief, placing his head in the fork of an oak tree, where it remained for many years. Branford bay is dotted with the Thimble islands, on which many summer homes are located.

At New Haven the buildings of Yale University are of particular interest, and if time permits, the Art School and Peabody Museum of Natural History should be visited. The way then leads through several shore resorts of more than local importance, including Savin Rock and Woodmont, the latter being a borough and the first in Connecticut in which women had a vote for local officials. Bridgeport is termed the Park City, which is sufficient to indicate that time might profitably be spent in viewing some of its very fine park property. The outward route is reached at Stamford.

ITINERARY NO. 1.

Night Stops—New York City; Pittsfield, Mass.; Burlington, Vt.; Bretton Woods, N. H.; Rangeley, Bangor and Portland, Me.; Boston, Mass.; New London, Conn. Nine Days, 1202 Miles.

New York-Pittsfield, 141.9 Miles.

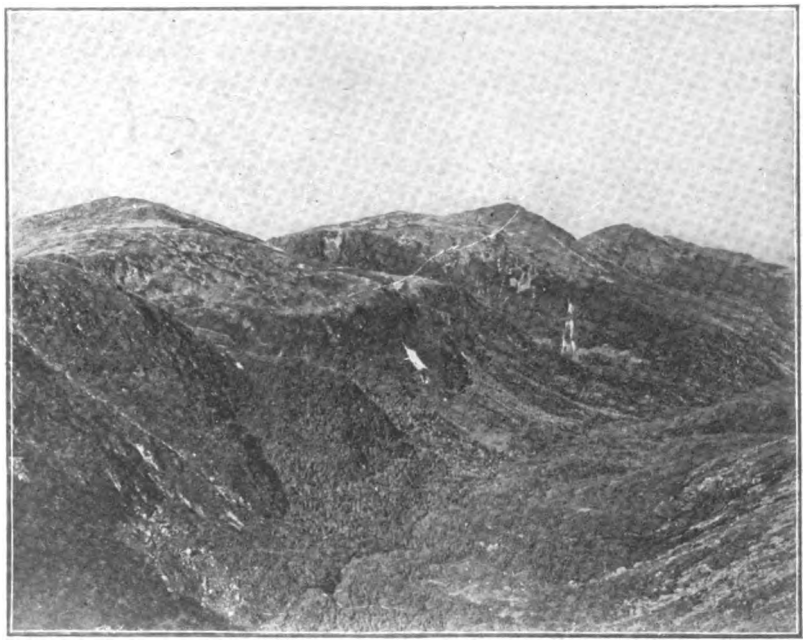
	Miles to	Total Miles Out	Return
New York	0.0	0.0	141.9
New Rochelle	16.7	16.7	125.2
Larchmont	1.8	18.5	123.4
Mamaroneck	1.6	20.1	121.8
Rye	3.7	23.8	118.1
Portchester	1.7	25.5	116.4
Greenwich, Conn.	3.1	28.6	113.3
Mianus	2.4	31.0	110.9
Stamford	2.7	33.7	108.2
Springdale	3.6	37.3	104.6
New Canaan	4.2	41.5	100.4
Ridgefield	10.7	52.2	89.7
Danbury	9.6	61.8	80.1
Brookfield	4.2	66.0	75.9
New Milford	4.1	70.1	71.8
Boardman	3.0	73.1	68.8
Gaylordsville	4.5	77.6	64.3
South Kent	2.5	80.1	61.8
Kent	3.5	83.6	58.3
North Kent	4.0	87.6	54.3
Swift's Bridge	3.2	90.8	51.1
Cornwall Bridge	2.0	92.8	49.1
West Cornwall	4.2	97.0	44.9
Lime Rock	4.6	101.6	40.3
Falls Village	2.0	103.6	38.3
South Canaan	1.8	105.4	36.5
Canaan	4.2	109.6	32.3
Ashley Falls, Mass.	2.2	111.8	30.1
Sheffield	4.0	115.8	26.1
Great Barrington	6.1	121.9	20.0
Stockbridge	7.4	129.3	12.6
Lenox	6.0	135.3	6.6
Pittsfield	6.6	141.9	0.0

Pittsfield-Burlington, 170.4 Miles.

	Miles to	Total Miles Out	Return
Pittsfield	0.0	0.0	170.4
Lanesboro	5.2	5.2	165.2
S. Williamstown	11.3	16.5	153.9
Williamstown	5.0	21.5	148.9
Pownal, Vt.	4.4	25.9	144.5
Bennington	9.4	35.3	135.1
S. Shaftsbury	5.3	40.6	129.8
Arlington	9.9	50.5	119.9
Manchester	8.0	58.5	111.9
East Dorset	6.5	65.0	105.4
Danby	7.4	72.4	98.0
Wallingford	9.4	81.8	88.6
Clarenden	3.4	85.2	85.2
Rutland	6.6	91.8	78.6
West Rutland	4.0	95.8	74.6
Castleton	7.4	103.2	67.2
Castleton Corners	1.7	104.9	65.5
Hubbardton	7.1	112.0	58.4
Hyde Manor	5.7	117.7	52.7
Sudbury	1.3	119.0	51.4
Whiting	4.6	123.6	46.8
Cornwall	6.9	130.5	39.9
Middlebury	4.3	134.8	35.6
Brookville	3.6	138.4	32.0
New Haven Junction	5.5	143.0	26.5
Vergennes	3.8	147.7	22.7
Shelburne	15.8	163.5	6.9
Burlington	6.9	170.4	0.0

Burlington-Bretton Woods, 115.4 Miles.

	Miles to	Total Miles Out	Return
Burlington	0.0	0.0	115.4
Williston	8.0	8.0	107.4
Richmond	5.2	13.2	102.2
West Bolton	4.6	17.8	97.6
Bolton	1.9	19.7	95.7
Waterbury	7.7	27.4	88.0
Middlesex Station	5.4	32.8	82.6
Montpelier	6.4	39.2	76.2
East Montpelier	7.1	46.3	69.1
Plainfield	3.5	49.8	65.6
Marshfield	7.1	56.9	58.5
Molly's Falls	1.8	58.7	56.7
South Cabot	2.9	61.6	53.8
West Danville	5.7	67.3	48.1
Danville	3.0	70.3	45.1
St. Johnsbury	7.7	78.0	37.4
Gaskill	6.0	84.0	31.4



View of Franconia Notch and Bald Peak in the White Mountain Region.

Lower Waterford	4.0	88.0	27.4
Waterford	3.0	91.0	24.4
Littleton, N. H.	5.0	96.0	19.4
Bethlehem	5.0	101.0	14.4
Twin Mountain House	8.3	109.3	6.1
Bretton Woods	6.1	115.4	0.0

Bretton Woods-Rangeley, 129.3 Miles.

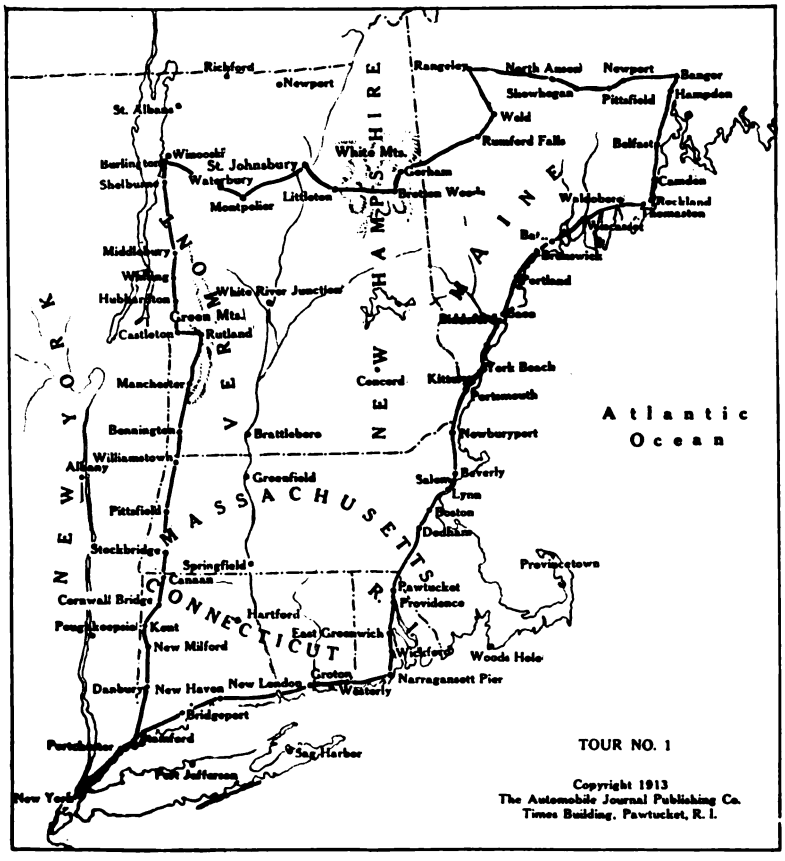
	Miles to	Total Miles Out	Return
Bretton Woods	0.0	0.0	129.3
Carroll	7.4	7.4	121.9
Cherry Mountain	6.8	14.2	115.1
Highlands Station	3.3	17.5	111.8
Randolph	7.3	24.8	104.5
Gorham	6.6	31.4	97.9
Shelburne	6.0	37.4	91.9
Gilead, Me.	6.0	43.4	85.9
Mayville	9.5	52.9	76.4
North Bethel	1.5	54.4	74.9
Newry	4.0	58.4	70.9
Rumford Point	7.5	65.9	63.4

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Rumford Falls	10.5	76.4	52.9
Mexico	1.2	77.6	51.7
Dixfield	4.8	82.4	46.9
Weld	13.4	95.8	33.5
Webb	3.0	98.8	30.5
Madrid	14.6	113.4	15.9
Rangeley	15.9	129,3	0.0

Rangeley-Bangor, 129.4 Miles.

	Miles to	Total Miles Out	Return
Rangeley	0.0	0.0	129.4
Dead River	7.6	7.6	121.8
Green Farm	9.7	17.3	112.1
Stratton	2.3	19.6	109.8
Flagstaff	10.2	29.8	99.6
North New Portland	27.2	57.0	72.4
North Anson	8.3	65.3	64.1
Skowhegan	10.7	76.0	53.4
North Searsport	7.2	23.2	117.8
Swanville	3.3	26.5	114.5
Belfast	8.0	34.5	106.5
East Northport	3.0	37.5	103.5
Northport	4.1	41.6	99.4
Lincolnville	4.4	46.0	95.0
Camden	6.0	52.0	89.0
Rockport	2.0	54.0	87.0
Rockland	6.0	60.0	81.0
Thomaston	4.8	64.8	76.2
Warren	4.6	69.4	71.6
Waldoboro	6.1	75.5	65.5
Glendon	3.5	79.0	62.0
Nobleboro	1.4	80.4	60.6
Damariscotta	5.6	86.0	55.0
Newcastle	0.6	86.6	54.4
North Edgecomb	6.9	93.5	47.5
Wiscasset	1.5	95.0	46.0
Montsweag	3.9	98.9	42.1
Nequasset	3.6	102.5	38.5



Canaan	7.9	83.9	45.5
West Pittsfield	5.0	88.9	40.5
Pittsfield	6.0	94.9	34.5
Detroit Station	4.5	99.4	30.0
Newport	3.0	102.4	27.0
East Newport	3.2	105.6	23.8
Etna	5.3	110.9	18.5
Carmel	3.5	114.4	15.0
Hermon	7.0	121.4	8.0
Hermon Center	1.5	122.9	6.5
Bangor	6.5	129.4	0.0

Bangor-Portland, 141 Miles.

	Miles to	Total Miles Out	Return
Bangor	0.0	0.0	141.0
East Hampden	3.0	3.0	138.0
Hampden	2.5	5.5	135.5
North Winterport	4.0	9.5	131.5
Winterport	3.5	13.0	128.0
Frankfort	3.0	16.0	125.0
Woolwich	1.5	104.0	37.0
Bath	1.0	105.0	36.0
Cook's Corner	6.0	111.0	30.0
Brunswick	3.1	114.1	26.9
Hillside	4.4	118.5	22.5
Freeport	5.1	123.6	17.4
Yarmouth	5.4	129.0	12.0
Cumberland	2.8	131.8	9.2
Falmouth Foreside	2.7	134.5	6.5
East Deering	4.5	139.0	2.0
Portland	2.0	141.0	0.0

Portland-Boston, 126.8 Miles.

	Miles to	Total Miles Out	Return
Portland	0.0	0.0	126.8
Oak Hill	5.9	5.9	120.9
Dunstan's	3.0	8.9	117.9
West Scarboro	1.8	10.7	116.1
Saco	3.6	14.3	112.5
Biddeford	0.8	15.1	111.7
Kennebunk	8.1	23.2	103.6
Elms	4.3	27.5	99.3
Wells	2.0	29.5	97.3
Ogunquit	3.5	33.0	93.8
Cape Neddick	4.8	37.8	89.0
York Beach	1.7	39.5	87.3
York Harbor	3.0	42.5	84.3
York Village	0.5	43.0	83.8
York Corners	0.8	43.8	83.0
Kittery	7.1	50.9	75.9
Portsmouth, N. H.	0.9	51.8	75.0
Rye Beach	9.3	61.1	65.7
Hampton Beach	7.5	68.6	58.2
Hampton Harbor	0.8	69.4	57.4
South Seabrook	3.4	72.8	54.0
Salisbury	2.2	75.0	51.8
Newburyport, Mass.	2.6	77.6	49.2
Newbury	1.0	78.6	48.2
Newbury Old Town	2.7	81.3	45.5
Rowley	4.4	85.7	41.1
Ipswich	3.6	89.3	37.5
Wenham Lake	7.5	96.8	30.0
North Beverly	0.7	97.5	29.3
Beverly	3.3	100.8	26.0
Salem	1.7	102.5	24.3
Lynn	7.3	109.8	17.0
Revere Beach	5.6	115.4	11.4
Somerville	6.2	121.6	5.2
Cambridge	2.4	124.0	2.8
Boston	2.8	126.8	0.0

Boston-New London, 119.3 Miles.

	Miles to	Total Miles Out	Return
Boston	0.0	0.0	119.3
Dedham	10.9	10.9	108.4
Norwood	4.2	15.1	104.2
Walpole	4.1	19.2	100.1
Wrentham	6.9	26.1	93.2
Plainville	4.8	30.9	88.4
North Attleboro	1.5	32.4	86.9
Pawtucket, R. I.	8.0	40.4	78.9
Providence	5.1	45.5	73.8
Apponaug	9.7	55.2	64.1
East Greenwich	2.8	58.0	61.3
Wickford	7.2	65.2	54.1
Hamilton	1.8	67.0	52.3
Saunderstown	3.3	70.3	49.0
Narragansett Pier	6.8	77.1	42.2
Wakefield	2.6	79.7	39.6
Charlestown	9.8	89.5	29.8
Westerly	11.2	100.7	18.6
Waquetequock	2.7	103.4	15.9
Stonington, Conn.	2.5	105.9	13.4
Mystic	4.5	110.4	8.9
Poquonnock Bridge	4.0	114.4	4.9
Groton	3.9	118.3	1.0
New London	1.0	119.3	0.0

New London-New York, 128.5 Miles.

	Miles to	Total Miles Out	Return
New London	0.0	0.0	128.5
Flanders	6.3	6.3	122.2
Lyme	9.6	15.9	112.6
Old Saybrook	10.5	26.4	102.1
Clinton	2.0	28.4	100.1
Madison	4.9	33.3	95.2
Guilford	5.2	38.5	90.0
Branford	9.0	47.5	81.0
East Haven	3.3	50.8	77.7
New Haven	4.1	54.9	73.6
West Haven	3.6	58.5	70.0
Savin Rock	1.1	59.6	68.9
Woodmont	4.0	63.6	64.9
Milford	4.7	68.3	60.2
Stratford	4.6	72.9	55.6
Bridgeport	3.8	76.7	51.8
Fairfield	4.5	81.2	47.3
Westport	1.6	82.8	45.7

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Norwalk	3.3	86.1	42.4	Greenwich	5.1	99.9	28.6	Larchmont	5.3	110.0	18.5
Darien	4.2	90.3	38.2	Portchester, N. Y.	3.1	103.0	25.5	New Rochelle	1.8	111.8	16.7
Stamford	4.5	94.8	33.7	Rye	1.7	104.7	23.8	New York	16.7	128.5	0.0

IN THE HEART OF THE MAINE WOODS.

Outlining a Week's Visit in Aroostook County and the Province of New Brunswick, with Return to Bangor by Way of the Coast and Washington County.

A FEW years ago Aroostook county, Maine, was an unknown wilderness. This applies in a measure to large portions of the district today, although the automobile has done much to overcome this, along the New Brunswick border. Not many sections of America, with the same population, area and conditions can muster more motor cars, and its roads are rapidly becoming such as to attract large numbers of tourists.

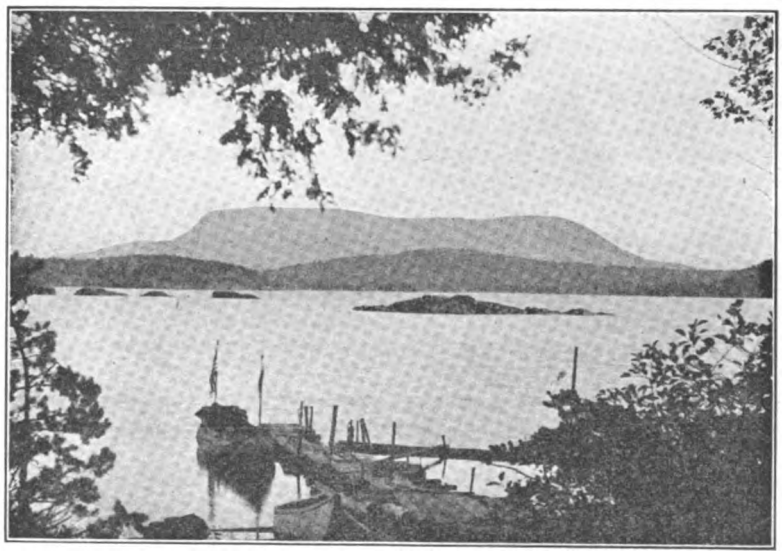
Beyond the fact that this is the very centre of the Maine woods, and that it is famed for the finest potatoes in the world, most motorists know little of Aroostook county. It follows from the above statement that not all of the district is covered with woods, although doubtless these virgin forests will have their appeal for the venturesome tourist. Fishing and hunting may be considered as ideal, and the entire section has been noted for years as a camping ground for vacationists.

Tour No. 2 is designed to occupy seven days, leaving from and returning to Bangor, from which point connection may be made with itinerary No. 1. This feature will appeal to many tourists from sections outside of New England, since it will be possible to add this trip to any of the others presented in this number. The night stops are at Houlton and Fort Kent, Me.; Woodstock, Fredericton and St. John, N. B., and Calais, Me. Of course, it is possible to return to Bangor over the outward route, if preferred, reducing the necessary time very materially.

The way leads from Bangor along the Penobscot river to Veazie, the surface of the river being covered with booms and immense rafts of timber, floated down from the Moosehead lake region and toward Mt. Katahdin, glimpses of which may be had from the distance. Accompanying the lumber in the river are the numerous saw mills along its banks. This is particularly true of Oldtown, but first, mention should be made of Orono, the seat of the State Agricultural College.

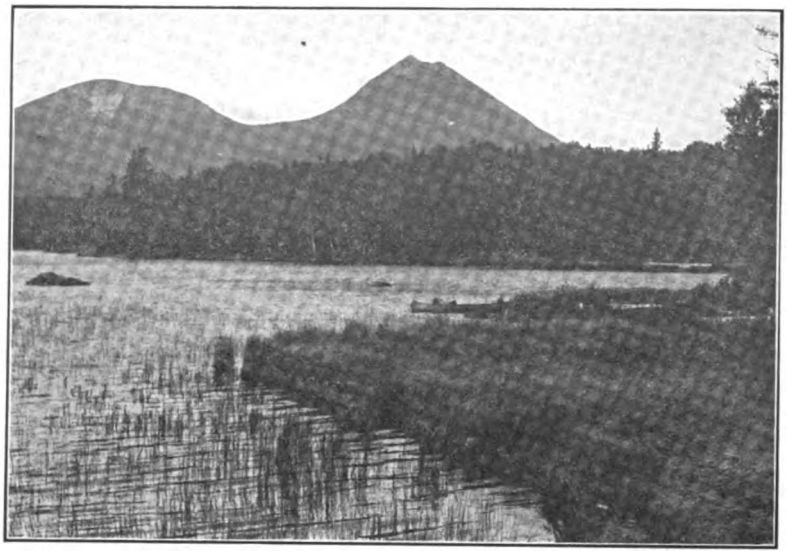
Oldtown is said to possess the largest lumber mill in the world, where over 100 saws are at work turning the rude logs, which come in at one side, into planks, these being rafted down the river to Bangor. On an island near the town is the home of the Tarratine Indians, one of the three tribes of the Etchemin nation. Although the most powerful and warlike of the northern tribes, the Tarratines rarely attacked the colonists. After a series of wrongs and insults, however, they visited the settlements and inflicted such terrible damage that Maine became tributary to them by the Peace of Casco. The treaty of 1726 contains the substance of their present relations with the state. They own the islands in the Penobscot, and have a revenue of some $7000 from the commonwealth. A ferry boat will take the tourist to their island home, and the visit is well worth while.

Leaving Oldtown, the route passes through a succession of thinly populated towns, Costigan, Olamon, Passadumkeag, Lincoln and Winn, to Mattawamkeag, a small village at the confluence of the Penobscot and Mattawamkeag rivers. Most of the inhabitants of these towns are engaged in lumbering. The last named village offers quite the best view of Mt. Katahdin, of volcanic origin, and Maine's chief claim to mountain scenery. From its rugged top may be seen all the lakes, rivers and woods of northern Maine, spread out like a map below. It



View of Spencer Mountain from Lobster Lake in Central Maine.

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Mt. Katahdin, Maine's Highest Peak, as Seen from Kidney Pond.

is in the centre of the best moose country of the state, and a peak about which very little was known until quite recently.

From this point the tour passes through the heart of the Maine woods, abounding in spruce, cedar, hemlock, yellow and white birch, and maple. Splendid mills are to be found nearly all of the way, and particularly at Haynesville. Several important ponds are within easy access of the road, and the many streams throughout this district plunge on their way to the Atlantic over a succession of beautiful falls.

The night stop is at Houlton, the principal city of the county and noted for its beauty, its splendid homes and its hospitable people. Besides being engaged in the lumber business, Houlton is one of the principal markets for the famous Aroostook county potatoes. The soil in and about the city is wonderfully fertile, and the product is justly considered the finest in the world.

Presque Isle is the centre of the rich farming lands, which cover 500,000 acres. There also is good fishing and plenty of interesting scenery in the vicinity. Many Swedes have settled north of Presque Isle, as may be gathered from the name—New Sweden. Another extensive lumbering establishment is located at Van Buren, and lumbering also is carried on at Grand Isle. Madawaska was settled by the French, who were expelled from Arcadia in 1755. Twelve miles distant is New Fairfield, a famous starch centre.

Fort Kent, the second night stop, is the most northern town in the United States. It is located at the confluence of Fish river and the St. John. Five miles away is Eagle lake, and dozens of other handsome bodies of water are in the immediate vicinity. All of these, as well as the many streams, are filled with big, gamy trout, and many salmon are caught in their season.

The return trip follows the outward itinerary to Van Buren, thence across the border into Grand Falls, N. B. Still other descendants of the Arcadians will be found in this vicinity. Here also the St. John river is contracted into a narrow gorge between lofty cliffs and plunges over a succession of rocky steps, the first in the series being a sheer drop of 40 feet.

Woodstock, the third night stop, is the shire town of Carleton county, New Brunswick, and is pleasantly situated on the banks of St. John river, 150 miles from its mouth. From this point it is possible to connect with the outward route at Houlton, Me., if desired, but the tour as outlined contemplates a visit to St. John, the way leading down the valley, so far as practical, with splendid mountain and lake views on either side.

Fredericton is a small city, beautifully situated on the river, and distinguished because of being the political capital of the province. The Government house is a plain and dignified stone building in extensive grounds just north of the city, and the Parliament house is a modern structure near the deserted barracks. The



Grand Falls, Webster Stream, One of Many Cataracts in Northern Maine.

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University of New Brunswick has fine buildings on a commanding hill near the city.

From this point the St. John river is very picturesque, and a number of other streams empty into it at various points, adding to the charm. The way is very nearly all down grade. Numerous islands are passed, and the road crosses many rich intervales. At one or two places may be seen abandoned forts, which were the centre of long sieges 200 or 250 years ago. Just before reaching St. John the river enters a narrow channel between palisades, and below is the suspension bridge over the famous reversing falls. The tides in the Bay of Fundy are well known throughout the world, and these falls, over which the river dashes through a narrow gorge at low tide, have the appearance of flowing up hill as the tide rushes upward through the gorge far above the river level.

St. John is the metropolis of the province and it is possible to make connection here for a number of pleasant trips through Nova Scotia, across the bay. Ample time should be available to take advantage of many interesting drives about the city, particularly that to the heights of Carleton; over Marsh bridge to Red Head, or to the cemetery and Loch Lomond.

The return trip to St. Stephen and Calais is along the coast, with splendid views all of the way. This is known as the St. George road, but care should be taken at Lepreaux that this old way is not followed between that town and St. George, unless the construction work begun last year is sufficiently well advanced to permit of its use. The longer route outlined is the main line taken by most tourists from the provinces to the States, although the new road, when completed, will save a number of miles.

Calais, the night stop, is well known as the border town. The people of Calais and those of St. Stephen, across the river, in New Brunswick, always have lived on the most fraternal terms. They formed and kept a compact not to engage in the war of 1812. It is possible to make this region the basis for an extended stay in eastern Maine, spending some time about the Grand lakes, and a pretty little side trip to Eastport may be taken if desired.

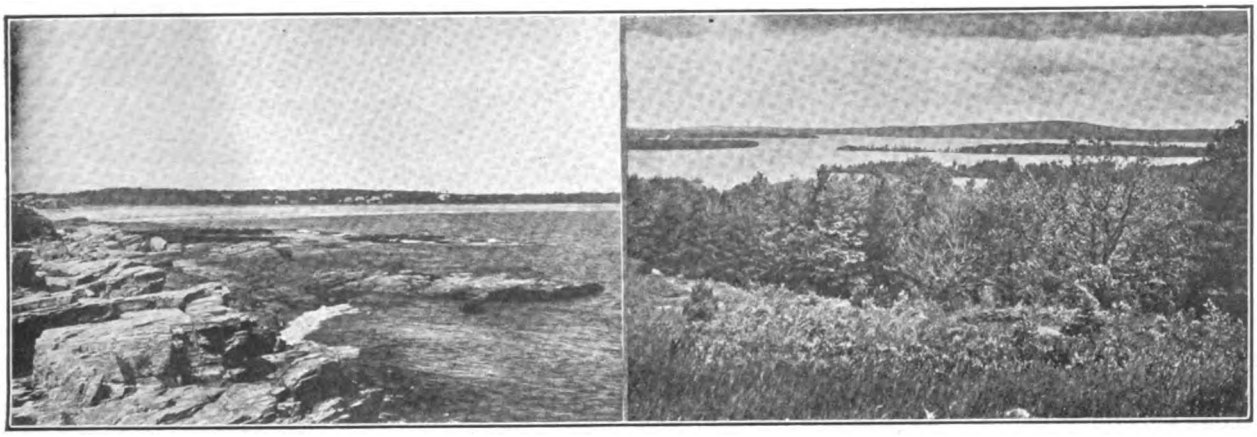
Dennysville is a picturesque country village on the shore of the Dennys river, which flows between high banks wooded with evergreens and through gorges with rocky sides. Marion is in the heart of a splendid partridge country. Deer are also plentiful in this section. At East Machias may be seen one of the oldest Masonic lodge rooms in the country, the lodge having been instituted Sept. 10, 1779.

Machias is an historic old town, noted for its many business enterprises. The town is located on both sides of the Machias river at tidewater, and up this river, reached either by canoe or automobile, are numerous lakes, and a hunting and fishing territory embracing over 300,000 acres. Harrington, one of the prettiest little villages in Washington county, has a number of desirable drives along the bay. Cherryfield, attractively situated on the picturesque Narraguagus river, is in the midst of several noted fishing ponds, and many well known woodcock covers are near here. The way next leads along the coast with its many indentations, and consequent fine marine views, through Steuben, Gouldsboro, etc., to Ellsworth, where connection may be made with Mt. Desert Isle and Bar Harbor, if the Town of Eden has at last decided to admit automobiles.

It may be added in this connection that there is a much shorter route from Calais to Bangor, this running in almost a straight line between the two cities and covering a distance of practically 99 miles. The road is somewhat rough, however, grass growing between the wheel tracks in many places. The country is of particular interest because of the virgin forests, and many excellent views are to be obtained.

Wesley is the first town of prominence to be reached, and is noted for the number of bears which have been shot within its confines. It does not follow that the tourist will see a bear if he takes this route, although he is pretty certain to find the woods well filled with deer in the immediate vicinity.

The covers about Beddington, 22 miles from Calais, are particularly well supplied with partridges, and there are a number of splendid camping sites to be found readily. Connection may be made here with the main route outlined, the distance between Beddington and Cherryfield being about 20 miles.



Inspiring Shore Scene Near Scarboro, Me. **One of the Fishing Lakes in Eastern Maine.**

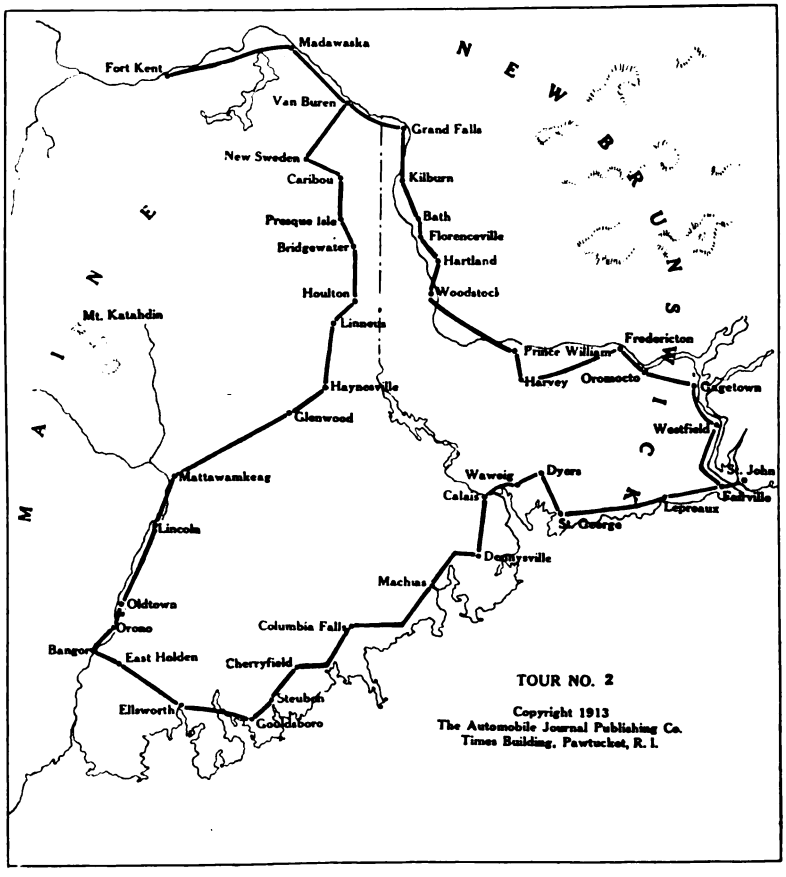
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ITINERARY NO. 2

Night Stops—Bangor, Houlton and Fort Kent, Me.; Woodstock, Fredericton and St. John, N. B.; Calais, Me. Seven Days, 764.6 Miles.

Bangor-Houlton, 118 Miles.

	Miles to	Total Miles Out	Return
Bangor	0.0	0.0	118.0
Veazie	4.3	4.3	113.7
Orono	3.6	7.9	110.1
Oldtown	6.1	14.0	104.0
Costigan	5.7	19.7	98.3
Olamon	8.5	28.2	89.8
Passadumkeag	4.3	32.5	85.5
South Lincoln	11.4	43.9	74.1
Lincoln	5.5	49.4	68.6
Lincoln Centre	1.9	51.3	66.7
Winn	8.9	60.2	57.8
Mattawamkeag	2.3	62.5	55.5
Molunkus	7.5	70.0	48.0
Macwahoc	2.4	72.4	45.6
Glenwood	12.1	84.5	33.5
Haynesville	7.4	91.9	26.1
Linneus	16.9	108.8	9.2
Houlton	9.2	118.0	0.0



Houlton-Fort Kent, 117.4 Miles.

	Miles to	Total Miles Out	Return
Houlton	0.0	0.0	117.4
Monticello	12.5	12.5	104.9
Bridgewater	7.6	20.1	97.3
Blaine	6.1	26.2	91.2
Mars Hill	1.0	27.2	90.2
Presque Isle	14.0	41.2	76.2
Caribou	12.9	54.1	63.3
New Sweden	8.9	63.0	54.4
Van Buren	9.0	72.0	45.4
Grand Isle	10.4	82.4	35.0
Madawaska	6.5	88.9	28.5
Frenchville	8.1	97.0	20.4
Fort Kent	20.4	117.4	0.0

Fort Kent-Woodstock, 131.2 Miles.

	Miles to	Total Miles Out	Return
Fort Kent	0.0	0.0	131.2
Frenchville	20.4	20.4	110.8
Madawaska	8.1	28.5	102.7
Grand Isle	6.5	35.0	96.2
Van Buren	10.4	45.4	85.8
Grand Falls, N. B.	12.4	57.8	73.4
Aroostook Junction	18.0	75.8	55.4
Andover	5.7	81.5	49.7
Perth	0.9	82.4	48.8
Kilburn	7.3	89.7	41.5
Upper Kent	7.8	97.5	33.7
Bath	3.7	101.2	30.0
Bristol	3.6	104.8	26.4
Florenceville	2.8	107.6	23.6
Hartland	11.2	118.8	12.4
Victoria	2.5	121.3	9.9
Upper Woodstock	8.0	129.3	1.9
Woodstock	1.9	131.2	0.0

Woodstock-Fredericton, 80.5 Miles.

	Miles to	Total Miles Out	Return
Woodstock	0.0	0.0	80.5
Temple	16.7	16.7	63.8
Hawkshaw	9.0	25.7	54.8
Prince William	15.0	40.7	39.8
Long	5.0	45.7	34.8
Harvey	8.6	54.3	26.2
Hanwell	13.1	67.4	13.1
Fredericton	13.1	80.5	0.0

Fredericton-St. John, 94.1 Miles.

	Miles to	Total Miles Out	Return
Fredericton	0.0	0.0	94.1
Oromocto	12.0	12.0	82.1
Upper Gagetown	8.8	20.8	73.3
Gagetown	5.1	25.9	68.2
Otnalog	8.9	34.8	59.3
Hempstead	4.5	39.3	54.8
Evansville	3.2	42.5	51.6
Oak Point	13.0	55.5	38.6
Brown's Flats	11.2	66.7	27.4
Westfield	12.4	79.1	15.0
South Bay	8.8	87.9	6.2
Manchester Corner	2.0	89.9	4.2
Fairville	1.2	91.1	3.0
St. John	3.0	94.1	0.0

St. John-Calais, 87.4 Miles.

	Miles to	Total Miles Out	Return
St. John	0.0	0.0	87.4
Fairville	3.0	3.0	84.4
Manchester Corner	1.2	4.2	83.2
Spruce Lake	4.8	9.0	78.4
Musquash	7.7	16.7	70.7
Lepreaux	8.8	25.5	61.9
New River Beach	8.0	33.5	53.9
Pennfield Corners	10.5	44.0	43.4
Spinney Corners	3.2	47.2	40.2
St. George	6.8	54.0	33.4
Stillwater Bridge	9.7	63.7	23.7
Digdequash	2.1	65.8	21.6
Dyers	3.0	68.8	18.6
Warveig	7.4	76.2	11.2
Roix	0.8	77.0	10.4
Oak Bay	2.9	79.9	7.5
Benson Corners	1.6	81.5	5.9
St. Setphen	5.1	86.6	0.8
Calais, Me.	0.8	87.4	0.0

Calais-Bangor, 136 Miles.

	Miles to	Total Miles Out	Return
Calais	0.0	0.0	136.0
Milltown	2.0	2.0	134.0
Charlotte	12.7	14.7	121.3
Dennysville	10.3	25.0	111.0
Marion	4.5	29.5	106.5
Gardner Corners	9.4	38.9	97.1
East Machias	4.1	43.0	93.0
Machias	4.5	47.5	88.5
Jonesboro	7.5	55.0	81.0
Columbia Falls	9.5	64.5	71.5
Harrington	5.3	69.8	66.2
Cherryfield	6.2	76.0	60.0
Smithville	6.1	82.1	53.9
Steuben	1.9	84.0	52.0
Gouldsboro	4.9	88.9	47.1
West Gouldsboro	2.6	91.5	44.5
East Sullivan	4.0	95.5	40.5
Sullivan	3.0	98.5	37.5
West Sullivan	1.6	100.1	35.9
Hancock	1.1	101.2	34.8
North Hancock	2.8	104.0	32.0
Ellsworth	6.5	110.5	25.5
North Ellsworth	5.0	115.5	20.5
Nicolin	1.4	116.9	19.1
East Dedham	3.2	120.1	15.9
East Holden	6.9	127.0	9.0
Hart's Corners	1.5	128.5	7.5
Holden	1.7	130.2	5.8
Brewer	4.8	135.0	1.0
Bangor	1.0	136.0	0.0

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MOUNTAIN LAKES OF NEW HAMPSHIRE.

First Day's Route Follows Closely That Taken by Paul Revere—Tour Furnishes Rich Scenic Beauties with Views of White Mountains in the Distance.

TOUR No. 11 has Boston for its starting point, and is suggested to cover three days, with night stops at Keene and Plymouth, N. H. Like all the itineraries listed in this number, it is possible, through connections at various points, to extend the vacation very materially if desired. The route covers much interesting country, particularly in southern New Hampshire, and many pleasing views of the White mountains are to be obtained at various points. Several very pretty lakes are within easy access by motor car, and all told the itinerary should prove especially attractive to those in search of a short tour among the lesser New England hills.

Leaving Boston by way of Cambridge, Arlington and Lexington, the motorist follows closely the road covered by Paul Revere on his famous midnight ride. At numerous points on the way monuments have been erected setting forth the progress of that trip as well as other interesting historical data connected with the Revolutionary period.

Groton was visited in 1646 by the sachem Monoco at the head of 400 Indians, and the town burned, with the exception of four garrison houses, in which the people successfully defended themselves. Monoco boasted that he was on his way to Concord and Lexington to reduce these towns, and later would march upon Boston. The following year saw him in Boston, but with a rope around his neck, marching toward the Common, where he was hanged.

The way then leads across country to Ashby and over the border into Keene, N. H., through the pretty little New Hampshire towns of East and West Rindge, East Jaffrey, Jaffrey and Marlboro. In the northwestern part of Jaffrey is Monadnock mountain, with its high and rugged top rising 3186 feet above the sea. In this town, also, may be seen the ancient church, now secularized, which was erected on the day of the battle of Bunker Hill. Workmen thereon are said to have heard the cannonading. Numerous drives about the lakes in this region are worth taking, if time be available.

Keene is a pleasant city in the valley of the Ashuelot river. Its original name was Upper Ashuelot, and signified "the collection of many waters." Two miles north of the city are the Beaver Brook falls, where the brook flows over a stair-like succession of ledges 40 feet into a deep pool.

The second day finds the tourist approaching Lake Sunapee, 1104 feet above sea level, and nestling among the hills of Sullivan and Merrimac counties. The lake is about 10 miles long, indented with enticing bays and coves, and ranges from one-half to three miles in width. A short distance from its shores is the majestic Mt. Sunapee, which adds not a little to the beauty of the scenery. Connections may be made here with tour No. 21 for a visit to the White mountains, rejoining this itinerary at Plymouth.

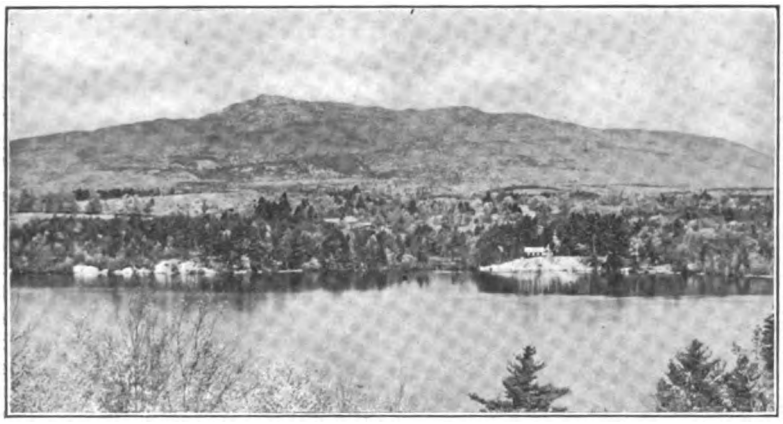


Lake Sunapee, N. H., in the Midst of Romantic Scenery and the Home of Gamy Bass.

Skirting this body of water by way of Newport, Guild, Sunapee and New London, the route lies toward the White mountains, with ever changing glimpses of the peaks in the distance. Entering the Pemigewasset valley, and passing Bristol, two miles further along, is Newfound lake, with Sugar Loaf mountain on the west shore and Crosby mountain on the east.

Plymouth, the night stop, is within easy view of the Franconia and White mountains to the north.

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The Beautiful Contoocook Lake, Near East Jaffrey, N. H.

Mt. Prospect, 2072 feet high, is a little to the northeast. It possesses a number of interesting features, notably the Miser's cave, the Avalanche, the Cold and the Boiling springs. Oscela and White Face are toward the northeast, and just below Squam range to the east, is Squam lake, island dotted and very pretty. This is only a partial list of the lakes and mountains to be seen from Plymouth, most of which are located within a few miles' drive.

Connection may be made here with tour No. 12, which may be followed in the reverse direction to Bethlehem and thence to the Bretton Woods, or as planned, reaching the White mountain region at Conway and visiting the Maine woods, returning to Boston by way of Portland.

The third day visits Meredith on the way to Lake Winnipesaukee and The Weirs. Near the latter, on the banks of the lake, is Endicott rock, which is about 20 feet around, and on which are carved the initials of the chiefs of the Colonial survey of 1652, and with the words, "John Endicut, Gov." The waters of the lake reflect the shadows of several bold mountains and surround nearly 300 islands, large and small.

The Weirs is best known as a summering place, but at this point is located a large flood gate, so arranged that the flow of the waters from the lake into the Merrimac river, is controlled for manufacturing purposes throughout the entire Merrimac valley to Newburyport, Mass. The return to Boston is through this valley as far as Lowell.

Franklin was the birthplace of Daniel Webster. Concord is the capital of the state, and an abundance of shade trees gives it a pleasant embowered appearance. A splendid view may be obtained from the dome of the State House, and a number of the public buildings are worthy of attention.

At Manchester, the Amoskeag falls on the Merrimac river have a descent of 47 feet, with rapids above, and afford a fine sight. A short distance from this city is Lake Massabesic, which has 31 miles of shore with some beaches of remarkably white sand. The Fairy Cave and a curious sulphur cave, Devil's Den, are often visited by tourists, while in this vicinity. Nashua is the last New Hampshire town to be visited, and at this point may be seen some of the largest carpet mills in America. The water power is taken from Mine falls on the Nashua river, pleasing views of which are to be noted from time to time as the tour progresses. The Pawtucket falls, at Lowell, were a favorite fishing ground of the Indians. The Pawtucket canal extends from the head of the falls to the Concord river, below the city, and affords excellent water power, having a fall of 30 feet.

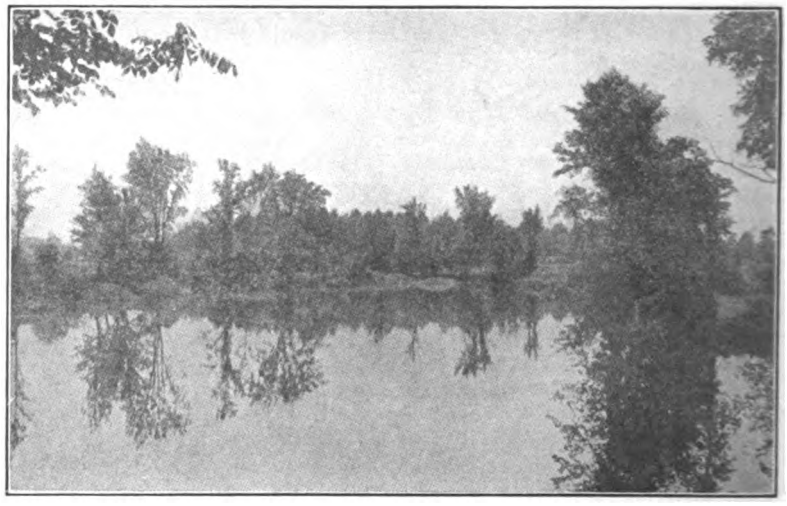
The outward route is rejoined at Arlington, after passing through Billerica and Burlington, although there are numerous methods of reaching the centre of the city from this point, practically all of them over excellent macadam roads.

ITINERARY NO. 11.

Night Stops—Boston, Mass.; Keene and Plymouth, N. H. Three Days, 308.7 Miles.

Boston-Keene, 83 Miles.

	Miles to	Total Miles Out	Return
Boston	0.0	0.0	83.0
Cambridge	3.6	3.6	79.4
Arlington	3.5	7.1	75.9
Lexington	4.4	11.5	71.5
Concord	7.0	18.5	64.5
North Acton	6.9	25.4	57.6
Littleton Common	2.8	28.2	54.8
North Littleton	1.5	29.7	53.3
Groton	6.1	35.8	47.2
Townsend Harbor	6.0	41.8	41.2
Townsend	1.2	43.0	40.0
West Townsend	2.0	45.0	38.0
Ashby	4.8	49.8	33.2
E. Rindge, N. H.	7.2	57.0	26.0



Pleasing View of the Nashua River in the Vicinity of Nashua, N. H.

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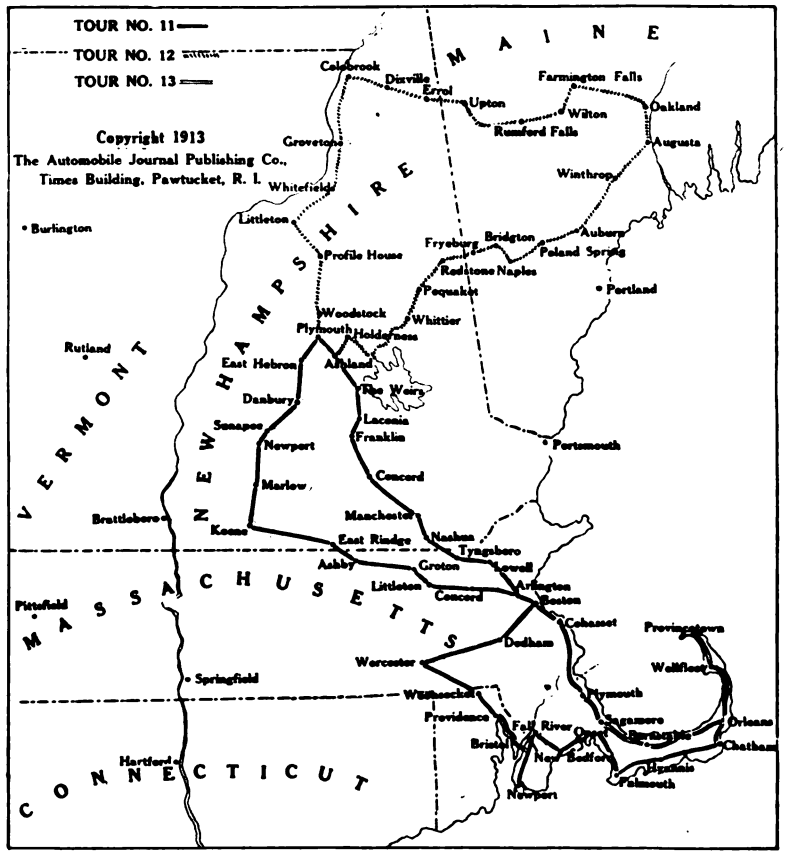
West Rindge	5.1	62.1	20.9
East Jaffrey	3.7	65.8	17.2
Jaffrey	1.7	67.5	15.5
Marlboro	10.9	78.4	4.6
Keene	4.6	83.0	0.0

Keene-Plymouth, 90 Miles.

	Miles to	Total Miles Out	Return
Keene	0.0	0.0	90.0
Gilsum	8.7	8.7	81.3
Marlow	7.1	15.8	74.2
East Lempster	9.0	24.8	65.2
Mill Village	6.1	30.9	59.1
Newport	4.7	35.6	54.4
Guild	2.4	38.0	52.0
Sunapee	3.2	41.2	48.8
George's Mills	3.6	44.8	45.2
New London	4.9	49.7	40.3
Elkins	3.1	52.8	37.2
Wilmot	2.8	55.6	34.4
Danbury	6.8	62.4	27.6
Elmwood Village	1.3	63.7	26.3
Bristol	8.7	72.4	17.6
Bridgewater	3.9	76.3	13.7
East Hebron	4.9	81.2	8.8
Plymouth	8.8	90.0	0.0

Plymouth-Boston, 135.7 Miles.

	Miles to	Total Miles Out	Return
Plymouth	0.0	0.0	135.7
Ashland	5.9	5.9	129.8
Holderness	3.9	9.8	125.9
Meredith	7.9	17.7	118.0
The Weirs	4.7	22.4	113.3
Lakeport	4.6	27.0	108.7
Laconia	1.7	28.7	107.0
Winnisquam	3.0	31.7	104.0
Tilton	6.4	38.1	97.6
Franklin Falls	3.0	41.1	94.6
Franklin	0.8	41.9	93.8
Franklin Junction	1.6	43.5	92.2
North Boscawen	2.2	45.7	90.0
Boscawen	3.2	48.9	86.8
Penacook	3.4	52.3	83.4
West Concord	4.2	56.5	79.2
Concord	1.9	58.4	77.3
Pembroke	5.9	64.3	71.4
Suncook	1.4	65.7	70.0
Manchester	11.2	76.9	58.8
Merrimac	8.6	85.5	50.2
Thornton's Ferry	3.6	89.1	46.6
Nashua	5.9	95.0	40.7
Tyngsboro, Mass.	6.6	101.6	34.1
Lowell	7.9	109.5	26.2
Billerica	6.2	115.7	20.0
Burlington	5.5	121.2	14.5
Arlington	7.4	128.6	7.1
Cambridge	3.5	132.1	3.6
Boston	3.6	135.7	0.0



THE WONDERS OF DIXVILLE NOTCH.

Itinerary Includes the Northern Portion of the White Mountain Region and Affords Splendid Opportunity for Scenic Grandeurs.

TOUR No. 12 is planned to start from Augusta, Me., and visits the White mountains. It is suggested as another three-day vacation, but can be continued indefinitely, by combination with other tours at various points on the way. The night stops are at Dixville Notch and Center Harbor, N. H., while a very pleasing alternative may be obtained by joining tour No. 11 at Plymouth, N. H., for Boston. The entire journey from Augusta to Boston by both of these outlines used in combination could be made to occupy not more than five days, if desired, and would afford a fine vacation.

Leaving Augusta on the first day, the tour visits the Belgrade lakes, without doubt the finest bass fishing grounds in the country. The water of the lakes is very clear and the bottom decidedly rocky, making an ideal haunt for bass. The shores of both lakes are well wooded and some excellent views are to be obtained along the roads skirting their edges.

The itinerary as outlined leads into the Maine woods in the vicinity of the Rangeley lakes, through Hanover, Newry, Grafton Notch and Upton, into New Hampshire at Errol. On the way several lakes are passed, included among which are: Mollychunkamunk, Allegundabagog, Welocksebacook and Umbagog, the last named at Upton.

At Errol, the tourist finds himself in the heart of the White mountains. On every side, there are to be found signs of nature's handiwork on the way to Dixville Notch. Among these may be mentioned Table rock, reached from the road by a rude stairway of stone blocks known as Jacob's Ladder. The view is very extensive from this point, and amply repays for the strenuous climb. The rock is 561 feet above the road, 2450 above the sea and is a narrow pinnacle only about eight feet wide at the top, with sharp, precipitous sides.

The notch itself, has high col-

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View in the Flume at Dixville Notch in New Hampshire.

umnar sides, frowning at each other across the narrow chasm. These cliffs of decaying mica slate present a scene of ruin, transition and shattered strength, that is mournful and almost repulsive. The Notch is not a mountain pass, but a wonderful ravine among high hills. It has its flume, its cascades, its profiles, its snow cave, and its cold springs of the purest water known to science. Altogether it is a sight not to be missed, and well worth the climbing to which the car is subjected in reaching it.

The second day, the tourist again passes through this two miles of palisades on his way to Colebrook, where a detour may be made to Connecticut lake, at the head of the Connecticut river, down the valley which he will drive through for a time. At Littleton, connection may be made with itinerary No. 1, which may be taken in either direction.

This tour now enters the Franconia range, scarcely less grand than that which was left behind so recently, and divided from it by the Twin Mountain and Field Willing ranges. The Franconia region has two great natural wonders, either of which would make any other section famous. Twelve hundred feet above the lake, starting out from the blue crest of the mountain, stands a sculptured likeness of a giant Titan; the profile of the Old Man of the Mountain. The Flume, located some miles below, is a rock fissure 700 feet long and 60 deep, with fern decked granite walls from 10 to 20 feet apart; in reality a miniature canyon.

Continuing to Plymouth, where connection may be made with tour No. 11 for Boston, this tour turns eastward to Center Harbor, on Lake Winnipesaukee, for the night stop. The next morning, the journey will take the tourist up the eastern side of the White mountains, affording still more wonderful views. Chief among these is that of Mt. Chocorua with the lake of the same name near its base.

At Conway the route leads away from the White mountain district and re-enters Maine at Fryeburg. A little later it visits the region of Lake Sebago and the well known resort at Poland Spring. Auburn and Lewiston, separated only by the Androscoggin river, are the last cities of importance passed on the way to Augusta. Lewiston falls, where the river breaks over a ledge of blackened gneiss, is worthy of note at this point. Lewiston is also the seat of Bates College, with its commodious buildings.

Near Winthrop is Lake Maranocook, the chief picnic ground of central Maine, It is a lovely winding lake, nine miles long, and about one mile wide, dotted with picturesque islands. West of the village is Mt. Pisgah, from which views of the White mountains are obtained.

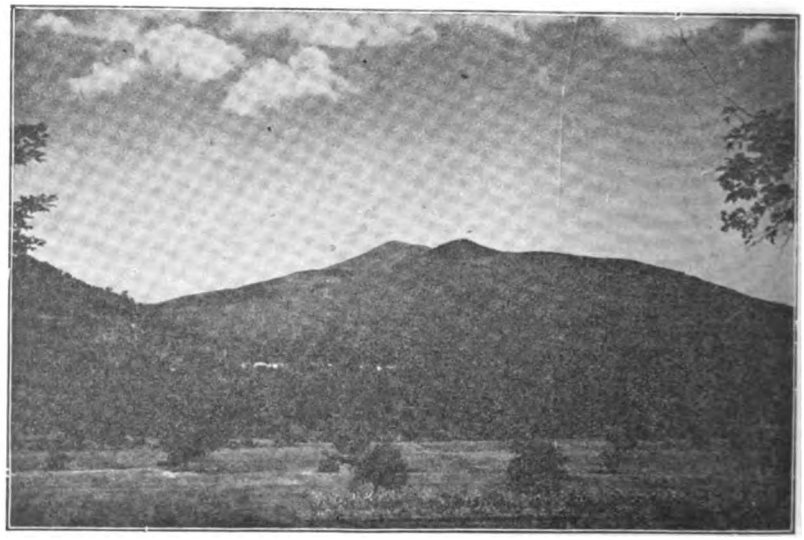
At Augusta is located the recently rebuilt Capitol, and also the State Hospital for the Insane.

ITINERARY NO. 12.

Night Stops—Augusta, Me.; Dixville and Center Harbor, N. H. Three Days, 391.3 Miles.

Augusta-Dixville, 135.4 Miles.

	Miles to	Total Miles Out	Return
Augusta	0.4	0.0	135.4
West Sidney	6.5	6.5	128.9
Oakland	1.5	8.0	127.4
Belgrade Station	2.5	10.5	124.9
Rome	9.5	20.0	115.4
Mercer	8.0	28.0	107.4



Majestic Mt. Kearsarge as Seen from Intervale, N. H.

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New Sharon	7.6	35.6	99.8
Farmington Falls	4.1	39.7	95.7
Farmington	4.7	44.4	91.0
East Wilton.....	4.8	49.2	86.2
Wilton	2.9	52.1	83.3
East Dixfield....	4.5	56.6	78.8
South Carthage..	3.1	59.7	75.7
Dixfield	8.4	68.1	67.3
Ridlonville	4.5	72.6	62.8
Rumford	1.8	74.4	61.0
Rumford Center.	6.0	80.4	55.0
Rumford Point..	3.9	84.3	51.1
Hanover	1.7	86.0	49.4
Newry	5.4	91.4	44.0
North Newry ...	5.1	96.5	38.9
Grafton Notch ...	11.9	108.4	27.0
Upton	4.1	112.5	22.9
Errol, N. H.....	9.8	122.3	13.1
Dixville Notch...	12.1	134.4	1.0
Dixville	1.0	135.4	0.0

Dixville-Center Harbor, 129.2 Miles.

	Miles to	Total Miles Out	Return
Dixville	0.0	0.0	129.2
Kidderville	3.7	3.7	125.5
Colebrook	6.7	10.4	118.8
Columbia Bridge.	4.1	14.5	114.7
North Stratford..	9.0	23.5	105.7
Stratford Hollow	8.6	32.1	97.1
Groveton	5.1	37.2	92.0
Northumberland..	3.6	40.8	88.4
Coos Junction...	4.9	45.7	83.5
Lancaster	1.5	47.2	82.0
Whitefield	8.6	55.8	73.4
Littleton	11.1	66.9	62.3
Glessner's Corners	2.6	69.5	59.7
Franconia.....	4.3	73.8	55.4
Profile House ...	5.5	79.3	49.9
Flume House ...	5.1	84.4	44.8
North Woodstock	5.1	89.5	39.7
Woodstock	4.1	93.6	35.6
West Thornton..	4.4	98.0	31.2
West Compton ..	5.8	103.8	25.4
Plymouth	7.2	111.0	18.2
Ashland	5.9	116.9	12.3
Holderness	3.9	120.8	8.4
Center Harbor ..	8.4	129.2	0.0

Center Harbor-Augusta, 126.7 Miles.

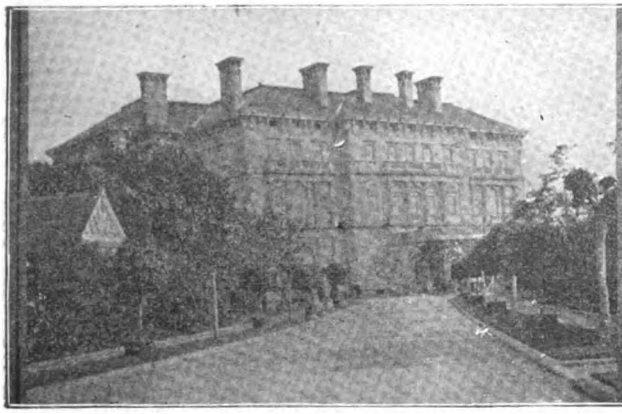
	Miles to	Total Miles Out	Return
Center Harbor ..	0.0	0.0	126.7
Moultonboro	4.9	4.9	121.8
South Tamworth	8.1	13.0	113.7
Whittier	1.9	14.9	111.8
Tamworth	2.1	17.0	109.7
Chocorua	3.4	20.4	106.3
Pequaket	3.5	23.9	102.8
Iona	3.0	26.9	99.8
Conway Station.	4.4	31.3	95.4
Conway	1.1	32.4	94.3
Redstone	3.4	35.8	90.9
Center Conway..	1.7	37.5	89.2
Fryeburg, Me....	5.7	43.2	83.5
East Fryeburg..	5.9	49.1	77.6
Bridgton	9.1	58.2	68.5
Naples	9.2	67.4	59.3
Cook's Mills	3.2	70.6	56.1
Webb's Mills ...	4.6	75.2	51.5
Poland Spring ..	8.8	84.0	42.7
Danville Junction	5.5	89.5	37.2
Auburn	6.2	95.7	31.0
Lewiston	0.4	96.1	30.6
Greene Corners..	6.1	102.2	24.5
Greene Station...	2.1	104.3	22.4
Winthrop	11.7	116.0	10.7
East Winthrop ..	4.2	120.2	6.5
Manchester	2.1	122.3	4.4
Augusta	4.4	126.7	0.0

NEW ENGLAND'S MOST HISTORIC SECTION.

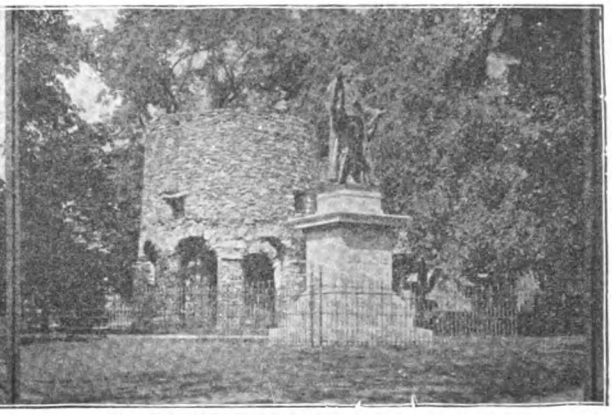
Along the South Shore to Plymouth and Provincetown, the Land of the Pilgrims, and Return to Boston by Way of Newport, the Home of the Norsemen.

TOUR No. 13 offers a decided change from those heretofore outlined. Like them it is planned to occupy three days, and is so arranged that it may be utilized in combination with any of the others presented herewith. It starts from Boston, and Provincetown, Mass., and Newport, R. I., are the night stops. The tourist returning from the Maine woods by itinerary No. 1 may enter upon this tour at Boston, rejoining his original schedule at Narragansett Pier, R. I., by ferrying across the lower end of Narragansett bay from Newport. It will add at least two days more to the trip, but it will be found to be time very well spent.

The route lies along the south shore from Boston, through Quincy, Hingham, Cohasset and Kingston, all filled with summer homes of Boston people, to historic Plymouth. In fact the entire trip during the first day from this point is over historic ground. At Plymouth, the tourist will wish to see Forefathers Rock, on which it is said that the Pilgrims first set foot in making their landing in America; Burying Hill, with its graves of Miles Standish, John and Priscilla Alden, and others only a little less known; Pilgrim Hall, with its museum of Pilgrim relics; the plot of ground where the dead were buried during that first winter, and their graves sown with grain the next spring to keep the Indians in ignorance of their death, and many other noted scenes. The sites of interest to the tourist are clearly marked, and it is possible to determine with a fair degree of accuracy just where each of the central figures lived and moved during those early days which followed closely the year 1620.



"The Breakers" at Newport's Summer Colony.



Historic Old Stone Mill in Truro Park, Newport.

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Seaconnet Point and Light in Southeastern Rhode Island.

The route lies along the north shore of Cape Cod, through a number of small towns, distinctive in their original quaintness, to Provincetown, in the harbor of which the Mayflower was brought to anchor, while the members of the little band drew up their compact and signed it with their life's blood. The tourist goes over the route in the reverse direction from that in which the Mayflower sailed from Provincetown to Plymouth, but after a night on the tip end of Cape Cod he returns over a portion of the trip, before shifting to the south shore.

From Chatham to Onset, the tour visits a number of towns, which have furnished numerous sailors for America's merchant marine, as well as the navy. Cape Cod has an individuality unlike that of any other section of the country. Connection may be made for Wood's Hole and Martha's Vineyard at West Falmouth. Buzzard's Bay is well known as the summer home of the late Grover Cleveland, while President.

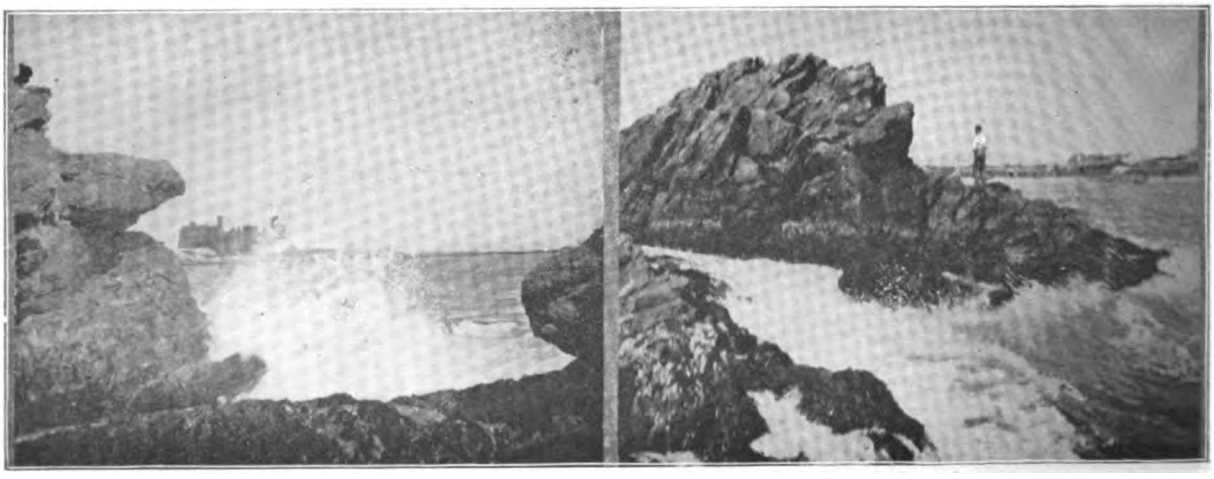
Fairhaven was the home of the late H. H. Rogers, and the very excellent highways of the town practically were a gift from him. For years he was superintendent of streets in Fairhaven, but many times the salary voted by the town was expended by Mr. Rogers in giving to that section permanent highways, which will serve long as a memorial to him.

New Bedford and Fall River are large commercial centres in southeastern Massachusetts, the former having been for a number of years the home port of an extensive whaling fleet. The latter has an excellent harbor, and the numerous streams emptying into it afford abundant water power for numerous manufacturing enterprises.

Newport is reached by the way of Tiverton and along the island of Rhode Island. It is famed the world over for its magnificent summer homes of wealthy people. Opportunity should be taken to visit a number of these. The cliff walk, leading for several miles along the shore and through many of the estates, is also of interest. Aside from the summer homes, Newport has much of historical value, and among these features may be mentioned the Old Stone Mill, found standing on the highest point in the city when the settlers first cleared away the underbrush, and supposed to have been erected by the Norsemen, hundreds of years before the visit of Columbus to America. The United States naval training station, navy yard and torpedo station also are located at Newport.

The third day finds the tourist skirting the east shore of Narragansett bay, after crossing from the island of Rhode Island to Bristol by ferry. From Bristol may be seen Mt. Hope, where King Philip congregated his anti-English allies for the attack upon the Narragansett fort in 1675.

Itinerary No. 1 is reached at Providence, over which the return to Boston may be made, if



Two Views of Surf from Cliff Walk at Newport, R. I.: Ochre Point at Left; Brenton Point at Right.

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desired. This tour follows the Blackstone valley to Worcester, Mass., and re-enters Boston over one of the three main macadam routes between those two cities. Good roads are encountered practically all of the way from Providence, the beautiful Blackstone valley being ideal touring ground.

ITINERARY NO. 13.

Night Stops — Boston and Provincetown,; Newport, R. I. Three days, 407.4 Miles.

Boston-Provincetown, 129.2 Miles.

	Miles to	Total Miles Out	Return
Boston	0.0	0.0	129.2
Milton Low. Falls	7.4	7.4	121.8
Quincy	4.1	11.5	117.7
Hingham	6.2	17.7	111.5
Cohasset	6.6	24.3	104.9
Scituate Center	3.6	27.9	101.3
Greenbush	2.1	30.0	99.2
Marshfield	7.3	37.3	91.9
Kingston	8.6	45.9	83.3
Plymouth	4.6	50.5	78.7
Manomet	5.7	56.2	73.0
Sagamore	12.5	68.7	60.5
Sandwich	2.0	70.7	58.5
West Barnstable	7.8	78.5	50.7
Barnstable	4.4	82.9	46.3
Yarmouthport	2.6	85.5	43.7
Yarmouth	1.4	86.9	42.3
Dennis	3.3	90.2	39.0
East Dennis	1.9	92.1	37.1
Brewster	4.6	96.7	32.5
East Brewster	1.6	98.3	30.9
Orleans	3.7	102.0	27.2
Eastham	4.0	106.0	23.2
South Wellfleet	6.6	112.6	16.6
Wellfleet	2.3	114.9	14.3
North Truro	8.1	123.0	6.2
Provincetown	6.2	129.2	0.0

Provincetown-Newport, 154.6 Miles.

	Miles to	Total Miles Out	Return
Provincetown	0.0	0.0	154.6
North Truro	6.2	6.2	148.4
Wellfleet	8.1	14.3	140.3
South Wellfleet	2.3	16.6	138.0
Eastham	6.6	23.2	131.4
Orleans	4.0	27.2	127.4
Chatham	9.2	36.4	118.2
South Harwich	4.8	41.2	113.4
Harwichport	1.8	43.0	111.6
West Harwich	2.1	45.1	109.5
West Dennis	3.1	48.2	106.4
South Yarmouth	0.8	49.0	105.6
West Yarmouth	3.2	52.2	102.4
Hyannis	2.0	54.2	100.4
Centerville	4.2	58.4	96.2
Osterville	2.9	61.3	93.3
Marston's Mills	2.6	63.9	90.7
Waquoit	7.6	71.5	83.1
East Falmouth	2.5	74.0	80.6
Falmouth	4.1	78.1	76.5
West Falmouth	4.1	82.2	72.4
North Falmouth	3.3	85.5	69.1
Monument Beach	5.7	91.2	63.4
Buzzard's Bay	6.9	98.1	56.5
Onset	2.7	100.8	53.8
East Wareham	1.4	102.2	52.4
Wareham	2.6	104.8	49.8
Marion	5.6	110.4	44.2
Mattapoisett	4.9	115.3	39.3
Fairhaven	5.1	120.4	34.2
New Bedford	2.0	122.4	32.2
North Dartmouth	10.5	132.9	21.7
Fall River	3.1	136.0	18.6
Tiverton, R. I.	6.2	142.2	12.4
Newport	12.4	154.6	0.0

Newport-Boston, 123.6 Miles.

	Miles to	Total Miles Out	Return
Newport	0.0	0.0	123.6
Bristol Ferry	11.9	11.9	111.7
Bristol	0.2	12.1	111.5
Warren	4.2	16.3	107.3
Barrington	1.6	17.9	105.7
East Providence	7.7	25.6	98.0
Providence	2.6	28.2	95.4
Pawtucket	4.1	32.3	91.3
Lonsdale	2.7	35.0	88.6
Ashton	2.4	37.4	86.2
Woonsocket	7.3	44.7	78.9
Blackstone, Mass.	1.6	46.3	77.3
Uxbridge	7.2	53.5	70.1
Whitins	1.8	55.3	68.3
Northbridge	4.2	59.5	64.1
Farnumsville	2.2	61.7	61.9
Saundersville	1.5	63.2	60.4
Millbury	3.2	66.4	57.2
Worcester	6.0	72.4	51.2
Grafton	8.0	80.4	43.2
West Upton	4.6	85.0	38.6
Upton	1.2	86.2	37.4
Milford	5.5	91.7	31.9
West Medway	5.7	97.4	26.2
Millis	4.0	101.4	22.2
Medfield	3.0	104.4	19.2
Westwood	5.7	110.1	13.5
Dedham	2.9	113.0	10.6
Boston	10.6	123.6	0.0

TOURING AMONG THE BERKSHIRE HILLS.

Itinerary Gives Two Routes Between Boston and Albany, Affording Connection with New England from the West---Particularly Attractive in the Autumn.

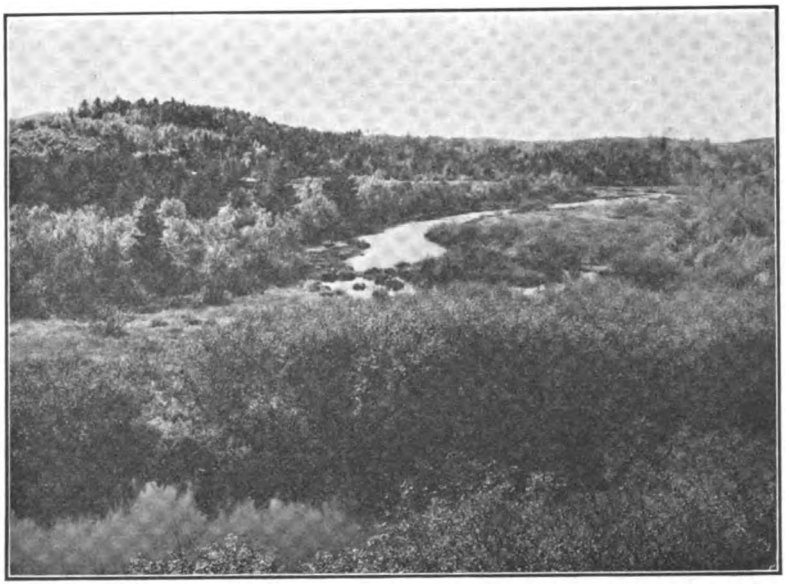
THOSE who enjoy the beauties of touring in the autumn, with all the kaleidoscopic colorings in the foliage of hill and dale, will appreciate the itinerary outlined herein. It is designed to connect Boston and Albany over two distinct routes, one of which, the outward trip, offers some slight deviations from the beaten path, while the other presents some of the best roads in the country in combination with many rich views of the Berkshires and the Connecticut valley. It is anticipated that the tourist will be on the road four days, with night stops at Greenfield, Mass.; Albany, N. Y., and Springfield, Mass.

After passing through Watertown, the site of the Massachusetts arsenal, and Waltham, the home of the Waltham watch, the tourist enjoys a pleasant drive through Maynard and Stow, and emerges from this first glimpse of country beauty to visit Fitchburg, another manufacturing city of importance. At Gardner is the largest chair factory in the world. Excellent automobile roads lead through Otter River, Baldwinsville and Athol to Orange, and then the descent into the Connecticut valley is begun. At Millers Falls, Mt. Toby and its base, and Lake Pleasant divide attention with the river. Greenfield is the night stop.

Soon after leaving Greenfield, the second day, the way leads up Shelburne mountain, and then into the valley of the Deerfield at Shelburne Falls, the early home of William Cullen Bryant, Charles Dudley Warner and several other people of note. At Charlemont, a view of the $20,000,000 Hoosac tunnel is obtained, and while the shorter distance to North Adams is over Hoosac mountain, a detour is made at this point, entering Vermont, through most interesting scenery, albeit, the roads are far from ideal in places. It is anticipated, however, that the tourist will find less difficulty in covering these country ways than in climbing the mountain and descending the many winding curves and heavy grades on the other side.

North Adams is in the shadow of Mt. Greylock, and about a mile north of the city is the famous natural bridge over Hudson's brook. The cascade in Notch brook is another pretty little spot half hidden away in a glen. After leaving Williamstown, the seat of Williams College, the way leads back into Vermont, through Pow-

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The Otter River Meadows in the Vicinity of Otter River, Mass.

nal, and thence into New York state at North Petersburg, passing near Walloomsac, where was fought the battle of Bennington. A few country villages, with their quaint old houses are next passed, and the road descends into the valley of the Hudson on the way to Troy and Albany.

Albany, the capital of New York, is full of interest. Chief among the buildings of prominece is the state house, built at an enormous cost and filled with relics of all the wars. Two other structures of note are the Catholic and Episcopal cathedrals. Van Rensselaer Manor House and its park, on the site first occupied by Kilian Van Rensselaer, Patroon of Beverwyk, also should be visited for its historic associations.

On the return trip the road leads over the hills to Pittsfield, passing through the Lebanons, a series of Shaker settlements. Pittsfield is admirably situated among the Berkshires, with a number of little lakes and several interesting mountains nearby. Lenox is described as "a gem among the mountains," and is the summer home of numerous people of prominence.

Lee was settled in 1760, and was named for one of the Virginia Lees. It is famed for its wonderful white marble, of which some $1,000,000 worth was employed in the erection of the capitol at Washington. Becket has several lakes, from one of which the Farmington river flows down into Connecticut. The route to Becket is over the famous Jacob's Ladder, now placed in excellent condition, through agitation aroused by motorists.

Chester, Huntington and Russell are all pretty Berkshire towns, and then the way dips down into the Connecticut valley, through the Indian domain of Woronoco, settled in 1660 by the English and called Streamfield. The Little River water works of the City of Springfield are near this town.

Late in King Philip's war the people of Westfield were ordered to evacuate and concentrate with those of the other settlements in the valley at Springfield and Hadley. An angry refusal was returned and for a time negotiations were under way looking toward a union with Connecticut. Later the legislature found it desirable to cancel the order.

Springfield, the night stop, is known as the City of Homes. It is a centre from which a number of motoring trips may be made in all directions. From the United States armory on State street it is possible to secure a view up and down the valley, which is unequalled anywhere in this country, and which is considered by many to be superior to the like views afforded in European countries.

From Springfield to Boston the road is macadam nearly all the way. Palmer also is famous for its scenery, combining woods and hills, the lesser mountains, lakes and rivers. Warren is a pretty manufacturing town amid rounding hills. Of West Brookfield it is stated that it produces apples and boots, and the orchards are of



Lake Pontoosuc, Favorite Berkshire Picnic Resort at Pittsfield, Mass.

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particular interest in the fall of the year.

In Brookfield time should be taken to visit the garrison house, in which for three days the settlers held out against a superior force of Indians. As a last resort the redskins backed a load of blazing flax and straw near it in an effort to burn it down. A sudden shower put out the flames, and the incident was regarded by both sides to the conflict as miraculous.

Spencer was the native town of Elias Howe, Jr., the inventor of the sewing machine. Then comes Worcester, the Heart of the Commonwealth, well and favorably known by motorists. The remainder of the distance into Boston is through Shrewsbury, Northboro, Marlboro (the so-called "boro" towns), Wayland and Weston.

Shrewsbury was the birthplace of Levi Pease, who started the first line of mail stages between Boston and New York in 1784, previous to which fortnightly mail was carried between these two cities in saddle bags. Northboro is devoted to cattle raising. Marlboro was the site of the Christian Indian village of Okammakemesitt. Each is filled with particular interest to the tourist.

In every respect this itinerary offers an ideal autumn tour. The Berkshires are at their very best during this season, and the two routes through them leave nothing to be desired. For those who have ample time at their disposal it would be possible to make North Adams, Pittsfield or Becket the headquarters for a more extended stay in their environs, with plenty of opportunity to enjoy nature at its prettiest.

ITINERARY NO. 14.

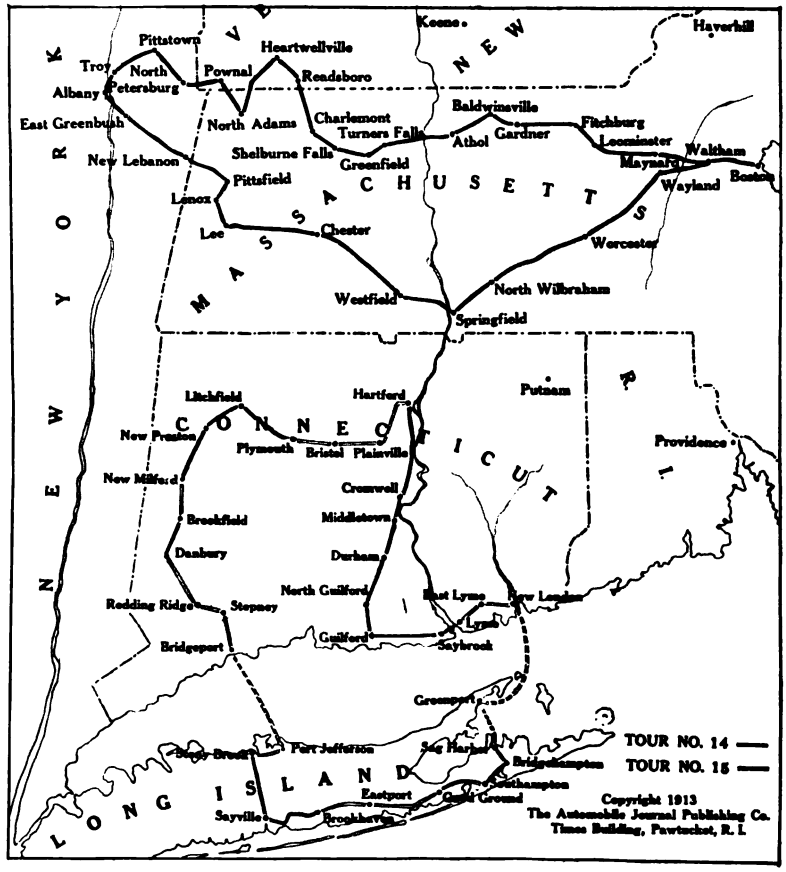
Night Stops — Boston and Greenfield, Mass.; Albany, N. Y.; Springfield, Mass. Fours Days, 392.7 Miles.

Boston-Greenfield, 97.2 Miles.

	Miles to	Total Miles Out	Return
Boston	0.0	0.0	97.2
Watertown	6.8	6.8	90.4
Waltham	2.8	9.6	87.6
Hastings	3.0	12.6	84.6
Maynard	9.8	22.4	74.8
Stow	2.8	25.2	72.0
Bolton	5.9	31.1	66.1
Leominster	10.1	41.2	56.0
Fitchburg	4.8	46.0	51.2
Westminster	7.2	53.2	44.0
South Gardner	3.8	57.0	40.2
Gardner	0.8	57.8	39.4
Otter River	4.6	62.4	34.8
Baldwinsville	1.3	63.7	33.5
Athol Center	8.7	72.4	24.8
Athol	1.1	73.5	23.7
Orange	4.7	78.2	19.0
Wendell	2.7	80.9	16.3
Irving	2.4	83.3	13.9
Millers Falls	6.3	89.6	7.6
Turners Falls	4.4	94.0	3.2
Greenfield	3.2	97.2	0.0

Greenfield-Albany, 106.7 Miles.

	Miles to	Total Miles Out	Return
Greenfield	0.0	0.0	106.7
Shelburne	5.4	5.4	101.3
Shelburne Falls	4.0	9.4	97.3
Charlemont	8.3	17.7	89.0
Readsboro, Vt.	17.8	35.5	71.2
Heartswellville	8.5	44.0	62.7
Stamford	7.2	51.2	55.5
Bridgeville	2.6	53.8	52.9
N. Adams, Mass.	2.2	56.0	50.7
Williamstown	5.4	61.4	45.3
Pownal, Vt.	4.7	66.1	40.6
North Pownal	3.4	69.5	37.2
North Petersburg, N. Y.	3.7	73.2	33.5
Potter Hill	5.9	79.1	27.6
Boyntonville	3.2	82.3	24.4
Pittstown	2.2	84.5	22.2
Raymertown	3.1	87.6	19.1
Center Brunswick	6.1	93.7	13.0
Troy	4.7	98.4	8.3
Albany	8.3	106.7	0.0



Albany-Springfield, 93.7 Miles.

	Miles to	Total Miles Out	Return
Albany	0.0	0.0	93.7
Rensselaer	1.0	1.0	92.7
East Greenbush	4.5	5.5	88.2
Schodack Center	1.7	7.2	86.5
Nassau	5.6	12.8	80.9
West Lebanon	8.9	21.7	72.0
New Lebanon Center	2.6	24.3	69.4
New Lebanon	1.7	26.0	67.7
Shaker Village, Mass.	6.0	32.0	61.7
Pittsfield	4.7	36.7	57.0
Lenox	6.6	43.3	50.4
Lee	4.0	47.3	46.4
East Lee	2.4	49.7	44.0
West Becket	5.8	55.5	38.2
Becket Center	2.2	57.7	36.0
Bonnyrigg Four Corners	3.1	60.8	32.9
Chester	4.3	65.1	28.6
Huntington	7.1	72.2	21.5
Russell	3.9	76.1	17.6
Woronoco	2.9	79.0	14.7
Westfield	5.6	84.6	9.1
West Springfield	7.4	92.0	1.7
Springfield	1.7	93.7	0.0

Springfield-Boston, 95.1 Miles.

	Miles to	Total Miles Out	Return
Springfield	0.0	0.0	95.1
North Wilbraham	10.3	10.3	84.8
Palmer	5.3	15.6	79.5
Warren	11.4	27.0	68.1

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West Brookfield..	3.4	30.4	64.7	Cherry Valley....	1.8	46.8	48.3	Marlboro	5.6	66.6	28.5
Brookfield	2.8	33.2	61.9	Worcester	4.2	51.0	44.1	Wayland 10.8		77.4	17.7
Spencer	6.8	40.0	55.1	Shrewsbury	5.6	56.6	38.5	Weston	3.4	80.8	14.3
Leicester	5.0	45.0	50.1	Northboro	4.4	61.0	34.1	Boston 14.3		95.1	0.0

VACATION SPOTS ON LONG ISLAND.

Tour First Visits Litchfield Hills and Housatonic Valley and Contemplates a Whole Day Among the Beauties of the Island Before Returning to Hartford.

FAMED as are the mountains, lakes and rivers of New England, it must not be denied there are numerous vacation spots in these states that are not so well known as their beauty would warrant. The same will hold true with respect to Long Island. And while this latter ground is more or less familiar to tourists from New York City, there are many motorists who have never taken the time to explore its resources.

In the accompanying itinerary, it is anticipated that three days will be devoted among the lesser known portions of this section. The start is made from Hartford, Conn., and the tour first reaches the Litchfield hills, and crosses Long Island sound for a day on the island itself, before returning to the capital of the Nutmeg State over ways perhaps somewhat better known.



Interesting Connecticut Touring Ground: At Left, Among the Litchfield Foothills; Centre, Washington Street, Hartford; at Right, in the Naugatuck Valley Near Thomaston.

Leaving Hartford, Farmington is the first interesting place reached. The town occupies a beautiful situation on the banks of the river of the same name. A broad and shaded street two miles long, practically composes the village. It was settled in 1640, and it was here that the village pastor preached to the Continental army on its march to Boston in 1775.

Plainville, with its macadam ways, Forestville, and Bristol follow in quick succession. The tourist is now in the centre of the original clock making industry in America. Eli Terry began the manufacture of these goods in a small shop in Terryville, but the business very soon spread to Bristol and Thomaston, both of which have been producing clocks for many years. Just before reaching the latter town, the route leads down a very steep hill, practically one mile long, although a detour may be taken if deemed advisable.

Northfield is a knife making centre, much of the cutlery being hand forged; the material is imported steel from Sheffield, Eng., whence many of the employees came. The road from this point to Litchfield is nearly all upgrade, and as the hills are climbed new scenes unfold themselves in rapid succession, and while the so-called mountains are small of stature the car finds much less difficulty in making the grades than would be the case in other portions of the chain.

Litchfield occupies an interesting place in history. The first law school in America was opened in a small building which is shown visitors with justifiable pride. During the summer months, the hill top is the favorite home for many New York people, and Bantam lake, only a few miles distant, and distinctly visible from many points, lends an added charm.

This lake is passed on the way to Bantam and New Preston. Just beyond the former town the road takes a dip between two high hills, one of which is known locally as Mt. Tom. New Preston commands a pleasing view of the surrounding country and easily explains the attractiveness of the section. Here, time should be taken to drive about Lake Warramaug, a splendid boulevard making this possible without difficulty.

New Milford is near the junction of the Housatonic and Aspe-

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Three Views of Historic Litchfield: Left, Wolcott Mansion; Centre, Elm Street Drive; Right, Old Whipping Post.

tuck rivers, with a wide verdant park and well shaded trees. Nearby is a silver mine, which was worked prior to 1790, and the town is one of the centres of the tobacco trade in the valley. The way then leads along the Housatonic to Brookfield and beyond, and finally reaches Danbury, the home of the hat industry.

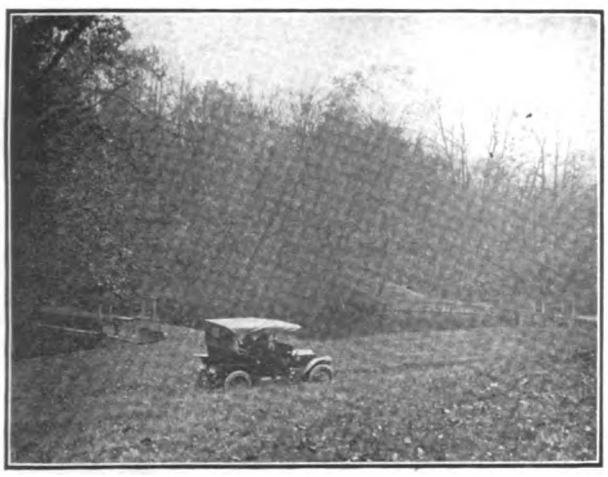
From this point to Bridgeport the road is most direct. Stop may be made to visit Putnam Park, established in memory of Israel Putnam. If desired the boat across the sound may be taken in the evening. The ferry is operated only twice daily, at 1:30 and 6:30 in the afternoon. Should the tourist elect to remain over night in the Park City, abundant opportunity may be had to explore the vicinity before taking the first boat to Port Jefferson the morning of the following day.

The harbor at the latter place is conceded to be one of the most beautiful on the sound. The town is built up on terraces, which extend back from the water's edge in pleasing array, the many hued trees lending their charm to the situation.

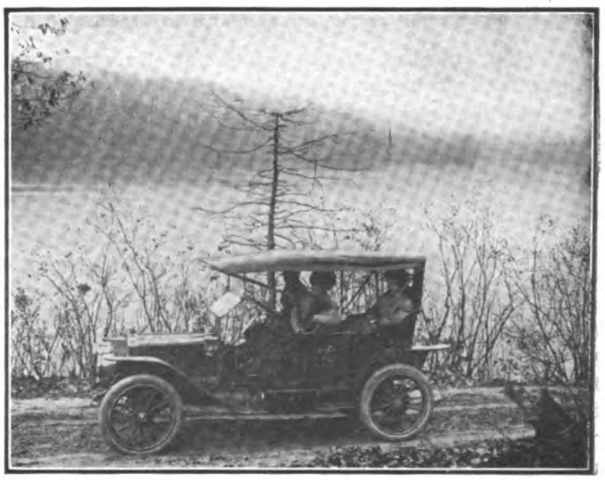
The second day soon finds the tourist at St. James, in which is located the summer estate of Mayor William J. Gaynor of New York City, Deepwells. A drive through pretty woodland leads to an arm of Lake Ronkonkoma, the terminus of the Long Island Motor Parkway. About this lake are numerous little coves and streams which form a perfect outline of a pair of spectacles. The lake itself has baffled government geologists in their efforts to learn why this body of fresh water should have a tide which rises and falls every seven years. It has no direct connection with the sound, the ocean or any other tidewater, and its actual depth is not known.

Then comes Bread and Cheese hollow and the headwaters of the Nissequogue river, the happy hunting grounds of the Long Island Indians. And finally the motorist finds himself on the opposite shore of the island at Bayport. The way turns eastward along this shore to Sag Harbor and Greenport. Boats leave Sag Harbor for New London at 6 in the morning, at 12:30 in the afternoon, and Greenport at 6:30 and 1:40. The tourist has the option of remaining on the island or crossing to the mainland, depending largely upon the time he arrives at these places.

The third day leaves New London behind to enjoy the beauties of the Connecticut shore. The route is over the main line to New



The Happy Hunting Grounds in Nissequogue Valley, on Long Island.

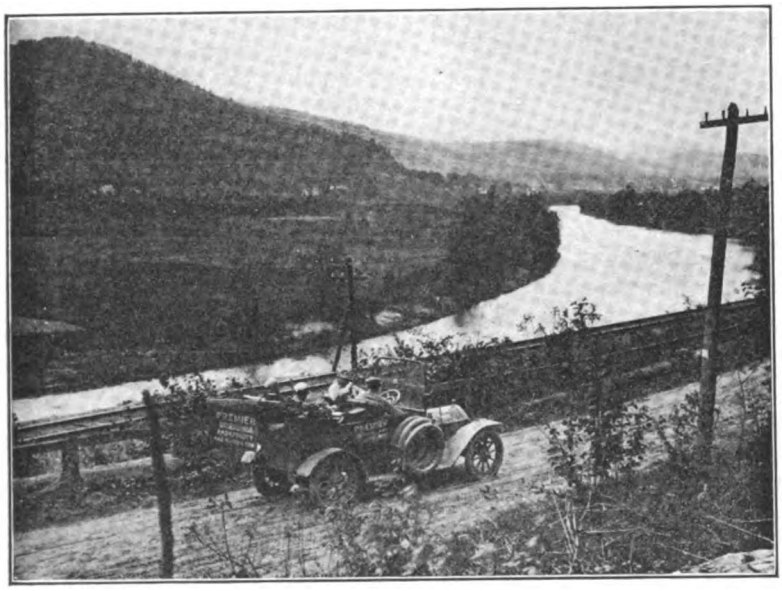


Skirting One of the Little Ponds in the Vicinity of Lake Ronkonkoma.

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York for some distance, crossing the Connecticut river on the new bridge between Lyme and Saybrook. Of course, the return to Hartford may begin at Saybrook, following the better known Connecticut valley road, but it is anticipated that the trip will be undertaken for the purpose of exploration, and the itinerary as outlined from Guilford will be found fully as enjoyable.

Lyme is a venerable hamlet, half-buried in foliage, its Main street lined with old trees and historic mansions, among the latter being Black Hall, the homestead of the patrician Griswolds. Westbrook and Clinton, are two quiet towns on the shore, much frequented by summer people, because of the absence of the trolley and other disturbing seaside factors. Madison is almost equally known in this respect.



Connecticut Valley Supplies Beautiful Mountain and River Scenery.

Guilford was settled in 1639 by four immigrants from Kent and Surrey, England, its former Indian name being Menuncatuck. During the extermination of the Pequots by the Mohegans, a few years previous to this time, the sachem, Uncas had his headquarters at this point and numerous battles were fought in this vicinity. In 1781 the regicides were hidden in an old house, which still stands. Three frigates landed a force which marched through the streets during this period, but the rapidly gathering militia drove them off, before the fugitives were located.

North Guilford is somewhat isolated from the surrounding country and offers abundant opportunity to witness the quaint and beautiful. The sound may be seen at intervals, but the motorist's attention is much more likely to be taken up by the interesting bits of woodland scenery, which continue through Bluff Head, from which point pleasing outlooks upon the Connecticut river may be had. Middletown is the seat of Wesleyan University and the view from the tower of the old chapel is considered by many as unequalled throughout this district.

After leaving Middletown, the road follows this river through Cromwell, Rocky Hill and Wethersfield. This is a favorite drive for Hartford motorists and is almost too well known to need comment. Rocky Hill is so named because of its trap rock and sandstone ledges, and commands an interesting view of the river toward the north, clear weather making it possible to discern the outlines of Mts. Tom and Holyoke in Massachusetts, leagues away.

ITINERARY NO. 15.

Night Stops—Hartford and Bridgeport, Conn.; Greenport, L. I. Three Days, 256.4 Miles.

Hartford-Bridgeport, 94.1 Miles.

	Miles to	Total Miles Out	Return
Hartford	0.0	0.0	94.1
West Hartford	3.7	3.7	90.4
Farmington	5.5	9.2	84.9
Plainville	4.6	13.8	80.3
Forestville	2.1	15.9	78.2
Bristol	2.4	18.3	75.8
Terryville	3.9	22.2	71.9
Plymouth	2.2	24.4	69.7
Thomaston	1.0	25.4	68.7
Northfield	2.7	28.1	66.0
Litchfield	6.0	34.1	60.0
Bantam	4.1	38.2	55.9
New Preston	8.1	46.3	47.8
Northville	3.3	49.6	44.5
New Milford	4.3	53.9	40.2
Still River	2.8	56.7	37.4
Brookfield	5.0	61.7	32.4
Danbury	7.3	69.0	25.1
Bethel	3.1	72.1	22.0
Redding Ridge	6.5	78.6	15.5
Stepney	6.8	85.4	8.7
Bridgeport	8.7	94.1	0.0

Bridgeport-Greenport, 87.8 Miles.

	Miles to	Total Miles Out	Return
Bridgeport	0.0	0.0	87.8
E. Setauket, L. I.	1.8	1.8	86.0
Stony Brook	3.5	5.3	82.5
St. James	2.3	7.6	80.2
Nesconsett	4.9	12.5	75.3
Sayville	9.4	21.9	65.9
Bayport	1.5	23.4	64.4
Blue Point	1.7	25.1	62.7
Patchogue	1.8	26.9	60.9
Belleport	4.3	31.2	56.6
Brookhaven	2.1	33.3	54.5
Moriches	5.7	39.0	48.8
Center Moriches	2.2	41.2	46.6
Eastport	4.4	45.6	42.2
West Hampton Beach	5.4	51.0	36.8
Quogue	3.1	54.1	33.7
Good Ground	7.1	61.2	26.6
Southampton	6.1	67.3	20.5
Bridgehampton	7.7	75.0	12.8
Sag Harbor	5.3	80.3	7.5
Shelter Ferry	5.1	85.4	2.4
Greenport	2.4	87.8	0.0

Greenport-Hartford, 74.5 Miles.

	Miles to	Total Miles Out	Return
Greenport	0.0	0.0	74.5
East Lyme, Conn.	7.1	7.1	67.4
Lyme	8.6	15.7	58.8
Saybrook	3.9	19.6	54.9
Westbrook	4.1	23.7	50.8
Clinton	4.7	28.4	46.1
Madison	4.9	33.3	41.2
Guilford	5.2	38.5	36.0
North Guilford	5.5	44.0	30.5
Bluff Head	4.1	48.1	26.4
Durham	4.6	52.7	21.8
Middletown	6.3	59.0	15.5
Cromwell	2.6	61.6	12.9
Rocky Hill	4.9	66.5	8.0
Wethersfield	3.8	70.3	4.2
Hartford	4.2	74.5	0.0

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IN THE GREEN AND WHITE MOUNTAINS.

Outward Trip Is Along the Connecticut Valley, Thence to Lake Champlain and Northward to Canadian Line, and Return by Way of Lake Sunapee.

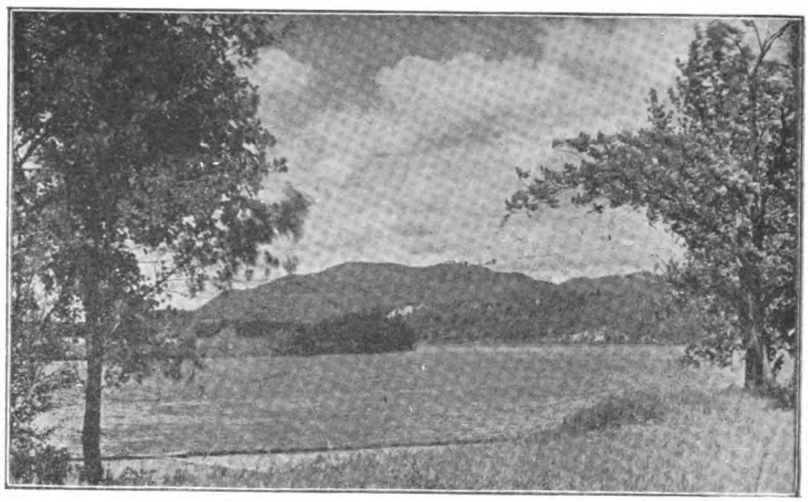
A TOUR that is outlined to occupy five days and to visit the Connecticut valley, Lake Champlain, the mountains of northern Vermont and the White mountain region, is that outlined in itinerary No. 21. The start is made from Springfield, Mass., crossing the Connecticut river into West Springfield, where it is possible to view the old Day house, built in 1754, and the home of Capt. Day, who was active in organizing the so-called Shays' rebellion. The way then leads along the west bank of the river, past a number of large truck farms, into Holyoke, where opportunity may be had to study the paper producing industry.

Just beyond Holyoke is Mt. Tom, one of the highest peaks in that section, and a little further along, Mt. Holyoke raises its head across the river. Northampton is the seat of Smith College for girls, and there are a number of interesting drives in and about this city. A little further along is Sugar Loaf mountain, the scene of some of the bloodiest tragedies of the King Philip and later Indian wars. King Philip is said to have directed the movements of the western Indians from his headquarters on this mountain, and Table rock, a beetling cliff on the east side, has a seat cut in the side, which is called King Philip's chair.

In the northern part of South Deerfield is a monument on the Bloody Brook battlefield. Sept. 18, 1675, Capt. Lathrop and 84 men were conveying a train of grain wagons from ruined Deerfield to Hadley, and as they passed this brook they halted to rest and pick some luscious wild grapes which hung in clusters over its waters. While they were thus engaged 700 Indians fell upon them, and but seven men escaped.

Deerfield was sacked and burned and then abandoned shortly before this battle. Later it was settled again by a number of younger men, and in 1694 it was again attacked, although ably defended by the settlers, headed by their pastor, Rev. John Williams. Feb. 29, 1704, a third attack was made, and this time the village was destroyed again, only one house remaining. One hundred and twelve captives were taken to Canada, where they were held for ransom. Memorial Hall contains an excellent collection of historical relics.

Soon after passing Greenfield, the route crosses the river again into East Northfield, the seat of the Moody School for girls, and of other institutions organized and perpetuated by Dwight L. Moody. Mt. Herman School for boys is situated only a short distance away.



Mt. Holyoke, Across the Connecticut from Smith's Ferry.

Entering Vermont at Vernon is noted the magnificent dam across the river, which furnishes Brattleboro with a splendid lake front. The electricity generated at this dam furnishes light and power for numerous towns in northern Massachusetts, as far distant as Worcester. Brattleboro is naturally very beautifully situated and is the business centre for a large area in both Vermont and New Hampshire. The Estey organ works here are of especial interest.

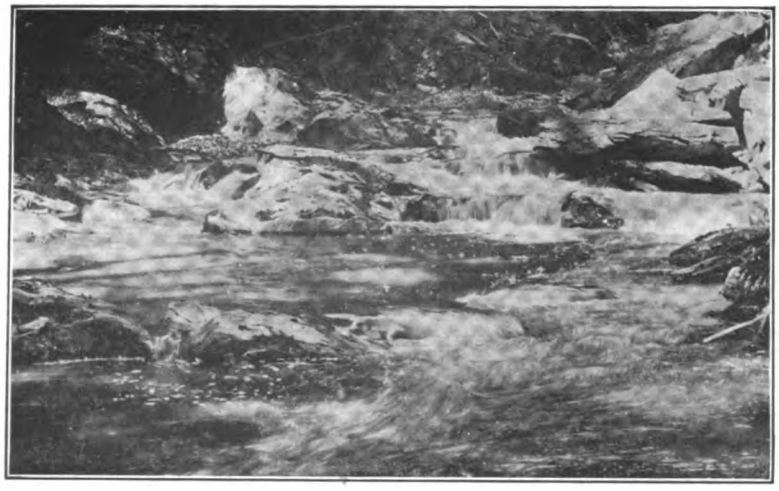
In Putney are long strata of roofing slate, and the rare mineral, fluor spar, of a rich emerald green. In 1775, a strong timber fort was erected, which protected the settlement until the conquest of Canada made it unnecessary.

Bellows Falls was a favorite Indian resort, because of the large number of salmon and shad near its rapids. A short distance above the old bridge at this point are a number of hieroglyphics, which Schoolcraft decided were the records of an ancient battle. The river falls 42 feet within half a mile of the village, forming a white and impetuous rapids.

Charlestown, N. H., was settled by Massachusetts people and was originally named Number Four. Between 1746 and 1760, it was repeatedly attacked and conducted a defense so admirable that the enemy decided at last to abandon the conquest. During the later French and Indian wars it was a military station. It is situated between two broad, rich meadows, and has a long, wide, well shaded street.

Ascutney mountain comes into view just above Claremont, and the river is recrossed into Vermont at Ascutneyville. At Windsor, during a heavy thunderstorm and with the news of the fall of Fort Ticonderoga ringing in their ears, the deputies of the Vermont towns adopted the state constitution, July 2, 1777. Ascutney, the name

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One of the Many Gorges Worn by the Winooski River in Vermont.

of the mountain, which is easily reached from Windsor, was Indian for Three Brothers, and is supposed to refer to the three singular valleys which run- down its western slope. Early settlers claimed they often saw a curious light overhanging the peak at night. White River Junction is the night stop, at the union of the White and Connecticut rivers.

The second day, the route follows the picturesque White river for a time, branching off to climb the Green mountains toward Montpelier. Joseph Smith, founder of Mormonism, was born in Sharon. At Royalton, occurred the last attack by the Indians on New England in October, 1780. Two hundred redskins plundered and burned the village, as well as Sharon, and captured 27 of the people.

Bethel is a busy manufacturing village among high hills. A little further along is the famous Williamstown gulf, through which it is seldom indeed that cool breezes do not blow. The view from this point to Barre and Montpelier is most superb. The route from the capital of the state to Burlington is a reversal of a portion of tour No. 1.

Near Winooski is the romantic canyon on the river, and at High Bridge, the impetuous stream has cut a gorge through the solid rock 90 feet deep and 70 feet wide. St. Albans is the night stop, located on an elevated plain, three miles from Lake Champlain. A neat park of four acres in the centre of the city, is surrounded by hotels and numerous public buildings. A Norman-towered Episcopal church of red sandstone is most noteworthy. A magnificent view may be had from Aldis hill, about a mile to the northeast.

The third day takes the tourist first to Sheldon, near which are located the famous mineral springs. That near the Missisquoi falls has had an enviable reputation. From Dunton's hill, a vast panoramic view of the Green mountains is obtained, while the silver waters of Lake Champlain, the Adirondacks and the spires of Montreal are to be included in the scene. At Richford, Jay peak rises to an altitude of over 4000 feet.

Newport is located at the upper end of Lake Memphremagog, and from the edge of the town rises Prospect hill, from which excellent lake views may be obtained. The lake is 30 miles long, and two-thirds of it lies in Canada. Barton Landing was the scene of much smuggling during 1810-15. At Barton, may be seen Crystal lake and the Flume, where a brook flows through a natural passage in the granite rock, 170 feet long, 10 wide and between 20 and 30 deep. The granite walls are smooth and perpendicular. In 1810, the people of Barton determined to widen Barton river by turning Long pond into it. They barely had completed a channel, when the waters burst through with tremendous force and swept down to Lake Memphremagog, wrecking everything in their path and causing immense damage. The bed of Long pond is now dry and is called Runaway pond.

Numerous rare plants are to be found along the sides of Lake Willoughby, a magnificent sheet of water on the way to Lyndon and St. Johnsbury. Tour No. 1 is followed again for a short distance to the night stop at Bethlehem. The fourth day, return is made to Littleton, with its far-viewing heights, and then the tourist turns toward the Connecti-



When a Summer Breeze Stirs Up the Waters in St. Albans Bay, Vt.

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cut river, visiting Lisbon, somewhat noted for its gold mining, Bath with its picturesque glen, and Woodsville, on the way to Wells River, Vt.

Near Bradford is Devil's Den on the side of Wright's mountain, where one Wright, who claimed to be a prophet, lived the life of a hermit in a dismal rocky cleft. Fairlee is a hilly town abounding in pretty lakes, one of which is nearly three miles long. Mt. Cuba and Mt. Sunday cast their reflection upon these waters. Cuba falls and the perpendicular cliffs of gray granite on Sawyer's mountain are worthy of special notice.

North Thetford produces much copper ore, which is sent overland to Portsmouth, N. H., thence to Baltimore by ship. Below Thetford distant views of Moosilauke and Bald mountains are to be had.

the way to Hinsdale a splendid outlook over the new dam of the Connecticut River Company is afforded. After crossing the state line into Massachusetts the Moody schools at Northfield and East Northfield, may be visited. Then comes the Massachusetts Agricultural College at North Amherst and Amherst College at Amherst. Just above Moody's Corner the road enters a narrow gorge between two mountains of the Holyoke range, and from this point the views of Mt. Holyoke and Mt. Tom are such as to hold particular interest.

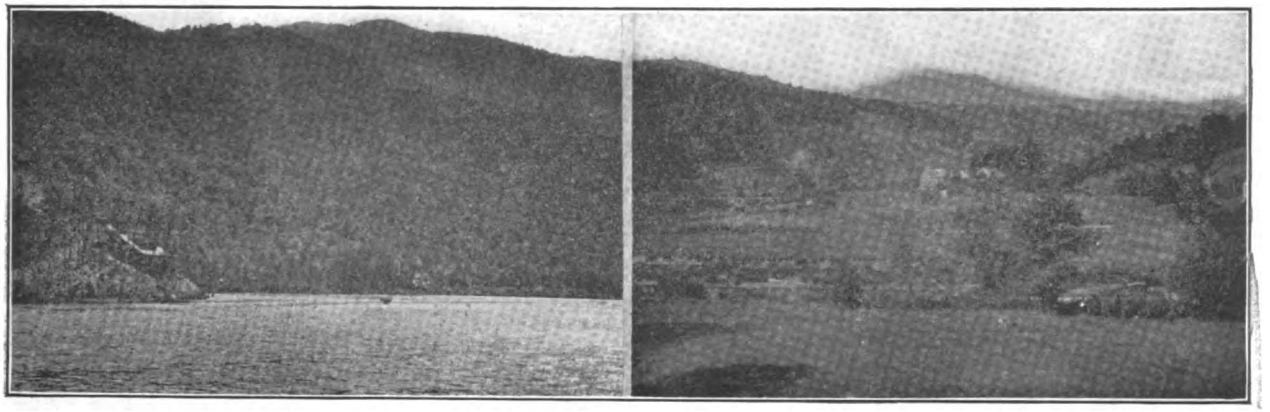
Time should be taken at South Hadley to visit the campus of Mt. Holyoke College for girls, concerning the fantastic beauty and sublime majesty of which much has been written. The surroundings at the college are especially pleasing, and the grove frequently

ITINERARY NO. 21.

Night Stops — Springfield, Mass.; White River Junction and St. Albans, Vt.; Bethlehem and Sunapee, N. H. Five Days, 591.2 Miles.

Springfield-White River Junction, 123.2 Miles.

	Miles to	Total Miles Out	Return
Springfield	0.0	0.0	123.2
West Springfield	1.3	1.3	121.9
Holyoke	0.3	8.6	114.6
Smith's Ferry ...	3.9	12.5	110.7
Mt. Tom	2.1	14.6	108.6
Northampton ...	2.4	17.0	106.2
South Deerfield .	11.5	28.5	94.7
Deerfield	5.1	33.6	89.6
Greenfield	3.4	37.0	86.2
Bernardston	6.6	43.6	79.6
Guilford, Vt.....	11.0	54.6	68.6
Brattleboro	2.6	57.2	66.0
Putney	9.5	66.7	56.5
Westminster	8.3	75.0	48.2



Two Famous Green Mountain Scenes: On Left, Lake Mansfield at Foot of Peak by the Same Name; at Right, View of Camel's Hump as It Appears from Waterbury, Vt.

Hanover is the seat of Dartmouth College, founded in 1770 as a school for Indians. At first it had 24 students, domiciled in huts built of green logs, situated in the midst of a vast wilderness. At West Lebanon is the Tilden Ladies' Seminary, whose fine buildings are seen on a commanding hill.

In the vicinity of Mascomy lake, near Enfield, is a community of Shakers, which has furnished much fine wood and wooden ware for the market. Lebanon is a pretty manufacturing village on an elevated plain near Mascomy falls. Croydon is noted for its splendid granite quarries.

The night stop is at Sunapee, and the morning of the fifth day finds the tourist reversing a portion of tour No. 11 to Keene. On

is utilized as an outdoor theatre for the presentation of Shakespearian plays and similar productions.

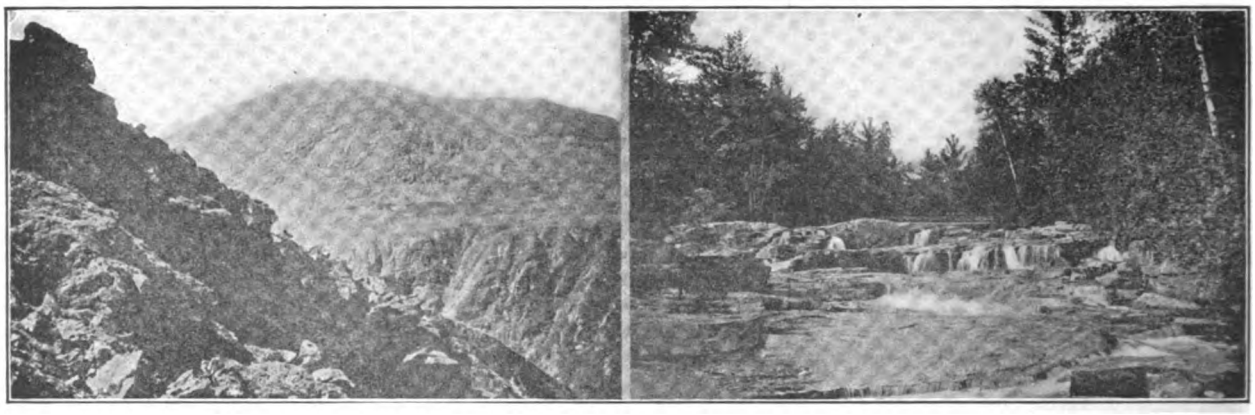
Chicopee, at the confluence of the Chicopee and Connecticut rivers, is the home of the Ames foundry, in which the superb bronze doors of the United States Senate chamber were cast during the Civil War. The doors of the House of Representatives were made in Munich, and the Senate doors were to have been cast in the same place. The over-prudent Bavarians demanded their money in advance, and the government decided to try home production. The work of the Chicopee foundry, while little was hoped or expected from it, challenges comparison with the best from the Munich concerns.

Bellows Falls ...	5.1	80.1	43.1
N. Walpole, N. H.	0.6	80.7	42.5
S. Charlestown...	2.9	83.6	39.6
Charlestown	4.8	88.4	34.8
N. Charlestown..	5.8	94.2	29.0
Claremont	5.0	99.2	24.0
Ascutneyville, Vt.	4.5	103.7	19.5
Windsor	4.8	108.5	14.7
Hartland	4.7	113.2	10.0
West Hartland..	4.5	117.7	5.5
White River Junction	5.5	123.2	0.0

White River Junction—St. Albans, 125.5 Miles.

	Miles to	Total Miles Out	Return
White River Junction	0.0	0.0	125.5
Hartford	1.6	1.6	123.9
West Hartford..	5.5	7.1	118.4
Sharon	6.2	13.3	112.2
South Royalton..	4.0	17.3	108.2
Royalton Station	3.0	20.3	105.2
East Bethel	5.3	25.6	99.9
South Randolph.	1.9	27.5	98.0
East Randolph...	3.1	30.6	94.9
North Randolph.	2.8	33.4	92.1
North Brookfield.	3.9	37.3	88.2

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In the White Mountains of New Hampshire: At Left, Looking Toward Mt. Washington; at Right, Artist Falls Near North Conway.

Williamstown ...	7.8	45.1	80.4
Barre	6.2	51.3	74.2
Montpelier	7.1	58.4	67.1
Middlesex Station	6.4	64.8	60.7
Waterbury	5.4	70.2	55.3
Bolton	7.7	77.9	47.6
West Bolton	1.9	79.8	45.7
Richmond	4.6	84.4	41.1
Williston	5.2	89.6	35.9
Burlington	8.0	97.6	27.9
Winooski	2.8	100.4	25.1
Colchester Center	5.0	105.4	20.1
Milton	7.3	112.7	12.8
Georgia	6.7	119.4	6.1
St. Albans	6.1	125.5	0.0

St. Albans-Bethlehem, 125.3 Miles.

	Miles to	Total Miles Out	Return
St. Albans	0.0	0.0	125.3
Sheldon	9.8	9.8	115.5
North Sheldon ..	3.3	13.1	112.2
Enosburg Falls .	5.4	18.5	106.8
North Enosburg..	4.1	22.6	102.7
East Berkshire..	1.4	24.0	101.3
Richford	4.8	28.8	96.5
East Richford...	5.5	34.3	91.0
North Troy	11.5	45.8	79.5
Newport Center..	6.5	52.3	73.0
Newport	6.0	58.3	67.0
East Coventry...	5.0	63.3	62.0
Coventry Depot .	1.5	64.8	60.5
Barton Landing..	4.5	69.3	56.0
Barton	5.0	74.3	51.0
Glover	3.5	77.8	47.5
Sheffield	9.0	86.8	38.5
Wheelock	1.5	88.3	37.0
Lyndon Center...	5.0	93.3	32.0
St. Johnsbury Center	6.0	99.3	26.0
St. Johnsbury ...	3.0	102.3	23.0
Gaskill	6.0	108.3	17.0
Lower Waterford	4.0	112.3	13.0
Waterford	3.0	115.3	10.0
Littleton, N. H...	5.0	120.3	5.0
Bethlehem	5.0	125.3	0.0

Bethlehem-Sunapee, 103.6 Miles.

	Miles to	Total Miles Out	Return
Bethlehem	0.0	0.0	103.6
Littleton	5.0	5.0	98.6
South Littleton..	5.4	10.4	93.2
North Lisbon ...	1.7	12.1	91.5
Sugar Hill	3.4	15.5	88.1
Lisbon	2.1	17.6	86.0
Bath	5.7	23.3	80.3
Woodsville	5.5	28.8	74.8
Wells River, Vt..	0.6	29.4	74.2
Newbury	4.9	34.3	69.3
Bradford	7.4	41.7	61.9
Fairlee	6.5	48.2	55.4
Ely	2.9	51.1	52.5
North Thetford..	2.7	53.8	49.8
Thetford	2.3	56.1	47.5
Hanover, N. H...	9.5	65.6	38.0
West Lebanon ..	3.9	69.5	34.1
Lebanon	3.8	73.3	30.3
Grantham	14.2	87.5	16.1
Croydon	3.3	90.8	12.8
Croydon Flats...	3.5	94.3	9.3
Newport	3.7	98.0	5.6
Guild	2.4	100.4	3.2
Sunapee	3.2	103.6	0.0

Sunapee-Springfield, 113.6 Miles.

	Miles to	Out	Return Total Miles
Sunapee	0.0	0.0	113.6
Guild	3.2	3.2	110.4
Newport	2.4	5.6	108.0
Mill Village	4.7	10.3	103.3
East Lempster...	6.1	16.4	97.2
Marlboro	8.9	25.3	88.3
Gilsum	7.1	32.4	81.2
Keene	8.1	40.5	73.1
West Swanzey ..	5.3	45.8	67.8
Westport	2.4	48.2	65.4
Winchester	5.3	53.5	60.1
Ashuelot	3.5	57.0	56.6
Hinsdale	2.4	59.4	54.2
East Northfield, Mass.	6.5	65.9	47.7
Northfield	0.6	66.5	47.1
Millers Falls	9.0	75.5	38.1
Lake Pleasant ..	3.4	78.9	34.7
Montague	0.8	79.7	33.9
North Amherst ..	9.4	89.1	24.5
Amherst	2.5	91.6	22.0
Moody's Corner..	8.4	100.0	13.6
South Hadley....	0.9	100.9	12.7
S. Hadley Falls..	3.1	104.0	9.6
Holyoke	0.7	104.7	8.9
Willimansett	1.2	105.9	7.7
Chicopee	3.8	109.7	3.9
Springfield	3.9	113.6	0.0



Campus at Mt. Holyoke College.

Lake Sunapee and the Southlands.

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THREE DAYS IN THE DOMINION OF CANADA.

Outlining a New Route Between the States and the City of Quebec, with a Splendid Trip up the Valley of the St. Lawrence to Montreal.

THE three-day trip outlined in tour No. 22 is a substitute for the better known route between Quebec and the States by way of Jackman, Me., and is suggested as a continuation to itinerary No. 2 at Montreal. The starting point is at Newport, Vt., and the night stops, Quebec and Montreal.

The customs formalities must be arranged at Stanstead, a short distance from Lake Memphremagog. Several picturesque lakes are viewed on the way, including Massawippi, near the town of that name; Noir, near Marbleton; Weeden, near Weeden; Aylmer, at Garthby; Francis, at D'Israeli; Clapham and Marie, between Thetford Mines and Robertson. Marbleton is noted for its marble quarries and lime pits, while at Thetford Mines are located the largest asbestos deposits in the world. Bell mine has an area of several acres and is 150 feet deep.

The final portion of the drive into Quebec is exceedingly picturesque. Beyond Leeds, Parkhurst and St. Giles, the road winds along the bank of the Beaurivage river to the St. Lawrence. It is understood that the magnificent Quebec bridge, which is said to be the largest single span bridge in the world, was opened last year, and that the tourist will not be obliged to enter the city by ferry as has been necessary heretofore.

Quebec is filled with historic interest. In many respects it is the most quaint and picturesque city on the American continent. Of the many side trips, the following may be mentioned: Ste. Anne de Beaupre, where thousands of pilgrims annually visit the relics for miraculous cures; the falls of Ste. Anne and those of Ste. Fereol, still further to the east; Lake Beauport, Indian Lorette, and Cap Rouge.

The view of Quebec from the St. Lawrence in the early morning is said to be a sight never to be forgotten. Above the city the river flows between the Laurentian mountains. Then the tour passes Lake St. Peter, where the St. Lawrence broadens out on the lowlands. Among the features of this body of water are the lumber rafts on which are carried the rude huts of the lumbermen. At various points along the route, quaint old towns are passed, in which the people, like those during the previous day's drive, speak French for the most part, and many old-world characteristics are noted.

Montreal is the metropolis of the Dominion of Canada and is termed "the Queen of the St. Lawrence." It is one of the most beautiful cities on the continent of North America, and has a history dating from 1535, in which year Jacques Cartier visited the triple-walled Indian village of Hochelaga and ascended the lofty hill beside it, which from the beauty of its view he named Mount Royal.

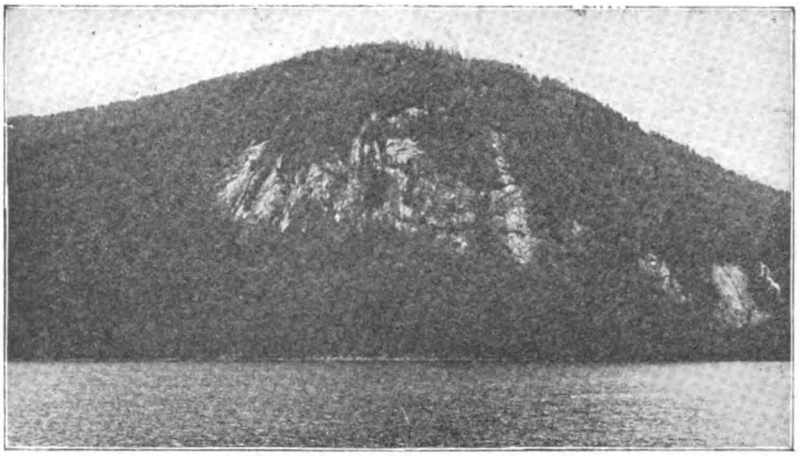
Chambly, reached early the third day, was fortified by the French in 1711, and in 1775 it had a strong stone fort, erected by the British. The town is situated on a lake-like expansion of the Richelieu river, known as the Chambly basin, and the Chambly rapids are nearby. Knowlton is at the foot of Brome lake, with Brome mountain about 10 miles distant, although in full view. At South Bolton, the tour goes through the Bolton notch, with excellent views along the way. Customs arrangements may be perfected at Mansonville. The return to Newport from this point is along the shore of Lake Memphremagog with excellent views of Owl's Head.

ITINERARY NO. 22.

Night Stops—Newport, Vt.; Quebec and Montreal, Can. Three Days, 467.3 Miles.

Newport-Quebec, 177.8 Miles.

	Miles to	Total Miles Out	Return
Newport	0.0	0.0	177.8
Derby	5.1	5.1	172.7
Stanstead, Que.	5.9	11.0	166.8
Cassville	6.1	17.1	160.7



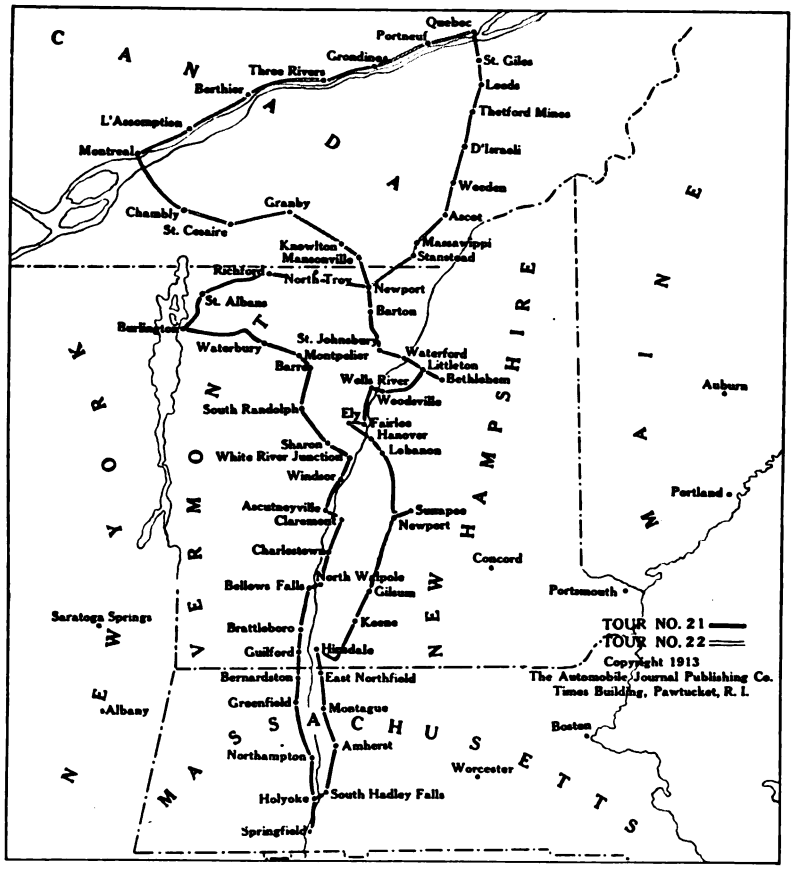
Mt. Hor Raises Its Head Above Willoughby Lake, West Burke, Vt.

Massawippi	12.4	29.5	148.3
Lennoxville	10.2	39.7	138.1
Ascot	15.5	55.2	122.6
South Dudswell	2.2	57.4	120.4
Marbleton	9.4	66.8	111.0
Weeden	8.9	75.7	102.1
Garthby	10.9	86.6	91.2
D'Israeli	5.1	91.7	86.1
Coleraine	5.8	97.5	80.3
Thetford Mines	10.7	108.2	69.6
Robertson Station	5.2	113.4	64.4
Reedham	1.9	115.3	62.5
Kinnear's Mills	8.5	123.8	54.0
Leeds	6.2	130.0	47.8
Parkhurst	9.8	139.8	38.0
St. Giles	8.6	148.4	29.4
St. Etienne	11.9	160.3	17.5
Chaudiere	5.3	165.6	12.2
Levis	7.9	173.5	4.3
Quebec	4.3	177.8	0.0

Quebec-Montreal, 186.7 Miles.

	Miles to	Total Miles Out	Return
Quebec	0.0	0.0	186.7

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St. Augustin	14.3	14.3	172.4
Les Ecureuils ...	14.2	28.5	158.2
Cap Santo	4.3	32.8	153.9
Portneuf	5.1	37.9	148.8
Deschambault ...	4.2	42.1	144.6
La Chevrotierre..	4.8	46.9	139.8
Grondines	2.3	49.2	137.5
St. Ann de la Perade	8.8	58.0	128.7
St. Genevieve	9.1	67.1	119.6
Champlain	8.9	76.0	110.7
Bonadventure ...	9.7	85.7	101.0
Three Rivers	4.1	89.8	96.9
Pointe du Lac...	8.9	98.7	88.0
Yamachiche	8.3	107.0	79.7
Louisville	7.0	114.0	72.7
Maskinonge	7.1	121.1	65.6
St. Cuthbert	9.8	130.9	55.8
Berthier	4.4	135.3	51.4
Lanoraie	9.2	144.5	42.2
Lavaltry	6.1	150.6	36.1
St. Sulpice	5.7	156.3	30.4
L'Assomption ...	5.2	161.5	25.2
Charlemagne	8.7	170.2	16.5
Longue Point....	9.6	179.8	6.9
Montreal	6.9	186.7	0.0

Montreal-Newport, 102.8 Miles.

	Miles to	Total Miles Out	Return
Montreal	0.0	0.0	102.8
Longueuil	3.0	3.0	99.8
St. Hubert	5.0	8.0	94.8
Chambly	8.9	16.9	85.9
Marieville	6.0	22.9	79.9
Rougemont	6.2	29.1	73.7
St. Cesaire	3.3	32.4	70.4
Abbotsford	6.8	39.2	63.6
Granby	8.4	47.6	55.2
Waterloo	11.9	59.5	43.3
Knowlton	9.6	69.1	33.7
South Bolton	9.8	78.9	23.9
Mansonville	8.4	87.3	15.5
Newport Center, Vt.	9.4	96.7	6.1
Newport	6.1	102.8	0.0

DOWN THE VALLEY OF THE HUDSON.

Along the Connecticut Shore, Overland into the Connecticut Valley, Through the Green Mountains and Back to New York by Way of Saratoga Springs.

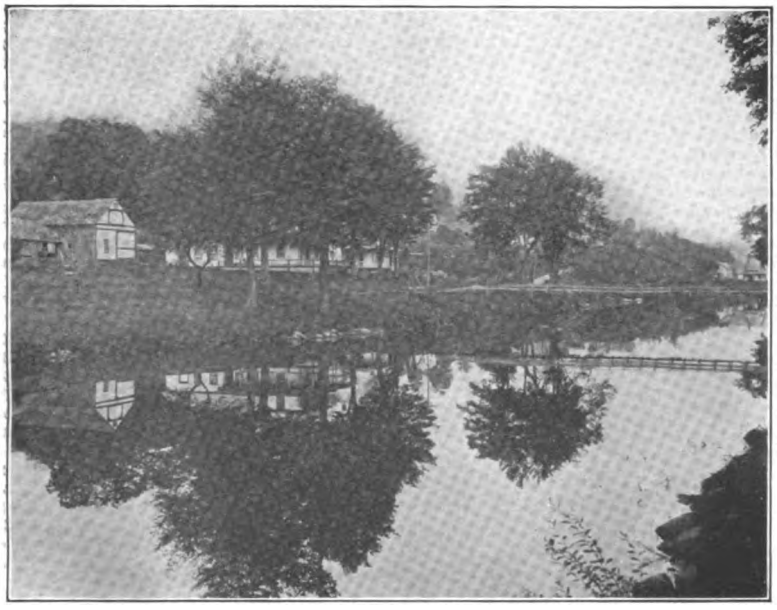
FOR those who love the beautiful in nature the Green mountains hold a particular charm. The roads leading through this region are not quite as ideal as those over which motorists have been wont to visit the White mountains of New Hampshire, but they offer little difficulty for the modern car. In some respects this adds to the delight of the tour, since it gives opportunity to get into more intimate touch with the mountainous districts.

As outlined this itinerary contemplates starting from New York City, the way leading along the shore of Long Island sound, through many of the residential suburbs of the metropolis, both in New York and Connecticut. Stamford, Norwalk and Bridgeport offer plenty of inducements to tarry by the way, and the intermediate shore resorts are equally inviting.

After passing Stratford the valley of the Housatonic is followed to the confluence of the Naugatuck at Shelton. This latter city is so interwoven with those of Derby and Ansonia as to make them practically one large centre. Seymour is a prosperous manufacturing town, although it suffered last year by reason of a flood, resulting from the breakage in the dam which held back the Naugatuck at this point. The borough of Naugatuck is a thriving rubber centre. Waterbury, the Brass City, is the night stop, and it will be found that the day's mileage has not been such as to preclude the possibility of taking advantage of some of the numerous pretty drives in this city and vicinity.

The second day takes the tourist over the new road to Southington mountain, through Southington, Plainville and Farmington to Hartford, the capital of the state and noted for its beautiful parks. The Massachusetts line is crossed at Southwick, that little "neck of land" which extends down into the state of Connecticut. The road from this point to Northampton, the seat of Smith College for girls, lies along the base of several mountains of the minor class, chief among which is Mt. Tom. Still others of the same character are passed on the way through South Deerfield and Deerfield to Greenfield, and the Vermont line is crossed soon after leaving the latter town. The night stop is at Brattleboro.

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The Mirror in the River at South Londonderry, Vt.

The mountains of the second day virtually are the foot hills of the Green mountains, and the more imposing peaks come into view early on the third day. Good roads lead into Newfane, near which is Putney mountain and Sunset lake. Splendid fishing and hunting are offered in season. Jamaica is another comfortable country town surrounded by beautiful green hills, almost in the West river valley.

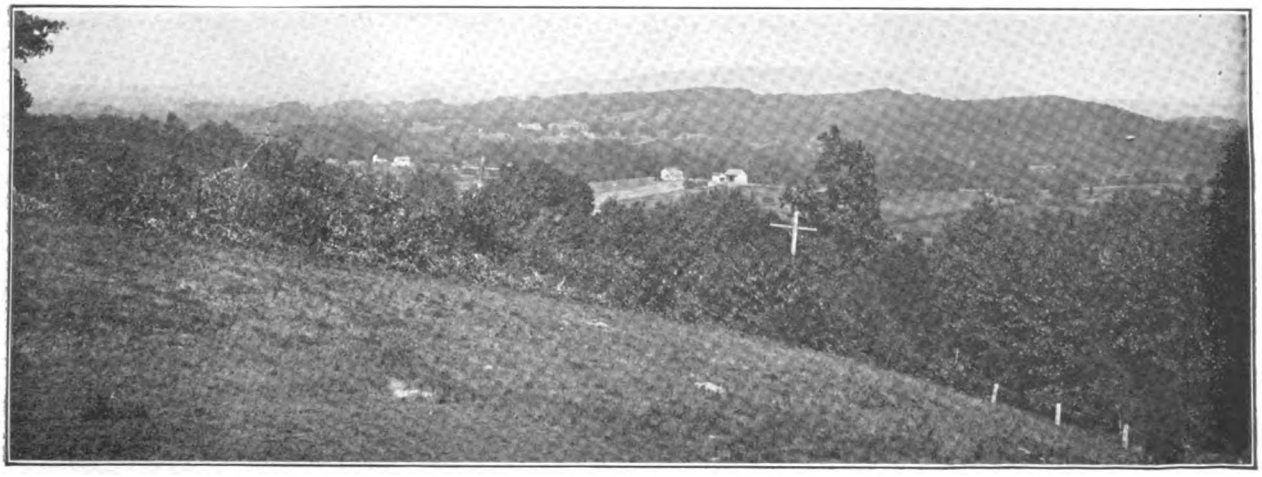
Innumerable lakes and streams dot the landscape in the vicinity of South Londonderry, and there are several attractive scenes within easy reach. Among these may be mentioned Hamilton falls, Flat rock on top of Glebe mountain, and Devil's Den. Manchester Center is admirably located between three mountains and is one of the highest points in this section. Manchester is at the base of Mt. Equinox, and at Stratton mountain, toward the southeast, is the romantic pass known as Stratton gap.

The state seal of Vermont had its origin in Arlington, in which town are the West and Red mountains. The way leads down the valley of the Battenkill to Cambridge, N. Y. This river is crossed at Greenwich, and then the country becomes more flat and uninteresting on the way to Saratoga, the night stop.

Saratoga Springs, once one of the foremost summer resorts in America, still retains its many health giving springs which won for it at least a portion of its wide reputation. The village is situated on a plateau a few miles west of the Hudson river, and may be made the headquarters for a number of pleasant drives about the lakes in the southern end of the Adirondack region. Lake Luzerne, 22 miles north of Saratoga, is a particularly picturesque sheet of water, and one that is easily reached, despite the grades. Saratoga lake is about four miles from the village and is reached by a favorite drive termed the Boulevard.

Good roads are offered for the trip between Saratoga and Albany by way of Mechanicsville and Waterford. Below Albany is Kinderhook, where may be seen a number of ancient buildings, among them being the Van Alen mansion built in 1721 and the Van Schaack mansion erected in 1774. Two miles below the village is Lindewald, the home of Martin Van Buren, and before that the home of Peter Van Ness. Time should be taken to visit the house, if possible, particularly the entrance hall with its picturesque wall paper of Van Buren's time. Near Upper Red Hook is North bay, in which Fulton constructed the Clermont. Poughkeepsie, the seat of Vassar College for girls, is the night stop, although it would be possible to continue the drive into New York City on this side of the river during the day's run if found desirable.

As planned, the tourist is expected to cross the Hudson at the

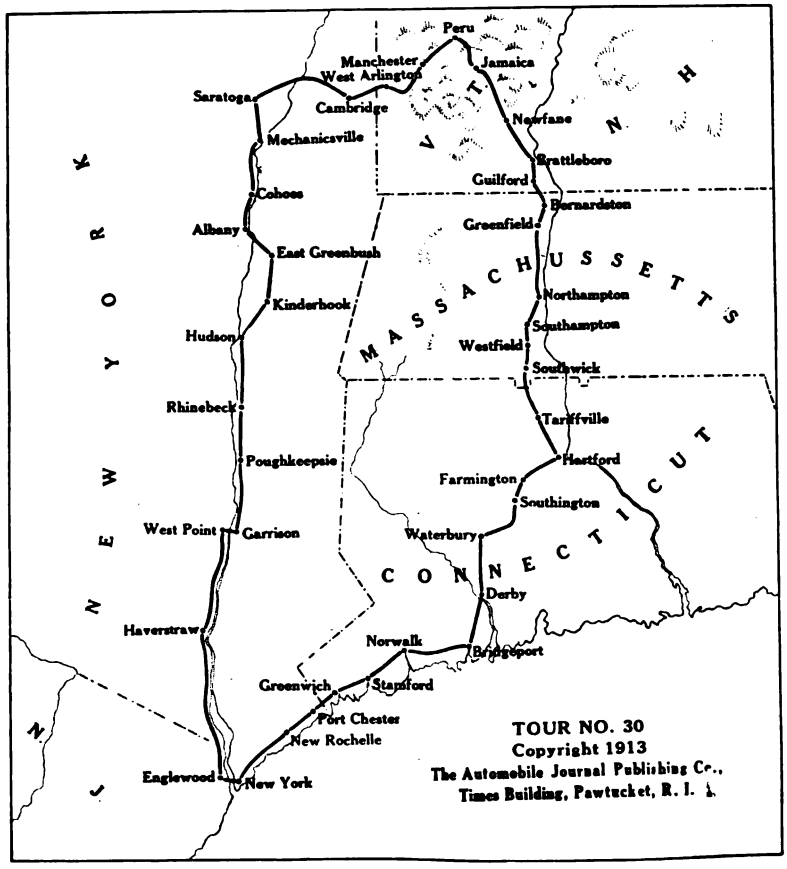


View of Southington Mountain, Near Waterbury, Conn., with Hanging Hills of Meriden in the Distance.

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Garrison-West Point ferry, visiting the United States military academy and running down the west bank of the river, where some of the grandest scenery in America is to be seen. Magnificent views of the Palisades are to be had as the city is approached, and the roads are of macadam practically the whole distance. Return might be made from Nanuet over itinerary No. 51 by way of Tarrytown, thus avoiding entering the State of New Jersey.

Larchmont	1.8	18.5	69.7
Mamaroneck	1.6	20.1	68.1
Rye	3.7	23.8	64.4
Port Chester	1.7	25.5	62.7
Greenwich, Conn.	3.1	28.6	59.6
Mianus	2.4	31.0	57.2
Stamford	2.7	33.7	54.5
Darien	4.5	38.2	50.0
Norwalk	4.2	42.4	45.8
Westport	3.3	45.7	42.5
Southport	4.2	49.9	38.3
Fairfield	1.6	51.5	36.7
Bridgeport	4.5	56.0	32.2
Stratford	3.8	59.8	28.4
Shelton	10.1	69.9	18.3
Derby	0.3	70.2	18.0
Seymour	5.7	75.9	12.3
Naugatuck	7.5	83.4	4.8
Waterbury	4.8	88.2	0.0



ITINERARY NO. 30.

Night Stops—New York City, Waterbury, Conn.; Brattleboro, Vt.; Saratoga and Poughkeepsie, N. Y. Five Days, 503.5 Miles.

New York-Waterbury, 88.2 Miles.

	Miles to	Total Miles Out	Return
New York	0.0	0.0	88.2
New Rochelle	16.7	16.7	71.5

Waterbury-Brattleboro, 116 Miles.

	Miles to	Total Miles Out	Return
Waterbury	0.0	0.0	116.0
Millidale	8.0	8.0	108.0
Plantsville	2.2	10.2	105.8
Southington	1.6	11.8	104.2
Plainville	4.9	16.7	99.3
Farmington	4.6	21.3	94.7
West Hartford	5.5	26.8	89.2
Hartford	3.7	30.5	85.5
Bloomfield	6.1	36.6	79.4
Tariffville	6.1	42.7	73.3
Granby	3.4	46.1	69.9
Mechanicsville	1.2	47.3	68.7
Southwick, Mass.	6.5	53.8	62.2
Westfield	5.2	59.0	57.0
Southampton	7.9	66.9	49.1
Easthampton	4.6	71.5	44.5
Northampton	4.3	75.8	40.2
South Deerfield	11.5	87.3	28.7
Deerfield	5.1	92.4	23.6
Greenfield	3.4	95.8	20.2
Bernardston	6.6	102.4	13.6
Guilford, Vt.	11.0	113.4	2.6
Brattleboro	2.6	116.0	0.0

Brattleboro-Saratoga, 102.6 Miles.

	Miles to	Total Miles Out	Return
Brattleboro	0.0	0.0	102.6
W. Dummerston	6.2	6.2	96.4
Newfane	5.6	11.8	90.8
Townshend	4.4	16.2	86.4
West Townshend	4.9	21.1	81.5
Jamaica	4.5	25.6	77.0
Rawsonville	5.0	30.6	72.0
S. Londonderry	3.8	34.4	68.2
Peru	6.4	40.8	61.8
Manchester Depot	9.5	50.3	52.3
Manchester	1.7	52.0	50.6
Arlington	8.1	60.1	42.5
W. Arlington	3.3	63.4	39.2
Cambridge, N. Y.	13.7	77.1	25.5
Coila	1.3	78.4	24.2
Greenwich	7.1	85.5	17.1
Schuylerville	5.9	91.4	11.2
Saratoga	11.2	102.6	0.0

Saratoga-Poughkeepsie, 113.5 Miles.

	Miles to	Total Miles Out	Return
Saratoga	0.0	0.0	113.5
Malta	8.1	8.1	105.4
Maltaville	2.6	10.7	102.8
Mechanicsville	5.7	16.4	97.1
Waterford	8.6	25.0	88.5
Cohoes	1.9	26.9	86.6
Latham Corners	4.5	31.4	82.1
Loudonville	3.1	34.5	79.0
Albany	4.5	39.0	74.5
Rensselaer	1.0	40.0	73.5
East Greenbush	4.5	44.5	69.0
Schodack Center	1.7	46.2	67.3
Kinderhook	13.4	59.6	53.9
Stuyvesant Falls	3.8	63.4	50.1
Rossmans	2.6	66.0	47.5
Stockport	0.5	66.5	47.0
Stockville	2.2	68.7	44.8
Hudson	3.4	72.1	41.4
Blue Stores	10.2	82.3	31.2
Upper Red Hook	6.5	88.8	24.7
Red Hook	2.5	91.3	22.2
Rhinebeck	5.9	97.2	16.3
Hyde Park	10.3	107.5	6.0
Poughkeepsie	6.0	113.5	0.0

Poughkeepsie-New York, 83.2 Miles.

	Miles to	Total Miles Out	Return
Poughkeepsie	0.0	0.0	83.2
Wappinger Falls	7.7	7.7	75.5
Hughsonville	1.4	9.1	74.1
Fishkill Landing	6.1	15.2	68.0
Cold Spring	7.5	22.7	60.5
Garrison	4.8	27.5	55.7
Ferry to West Point.			
Highland Falls	6.3	33.8	49.4
North Haverstraw	8.4	42.2	41.0
West Haverstraw	1.4	43.6	39.6
Haverstraw	1.7	45.3	37.9
New City	5.1	50.4	32.8
Nanuet	4.3	54.7	28.5
Pearl River	3.3	58.0	25.2
Montvale	1.4	59.4	23.8
Park Ridge	0.8	60.2	23.0
Woodcliff Lake	0.8	61.0	22.2
Hillside	1.3	62.3	20.9
Westwood	0.8	63.2	20.0
Emerson	1.6	64.8	18.4
Oradell	2.4	67.2	16.0
Englewood, N. J.	6.4	73.6	9.6
Edgewater	5.6	79.2	4.0
New York	4.0	83.2	0.0

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THE ADIRONDACKS AND CANADIAN POINTS.

Visiting Mountains and Lakes of Northern New York, Crossing the Border to Montreal, Ottawa and Toronto, and Returning by Way of Niagara Falls.

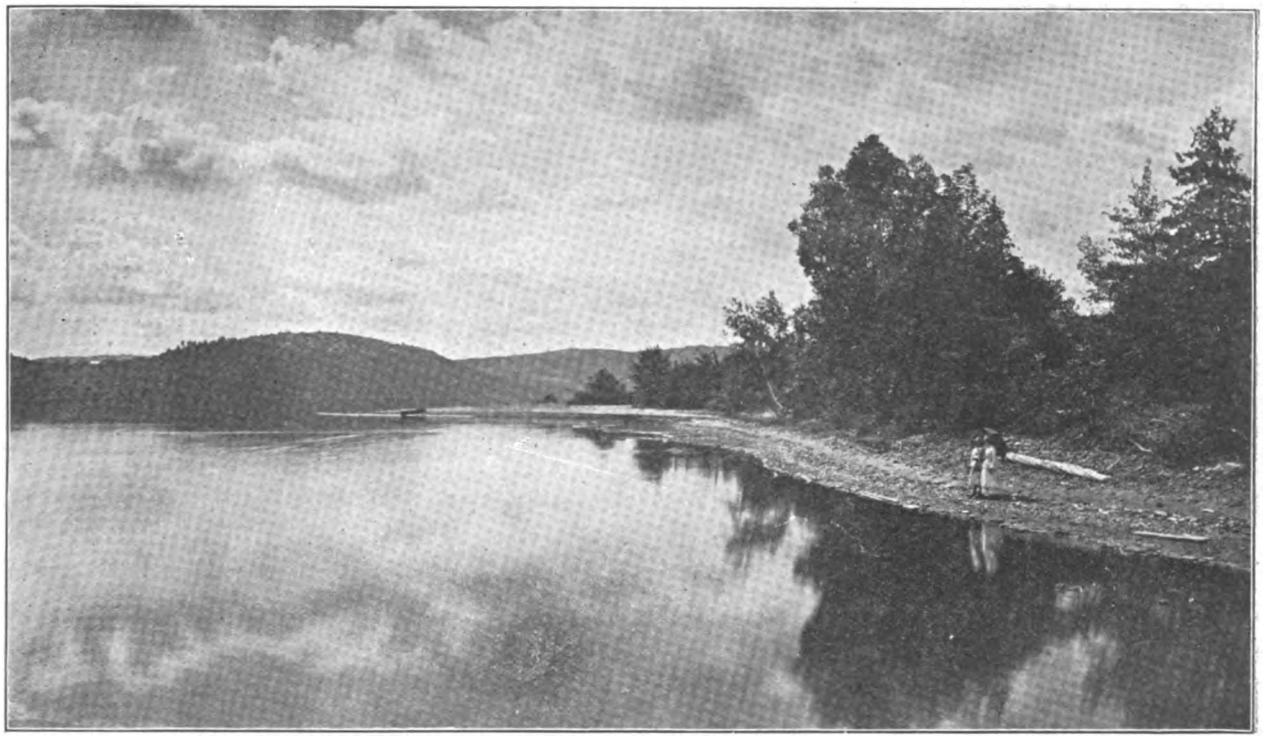
COMBINING some of the most interesting touring ground in the Dominion of Canada with the Adirondack region and a portion of the transcontinental route through central New York State, this itinerary contemplates that the motorist will start from Albany. The route the first day is along the Hudson for a time, until the Falls of the Mohawk are reached north of Cohoes, and then away from the river to Saratoga.

For years Lake George has been a favored resort of those who love the beautiful in nature. The lake itself is 35 miles long and in some places four miles wide. The hills and vales of the neighborhood, as well as the waters themselves, witnessed many fierce engagements during the French and Indian, and Revolutionary wars. A few miles distant is Loon lake, one of several by that name in this region, although not so well known as that other in the extreme northern part of the state.

Schroon lake is indeed a pretty sheet of water, 10 miles long and at an elevation of 807 feet. The valley of the Schroon river is next followed until the low divide is crossed, and the route then lies along the Pleasant valley to Elizabethtown. The way becomes rough and more mountainous at this point, albeit the views are among the best to be found in the entire Adirondack region.

Considerable road work has been accomplished in the Keene valley and the motorist should have little difficulty in making Cascade Lake for the night stop. There are two of the lakes, and the scenery about them is held to be unsurpassed. Those who desire may spend some little time in this section, the roads now being in condition to permit of reaching many of the camps by automobile.

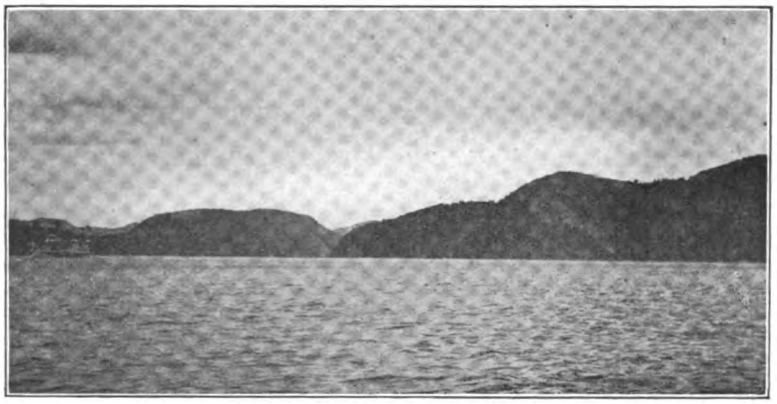
The tourist is now in the Adirondack foothills, and may visit the famous Ausable Chasm, with its grand succession of cascades and gorges early the third day. Keeseville, on the lake near the Chasm, is the turning point toward Canada, which is entered by way of Plattsburg and Chazy, at Rouse's Point. Here the customs regulations will have to be observed, licenses, customs bond and numbers being secured at a reasonable fee, as well as the necessary papers for readmission of the



Beautiful Schroon Lake in the Foothills of the Adirondacks and Surrounded by New York's Historic Ground.

While Saratoga Springs is not the resort it once was, the mineral springs have lost none of their interest. There are still many handsome buildings and the city is by no means deserted. A short distance further along is Glens Falls, intimately associated with recollections of Uncas, the last of the Mohicans, so graphically portrayed in Cooper's romance. It was also the scene of a decisive battle between the French and English in 1755.

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Brant Lake Vies with the Mountains in Tempting the Tourist.

tourist to the United States.

At St. Johns, Que., a chain of forts existed for years, extending along the Richelieu river from Sorel to Lake Champlain. It was the scene of a 45 days' siege by the Americans in 1775, at the end of which it fell and was destroyed. The St. Johns of today boasts of some excellent hotels and fine shops, as stores are termed on that side of the line, and also possesses a large barracks and military school. Across the river is Iberville, in which there is a curiously constructed church tower, reminding the tourist of the Turkish mosques, from the turrets of which the Moslems call the people to prayer.

Montreal is replete with the historic and the interesting, both as the result of nature and man's handiwork. It has been successively under French and English rule, and was for a time in the hands of the Americans. In 1776, the commissioners of the Continental Congress, Benjamin Franklin, Samuel Chase and Charles Carroll, held council in the Chateau de Ramezay. The city was the scene of many battles between the Indians and white men, French, English and Americans and is filled with historic tablets and monuments.

The third day takes the tourist from Montreal to Ottawa. The road is of clay and in wet weather is practically impassable. Should the tourist happen to reach this point under such circumstances, he is earnestly advised to ship his car by way of boat to Kingston, and rejoin the route at that point. A somewhat better road lies along the shores of the St. Lawrence river joining this route at Prescott, but if conditions are favorable it will pay the tourist to make the trip to Ottawa, as originally planned.

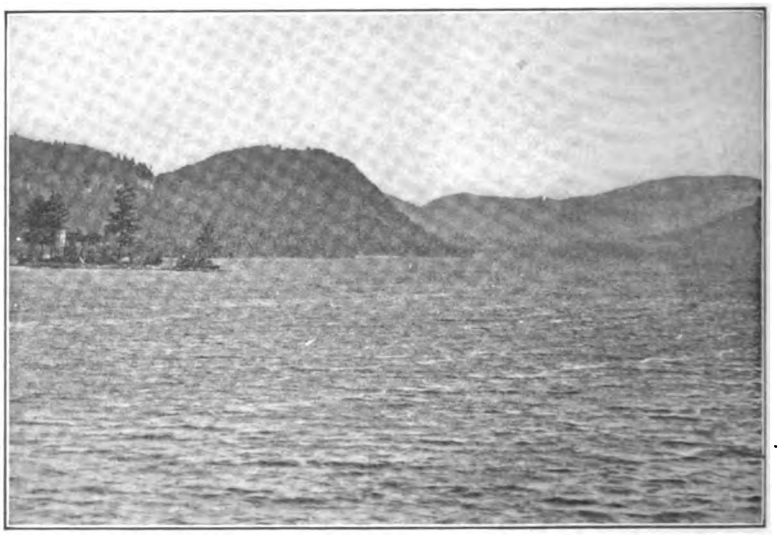
The way leads across Montreal Island, thence across the Isle of Jesus and along the shores of the Lake of Two Mountains to St. Andrews East on the River du Nord. It then lies to Carillon and across the Ottawa river to Point Fortune, following the south shore of this river to Little Rideau and L'Original. At this point it turns away from the river to Alfred and Plantagenet, and back again to the Ottawa at Wendover, skirting the river again to Clarence, Rockland, Cumberland and Orleans.

Ottawa is of interest because of its being the seat of the Canadian government, the buildings of which are situated on a picturesque bluff 150 feet high, overlooking the Ottawa river. They comprise three blocks of departmental buildings, the House of Parliament occupying the fourth side of the square. The famous Chaudiere Falls, where the river dashes over a ledge of rock 1260 feet high, are located in the west end of the city and furnish power for extensive lumber operations as well as lighting and street railway plants.

The fourth day finds the tourist on good roads once more, turning back toward the States. The St. Lawrence is reached at Morrisburg and is followed to Prescott, opposite Ogdensburg, N. Y., where the boat may be taken to Niagara-on-the-Lake. Just below Prescott is the famous Patriot's Windmill, the scene of a bloody conflict in the uprising of 1837. The old mill is now a lighthouse. In making the water trip from the Thousand Islands to Montreal, passengers change at Prescott for smaller boats, more suitable for shooting rapids, some of which are passed on this tour.

The route follows the north shore of the river to Brockville, from which point there is a ferry to Morristown, N. Y. The road now turns away from the St. Lawrence for a time, though within sight of the beautiful Thousand Islands, which are seen still better at Gananoque. The Rideau river is crossed at Kingston, the night stop.

Kingston is a quaint, attractive city and will reward amply a few hours' sight-seeing. The fine busi-



Anthony's Nose and Rogers' Rock on the Banks of Lake George, N. Y.

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ness blocks and public buildings offer a pleasing contrast to the old forts and other evidences of early occupation. Among the interesting places to visit are Fort Henry, the Royal Military College (Canada's West Point), Queen's University and St. George's Cathedral.

The fifth day's route skirts the north shore of Lake Ontario all the way into Toronto. Many splendid views of this immense inland lake are afforded, as the road follows the shore line for many miles. None of the towns en route are large, but offer sufficient opportunity to study the people and furnish a safe source of fuel supply at all times.

Toronto is a beautiful modern city, rich in architectural attractions and containing many eminent institutions of learning. Its extensive parks, broad avenues and pleasant environs make it exceedingly interesting to tourists. Located on the lake for some distance on either side of the city are numerous summer resorts, and Toronto is the centre from which these may be reached. If visited in the first week of September, the annual fair is worthy of a couple of days' stop.

The sixth day ends at Niagara Falls, one of the greatest wonders of the American continent. The tip of Lake Ontario is rounded at Hamilton, and from that point the roaring of the mighty cataract begins to penetrate above the humming of the motor. The approach to the falls from the Canadian side is perhaps a little less beautiful than from the American, still, there is so much that is grand and awe inspiring concerning the spectacle that comparisons seem out of place.

The customs regulations will have to be arranged at the Falls. Naturally, the tourist will desire some little time for exploration, and fortunately, the roads throughout the day's trip are such that the whole afternoon ought easily to be available. The trip to Queenstown Heights and Brock's monument is advised, especially. The short 20-mile drive to Buffalo can be made comfortably in the cool of the evening.

Buffalo may be considered the gateway to the immense touring country from the West. Similarly, it might be added, that the tourist could so plan an extension of his vacation to include portions of the Middle West before returning.

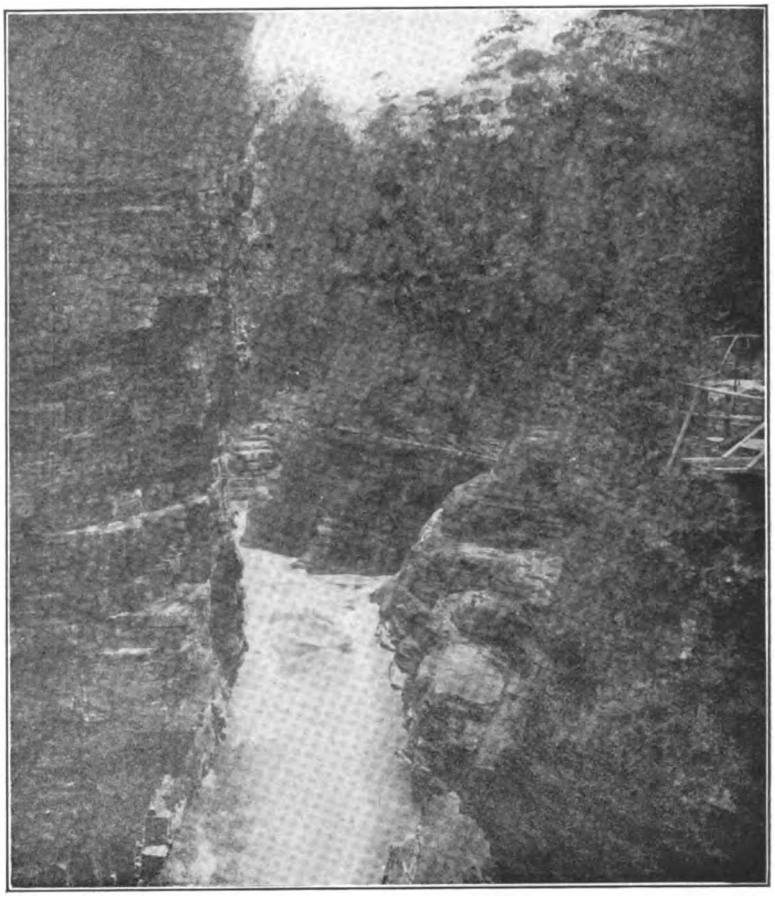
The return trip from Buffalo is almost too well known by motorists to need extended comment. There should be little trouble except in the so-called Montezuma swamp between Montezuma and Port Byron, and then only in wet weather. Among the points of interest on the way may be mentioned the home of Joseph Smith, the founder of Mormonism, at Palmyra, where he claimed to have discovered the golden plates of the Book of Mormon. Nearby is the village of Hydesville, the home of the Fox sisters, who were instrumental in establishing Spiritualism. Three miles north of Oneida is located the famous Oneida Community, founded in 1847. South of this town is the Oneida Indian reservation, from which excellent views of Oneida lake may be obtained. The last portion of the tour is along the Mohawk valley.

ITINERARY NO. 40.

Night Stops—Albany and Cascade Lake, N. Y.; Montreal, Ottawa, Kingston and Toronto, Can.; Buffalo and Syracuse, N. Y. Eight Days, 1127.9 Miles.

Albany-Cascade Lake, 152.4 Miles.

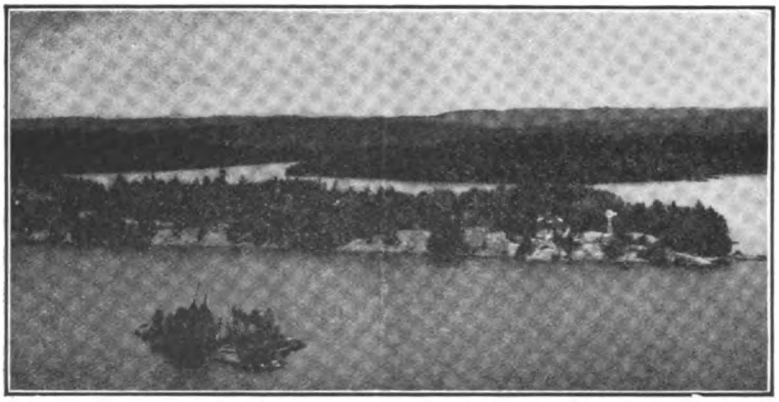
	Miles to	Total Miles Out	Return
Albany	0.0	0.0	152.4



Where the River Has Made Its Mark in the Ausable Chasm, N. Y.

Loudenville	4.5	4.5	147.9
Newtonville	1.4	5.9	146.5
Lathams Corners	1.7	7.6	144.8
Cohoes	4.5	12.1	140.3
Waterford	1.9	14.0	138.4
Mechanicsville	8.6	22.6	129.8
Maltaville	6.1	28.7	123.7
Malta	2.2	30.9	121.5
Saratoga	8.1	39.0	113.4
Wilton	7.8	46.8	105.6
Glens Falls	11.3	58.1	94.3
Frenchmont	4.3	62.4	90.0
Lake George	3.8	66.2	86.2
Warrensburg	6.5	72.7	79.7
Chestertown	12.5	85.2	67.2
Loon Lake	4.0	89.2	63.2

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The Beautiful Muskoka Lake Country, North of Ottawa, Canada.

Pottersville	4.9	94.1	58.3
Taylors-on-Schroon	3.8	97.9	54.5
Schroon Lake	5.7	103.6	48.8
Schroon River	9.1	112.7	39.7
Elizabethtown	22.6	135.3	17.1
Keene	12.4	147.7	4.7
Cascade Lake	4.7	152.4	0.0

Cascade Lake-Montreal, 129.3 Miles.

	Miles to	Total Miles Out	Return
Cascade Lake	0.0	0.0	129.3
Keene	4.7	4.7	124.6
Upper Jay	6.1	10.8	118.5
Jay	3.7	14.5	114.8
Ausable Forks	6.1	20.6	108.7
Clintonville	5.4	26.0	103.3
Keeseville	6.3	32.3	97.0
Peru	6.1	38.4	90.9
Plattsburg	9.7	48.1	81.2
Halsey Corner	1.5	49.6	79.7
E. Beekmantown	3.1	52.7	76.6
Beekmantown	2.0	54.7	74.6
West Chazy	3.7	58.4	70.9
Chazy	6.4	64.8	64.5
Champlain	7.0	71.8	57.5
Rouse's Point	5.1	76.9	52.4
La Colle Junction, Que.	5.3	82.2	47.1
St. Pauls	6.4	88.6	40.7
St. Johns	12.4	101.0	28.3
Chambly	11.4	112.4	16.9
St. Hubert	8.9	121.3	8.0
Longueuil	5.0	126.3	3.0
Montreal	3.0	129.3	0.0

Montreal-Ottawa, 121 Miles.

	Miles to	Total Miles Out	Return
Montreal	0.0	0.0	121.0
St. Laurent	6.9	6.9	114.1
Borde a Plouffe	4.1	11.0	110.0
St. Martin	1.6	12.6	108.4
St. Eustace	7.9	20.5	100.5
St. Benoit	11.3	31.8	89.2
St. Placide	6.4	38.2	82.8
St. Andrews East	8.4	46.6	74.4
Carrillon	2.2	48.8	72.2
Ferry to Point Fortune.			
Little Rideau	5.4	54.2	66.8
Hawkesbury	7.7	61.9	59.1
L'Original	3.1	65.0	56.0
Cassburn	2.5	67.5	53.5
Alfred	10.0	77.5	43.5
Plantagenet	7.0	84.5	36.5
Wendover	6.0	90.5	30.5
Clarence	5.5	96.0	25.0
Rockland	2.5	98.5	22.5
Cumberland	5.0	103.5	17.5
Orleans	7.0	110.5	10.5
Ottawa	10.5	121.0	0.0

Ottawa-Kingston, 132.5 Miles.

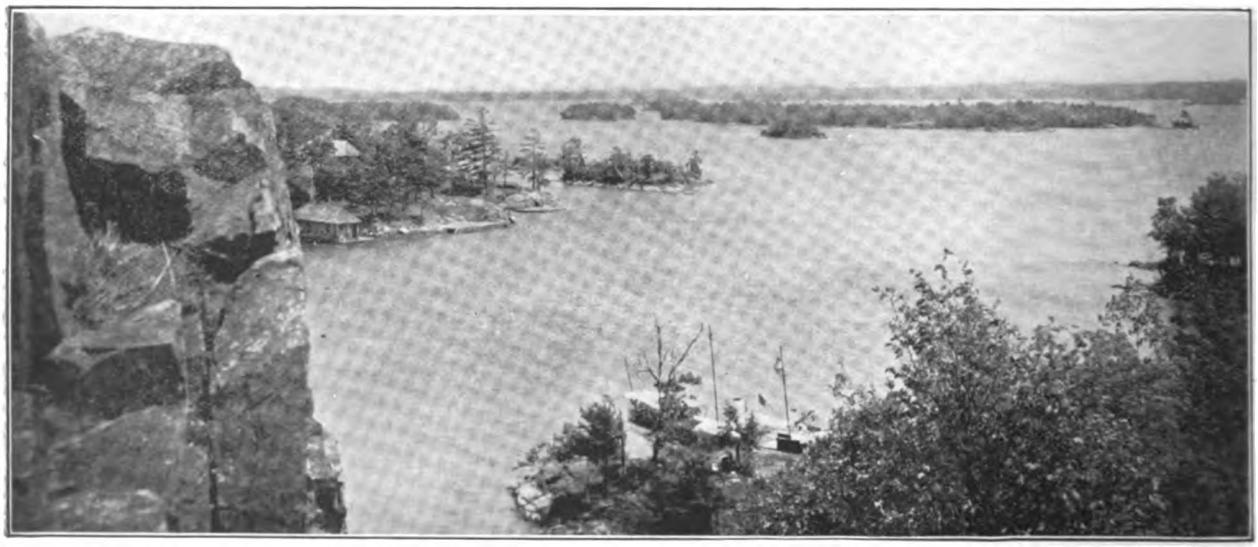
	Miles to	Total Miles Out	Return
Ottawa	0.0	0.0	132.5
S. Gloucester	13.0	13.0	119.5
Metcalf	4.0	17.0	115.5
Ormond	8.0	25.0	107.5
Winchester	4.0	29.0	103.5
Cass Bridge	3.5	32.5	100.0
Williamsburg	8.5	41.0	91.5
Morrisburg	6.0	47.0	85.5
Iroquois	6.0	53.0	79.5
Cardinal	5.5	58.5	74.0
Prescott	9.6	68.1	64.4
Brockville	12.2	80.3	52.2
Lyn Village	6.3	86.6	45.9
Gananoque	27.3	113.9	18.6
Kingston	18.6	132.5	0.0

Kingston-Toronto, 165 Miles.

	Miles to	Total Miles Out	Return
Kingston	0.0	0.0	165.0
Catoraqui	3.6	3.6	161.4
Napanece	21.9	25.5	139.5
Maryville	8.4	33.9	131.1
Shannonville	6.7	40.6	124.4
Belleville	8.8	49.4	115.6
Trenton	11.3	60.7	104.3
Brighton	9.4	70.1	94.9
Colborne	8.3	78.4	86.6
Grafton	7.8	86.2	78.8
Cobourg	7.6	93.8	71.2
Port Hope	7.4	101.2	63.8
Welcome	3.1	104.3	60.7
Newcastle	13.3	117.6	47.4
Boumanville	5.2	122.8	42.2
Oshawa	9.4	132.2	32.8
Whitby	4.2	136.4	28.6
Pickering	6.1	142.5	22.5
Liverpool	2.2	144.7	20.3
Riverdale	18.5	163.2	1.8
Toronto	1.8	165.0	0.0

Toronto-Buffalo, 120.1 Miles.

	Miles to	Total Miles Out	Return
Toronto	0.0	0.0	120.1
Cooksville	16.3	16.3	103.8
Erindale	3.3	19.6	100.5
Trafalgar Village	5.1	24.7	95.4
Appleby	10.3	35.0	85.1
Freeman	3.8	38.8	81.3
Aldershot	2.8	41.6	78.5
Hamilton	5.4	47.0	73.1



The Thousand Islands of the St. Lawrence River, Viewed from Owl's Point, Near Kingston, Ont.

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Stony Creek	6.7	53.7	66.4
Winona	5.6	59.3	60.8
Grimsby	5.1	64.4	55.7
Beamsville	4.9	69.3	50.8
Vineland	4.2	73.5	46.6
Jordan	1.8	75.3	44.8
St. Catharines	7.1	82.4	37.7
Homer	3.3	85.7	34.4
St. Davids	4.9	90.6	29.5
Stamford	2.1	92.7	27.4
Niagara Falls, Ont.	4.8	97.5	22.6
Niagara Falls, N. Y.	1.0	98.5	21.6
Echota Station	2.5	101.0	19.1
La Salle	3.0	104.0	16.1
N. Tonawanda	6.2	110.2	9.9
Tonawanda	0.4	110.6	9.5
Buffalo	9.5	120.1	0.0

Buffalo-Syracuse, 162.0 Miles.

	Miles to	Total Miles Out	Return
Buffalo	0.0	0.0	162.0
Williamsville	9.8	9.8	152.2
Clarence	8.3	18.1	143.9
Pembroke	7.9	26.0	136.0
East Pembroke	6.6	32.6	129.4
Batavia	6.6	39.2	122.8
Byron	9.8	49.0	113.0
Bergen	6.6	55.6	106.4
Churchville	3.4	59.0	103.0
North Chili	4.4	63.4	98.6
Rochester	10.4	73.8	88.2
Brighton	3.2	77.0	85.0
Fairport	6.8	83.8	78.2
Macedon	8.3	92.1	69.9
Yellow Mills	2.7	94.8	67.2
Palmyra	1.2	96.0	66.0
East Palmyra	4.9	100.9	61.1
Newark	4.6	105.5	56.5
Lyons	6.1	111.6	50.4
Lock Berlin	4.2	115.8	46.2
Clyde	4.4	120.2	41.8
Savannah	6.4	126.6	35.4
Montezuma	5.4	132.0	30.0
Port Byron	4.6	136.6	25.4
Weedsport	3.5	140.1	21.9
Elbridge	6.4	146.5	15.5
Camillus	7.2	153.7	8.3
Syracuse	8.3	162.0	0.0

Syracuse-Albany, 145.6 Miles.

	Miles to	Total Miles Out	Return
Syracuse	0.0	0.0	145.6
Fayetteville	7.6	7.6	138.0
Manlius	4.5	12.1	133.5
Sullivan	4.3	16.4	129.2
Canastota	5.1	21.5	124.1
Wampsville	2.2	23.7	121.9
Oneida	3.4	27.1	118.5
Oneida Castle	1.4	28.5	117.1
Vernon	5.2	33.7	111.9
Kirkland Village	8.3	42.0	103.6
New Hartford	5.1	47.1	98.5
Utica	3.5	50.6	95.0
Deerfield	1.4	52.0	93.6
West Schuyler	1.0	53.0	92.6
Ilion	10.4	63.4	82.2
Herkimer	2.7	66.1	79.5
Little Falls	7.3	73.4	72.2
St. Johnsville	10.5	83.9	61.7
Palatine Bridge	8.8	92.7	52.9
Yost's Station	6.2	98.9	46.7
Fonda	5.3	104.2	41.4
Aiken	7.7	111.9	33.7
Amsterdam	3.0	114.9	30.7
Scotia	14.1	129.0	16.6
Schenectady	1.6	130.6	15.0
Albany	15.0	145.6	0.0



Niagara Falls, as Seen from the Canadian Side.

THE LAKES OF CENTRAL NEW YORK.

After a Day in the Vicinity of James Fenimore Cooper's Home, the Tourist Reaches One of America's Most Interesting Groups of Inland Lakes.

FOR those who delight in the romantic, somewhat off the beaten paths, no section of the East contains more charm than the lake district of central New York. Fortunately the towns in the vicinity early recognized the advantages of cultivating automobile touring, inasmuch as they are not a little neglected by the railroads. Their delightful scenery is such as to merit wide attention on the part of the tourist and the motor car has done much to bring these beauties within easy reach.

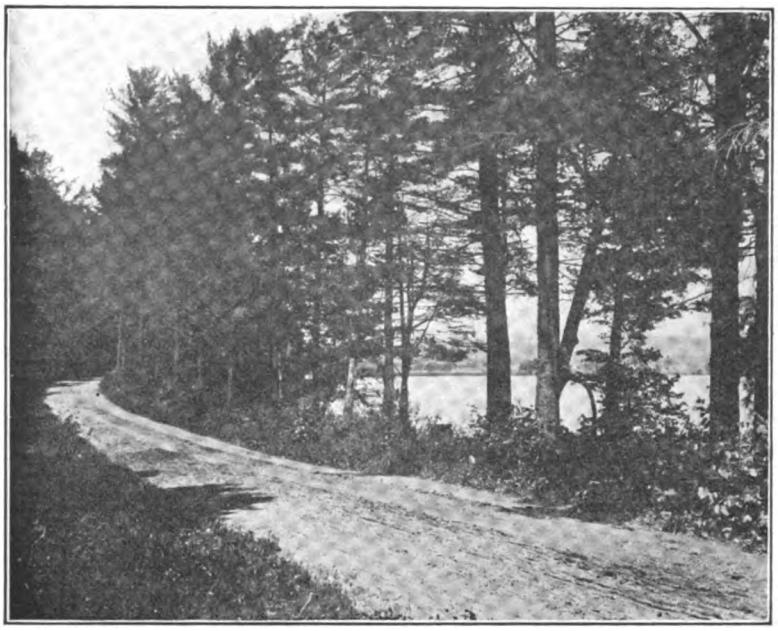
Leaving Binghamton the morning of the first day, the tour follows the valley of the Susquehanna river for some distance, skirting the foothills of the Catskill mountains, particularly as the route nears Oneonta. Numerous small lakes and pretty little trout brooks divide attention with the hills and mountains in the distance, but it is not until Cooperstown is reached that it may be said the lake region is entered.

Cooperstown, the home of James Fenimore Cooper, is on the shore of Otsego lake, and this entire region has been so touched by his genius as to be familiar ground to those who revel in his works. In a park at the centre of the town is a boulder surmounted by the figure of an Indian, which marks the spot where Cooper lived. Fairly good roads encircle the lake, and time might be spent profitably in catching numerous glimpses of its remarkable beauty on this side trip.

The night stop is at Richfield Springs on Canandarago lake, better known by the name of Schuyler. No more inspiring views are to be found anywhere on the American continent than in this vicinity. It is extremely doubtful if the tourist will be satisfied with a night stop at this point, but other lakes still further along offer other charms, and it will be hard for the motorist to decide just how much time he may allow himself away from home.

The second day's run enters the Mohawk valley, which is followed into Syracuse, not forgetting to

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Pine Grove Drive, a Pleasing Scene Near Richfield Springs, N. Y.

mention Cazenovia, a summer resort of considerable repute situated at the foot of a pretty little lake, which empties into Lake Oneida. Time should permit of taking the pleasing little drive about the shores of this sheet of water. After leaving Syracuse, the main route through central New York is followed for a time, practically into Geneva.

Auburn is on Cayuga lake, which may be skirted if it is desired to extend the tour beyond the three days originally planned. This additional mileage will amply repay, as there are many attractions within easy driving distance. Among these may be mentioned Taghanic falls, at the end of a gorge a mile long and 400 feet deep, where the water takes a sheer drop of 250 feet, higher than Niagara.

Geneva is on Seneca lake, which is reached along the banks of the Seneca river from Seneca Falls, after the Montezuma marshes are passed. This lake is considered the most picturesque of the entire group. It is 38 miles long and from two to six miles wide. Steamers may be taken from Geneva to Watkins, if more time is desired for exploring portions of this district. This route anticipates making Penn Yan, on the shores of Keuka lake, the night stop.

Penn Yan is some 900 feet above the level of Seneca lake, and the road from Geneva is a gradual rise, although it can be made practically all of the way on high speed. Possibly it will be well to continue the journey about two miles south of the city itself for the night stop, as here opportunity is afforded to spend the night on the banks of the lake in a new hostelry, which is famed throughout this district for treatment accorded to motorists.

The third day finds the tourist between the two arms of the lake on his way to Bluff Point, 700 feet above the surface of Keuka, which is 900 feet above the level of Seneca. From this elevation an extensive view of the surrounding country is obtained, a clear day affording glimpses of four counties. Looking down upon the lake itself, the visitor is surprised to see what appears to be a toy steamboat, and finds it hard to believe it is one of the large lake steamers with a capacity of 400 to 500 people. Immediately below a reflection of glistening oars and little specks on the water, not unlike a school of minnows, prove to be full sized rowboats filled with fishing parties.

Keuka lake is in the centre of the rich grape country, and the district is famed for its wines and champagnes. None the least of the pleasing pictures from Bluff Point are the vine clad, ravine broken hills, many of which will be visited on the trip from Bluff Point to Hammondsport, but first the tourist must turn north to get around the lower end of the other arm of the lake at Branchport.

From Branchport to Hammondsport is a steady drop, with the lake level lost to view. On either side are to be seen the vineyards, and at Hammondsport, 300 feet above the surface of the lake, the tourist finds a view to the northward, which for breadth, distance and picturesque



One of the Many Interesting Trout Streams in the Foothills of the Catskills.

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beauty is to be equalled nowhere.

Hammondsport is the home of Glenn H. Curtiss, and his plant for the manufacture of aeroplanes. A visit to this industry will offer a pleasing diversion, as many of the Curtiss aviators are continually testing out new machines in the vicinity of the city. Recent activities have been in connection with the perfection of the hydaeroplane, and the waters of the lake are utilized by the United States naval students of aviation as well as the Curtiss instructors in exploiting the latest inventions.

Turning eastward again, the way leads past Lake Wauneta, between Weston and Wayne, and then on to Watkins, at the southern end of Seneca lake. Here, time should be spent in visiting the famous Watkins Glen, one of the most remarkable of nature's wonders, now a state park.

During the ages the small stream, in making its way from the hills to Seneca lake, has worn a deep gorge in the soft rock at this point, until now the water tumbles over a series of gorges, some of them nearly 200 feet deep. Sometimes the cut is no more than 10 feet wide, while at others it broadens out into vast amphitheatres, in which the echo of the tourist's voice sounds wierd and almost supernatural. This chasm penetrates the hills for three miles, winding and curving abruptly, and presenting an almost infinite variety of rocky and picturesque scenes.

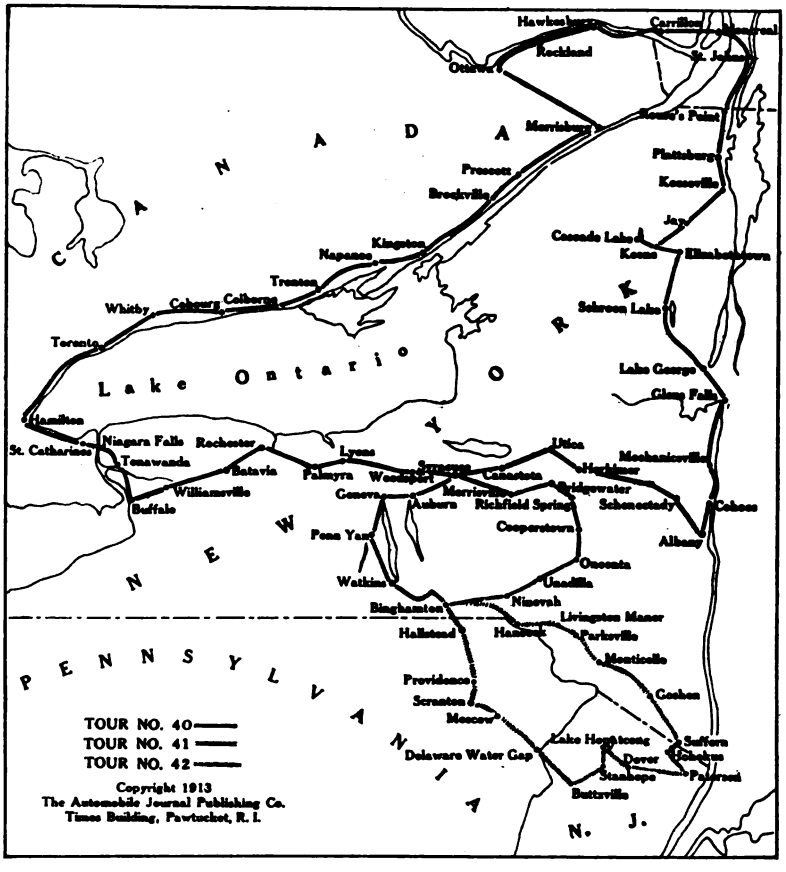
The return to Binghamton is over the divide into the Susquehanna valley. The country is still picturesque, although by no means as romantic in its beauty as that which has occupied the tourist for the greater portion of three days. The road is excellent, while not of macadam, and good time can be made.

ITINERARY NO. 41.

Eight Stops—Binghamton, Richfield Springs and Penn Yan, N. Y. Three Days, 372.1 Miles.

Binghamton-Richfield Springs, 100.4 Miles.

	Miles to	Total Miles Out	Return
Binghamton	0.0	0.0	100.4
Port Crane	7.2	7.2	93.2
Sanitaria Springs	3.4	10.6	89.8
Belden	6.2	16.8	83.6
Harpursville	3.6	20.4	80.0
Nineveh	1.7	22.1	78.3
Afton	5.3	27.4	73.0
Bainbridge	5.3	32.7	67.7
Unadilla	10.8	43.5	56.9
Wellsbridge	5.1	48.6	51.8
Otego	4.4	53.0	47.4
Oneonta	8.4	61.4	39.0
Colliers	5.5	66.9	33.5
Milford Center	2.4	69.3	31.1
Portlandville	1.3	70.6	29.8
Milford	4.6	75.2	25.2
Bartwick	4.3	79.5	20.9
Cooperstown	4.3	83.8	16.6
Springfield Center	9.9	93.7	6.7
Warren	3.6	97.3	3.1
Richfield Springs	3.1	100.4	0.0



Richfield Springs-Penn Yan, 138.6 Miles.

	Miles to	Total Miles Out	Return
Richfield Springs	0.0	0.0	138.6
East Winfield	9.1	9.1	129.5
West Winfield	2.2	11.3	127.3
Bridgewater	3.5	14.8	123.8
Sangerfield	7.5	22.3	116.3
Madison	6.1	28.4	110.2
Bouckville	3.2	31.6	107.0
Pine Woods	1.2	32.8	105.8
Morrisville	4.3	37.1	101.5
Nelson	3.9	41.0	97.6
Cazenovia	7.1	48.1	90.5
Oran	6.3	54.4	84.2
Manlius	2.9	57.3	81.3
Fayetteville	2.8	60.1	78.5
Syracuse	7.6	67.7	70.9
Camillus	8.3	76.0	62.6
Elbridge	7.2	83.2	55.4
Sennett	5.3	88.5	50.1
Auburn	5.2	93.7	44.9
Seneca Falls	12.8	106.5	32.1
Waterloo	3.6	110.1	28.5
Geneva	6.9	117.0	21.6
Flint	7.2	124.2	14.4
Halls Corners	6.2	130.4	8.2
Benton Center	4.2	134.6	4.0
Penn Yan	4.0	138.6	0.0

Penn Yan-Binghamton, 133.1 Miles.

	Miles to	Total Miles Out	Return
Penn Yan	0.0	0.0	133.1
Bluff Point	11.9	11.9	121.2
Branchport	7.8	19.7	113.4
Catawba	8.1	27.8	105.3
Urbana	6.2	34.0	99.1
Hammondsport	4.8	38.8	94.3
Wayne	8.6	47.4	85.7
Lake Wauneta	3.9	51.3	81.8
Weston	0.7	52.0	81.1
Tyronne	1.1	53.1	80.0
Watkins	9.9	63.0	70.1
Montour Falls	2.3	65.3	67.8
Odessa	3.8	69.1	64.0
Alpine	4.1	73.2	59.9
Cayuta	3.0	76.2	56.9
Vanetta	9.9	86.1	47.0
Spencer	3.3	89.4	43.7
Candor	8.6	98.0	35.1
Catatonk	6.0	104.0	29.1
Owego	4.5	108.5	24.6
Appalachan	8.1	116.6	16.5
Vestal	6.2	122.8	10.3
Endicott	1.1	123.9	9.2
Lestershire	5.3	129.2	3.9
Binghamton	3.9	133.1	0.0

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POCONO MOUNTAINS AND SUFFERN HILLS.

Itinerary Covers Northeastern Pennsylvania, Delaware Water Gap, Northern New Jersey and the Wallkill Valley in New York State.

TOUR No. 42 has Binghamton, N. Y., as its starting point, with Delaware Water Gap, Penn., and Suffern, N. Y., as night stops. It covers northeastern Pennsylvania, northern Jersey and the Wallkill valley of New York, and makes a number of connections with other tours outlined herein.

Crossing the Pennsylvania line, the first town of importance is Hallstead, rich in Indian traditions. The tiny gravel point in the middle of the Susquehanna at this place was once an island, around which the savages used to race in canoes, the prize for the swiftest being the honor of chief of the funmakers for the day. High upon the cliffs above the river, at a point seemingly inaccessible, was once a picture of a red chief in full war paint. The picture gradually faded, but the red remained, giving to the cliff its present name of Red Rock.

Scranton is situated in a pocket among the mountains and on the banks of the beautiful Lackawanna. The outskirts of the city are marked by a number of culm banks and coal breakers, bearing eloquent testimony of the unceasing search for coal.



Eastman's Glen in the Vicinity of Livingston Manor, N. Y.

The tour then begins the climb to Mt. Pocono, and descends to Stroudsburg, the views presenting panoramas of waving pine, mountain laurel and rhododendron, which grow in endless profusion along the walks and driveways in this section. The night stop is at Delaware Water Gap.

The second day's run enters New Jersey, climbing into the Schooleys mountain region, and visiting the interesting district about Lake Hopatcong. The roads will be found to be good for the most part, with occasional stretches of macadam. The views of mountains on either side, combined with those of the fertile valley, make this an ideal trip. The night stop is Suffern, N. Y., from which point connection is made with tour No. 51 for the New England states.

Goshen is in the midst of a famed stock producing country. Middletown is the centre from which the famous Orange county milk and butter is shipped to New York City and other points. Highview is located on the eastern slope of the Shawangunk mountains, and as its name implies, affords a broad and extensive view of the valleys and the Catskills. Mamakating is on the other slope of the same mountain, and near this is Mamakating park on the banks of the lake by the same name, a beautiful body of spring water covering 100 acres.

Connection is again made with tour No. 51 at Wurtsboro, on its return from New England points. Within 1.5 miles of Rock Hill are six lakes, besides numerous trout streams, making this town deservedly popular as a fishing ground.

At Ferndale the road crosses the east branch of the Mongaup river, the scenery around which is wild. Liberty falls, nearby, have an added interest. Lake Ophelia at Liberty is a pretty sheet of water, and the highlands about this region form a chain of foothills extending to the Catskills, 20 to 40 miles distant, although in plain view, from the broad plateau on which the town is located.

Parksville is in the heart of an immense trout country. Livingston Manor, at the junction of the Willowemoc and Little Beaverkill rivers, is situated in a wide valley, and the surrounding hills lend

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Chestnut Point at the Head of Lake Hopatcong, N. J.

much to its attractions. Among the points of interest are the celebrated Eastman, Marguerite and Woolsey falls, near the highway.

It is said to be worth 10 years of city life to spend a week among the trout haunts in the vicinity of Cook's falls. At East Branch the Beaverkill pours its spring waters into the Delaware, and bass fishing is said to be the best in the state. The remainder of the distance into Binghamton is by way of Hancock, Rood's Creek, Deposit, Damascus and Windsor.

ITINERARY NO. 42.

Night Stops—Binghamton, N. Y.; Delaware Water Gap, Penn.; Suffern, N. Y. Three Days, 397.8 Miles.

Binghamton-Delaware Water Gap, 112 Miles.

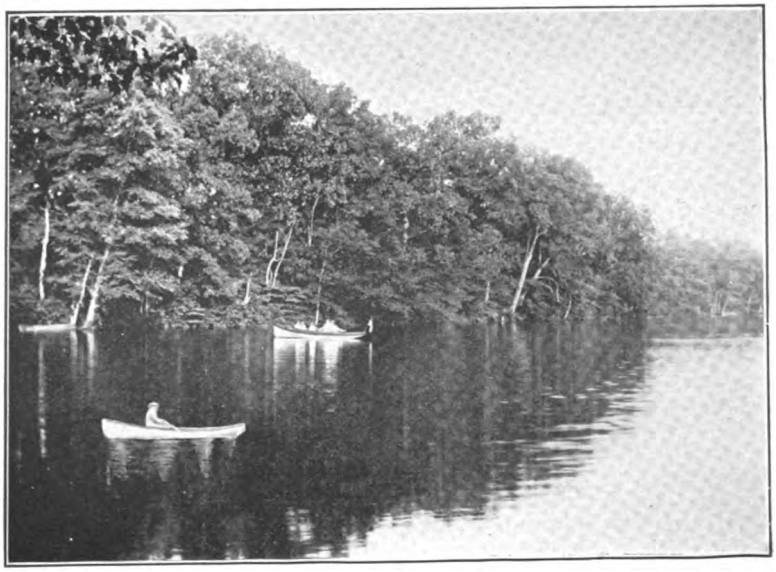
	Miles to	Total Miles Out	Return
Binghamton	0.0	0.0	112.0
Kirkwood	8.9	8.9	103.1
Great Bend, Penn.	5.7	14.6	97.4
Hallstead	0.7	15.3	96.7
New Milford	6.0	21.3	90.7
Harford	7.1	28.4	83.6
Glenwood	10.4	38.8	73.2
Fleetville	3.7	42.5	69.5
Wallsville	2.7	45.2	66.8
Waverly	4.0	49.2	62.8
Clark's Green	2.0	51.2	60.8
Clark's Summit	0.5	51.7	60.3
Chincilla	1.7	53.4	58.6
Providence	3.1	56.5	55.5
Scranton	2.8	59.3	52.7
Elmhurst	8.5	67.8	44.2
Moscow	3.3	71.1	40.9
Gouldsboro	10.3	81.4	30.6
Tobyhanna	5.6	87.0	25.0
Mt. Pocono	5.1	92.1	19.9
Paradise	4.1	96.2	15.8
Henryville	2.8	99.0	13.0
Analomink	4.1	103.1	8.9
Stroudsburg	5.2	108.3	3.7
Delaware Water Gap	3.7	112.0	0.0

Delaware Water Gap-Suffern, 124.8 Miles.

	Miles to	Total Miles Out	Return
Delaware Water Gap	0.0	0.0	124.8
Portland	5.3	5.3	119.5
Myers Ferry	2.9	8.2	116.6
Delaware, N. J.	0.4	8.6	116.2
Bridgeville	5.6	14.2	110.6
Buttzville	1.2	15.4	109.4
Pequest	1.7	17.1	107.7
Townsbury	2.2	19.3	105.5
Danville	2.5	21.8	103.0
Great Meadow	0.5	22.3	102.5
Vienna	1.0	23.3	101.5
Hacketstown	3.9	27.2	97.6
Warrenville	3.7	30.9	93.9
Allamuchy	1.5	32.4	92.4
Andover	6.2	38.6	86.2
Stanhope	6.3	44.9	79.9
Port Morris	1.5	46.4	78.4
Lake Hopatcong	6.3	52.7	72.1
Kenvil	5.5	58.2	66.6
Dover	3.9	62.1	62.7
Rockaway	3.2	65.3	59.5
Denville	2.2	67.5	57.3
Parsippany	3.5	71.0	53.8
Boonton	2.5	73.5	51.3
Montville	1.9	75.4	49.4
Lowaco	2.3	77.7	47.1
Mountain View	4.3	82.0	42.8
Paterson	6.3	88.3	36.5
Hackensack	8.0	96.3	28.5
Arcola	3.5	99.8	25.0
Hohokus	6.2	106.0	18.8
Suffern, N. Y.	18.8	124.8	0.0

Suffern-Binghamton, 161 Miles.

	Miles to	Total Miles Out	Return
Suffern	0.0	0.0	161.0
Ramapoo	1.8	1.8	159.2
Tuxedo	4.7	6.5	154.5
Monroe	10.1	16.6	144.4
Chester	6.7	23.3	137.7
Goshen	4.4	27.7	133.3
Middletown	8.4	36.1	124.9
Highview	8.7	44.8	116.2
Manakating	1.9	46.7	114.3
Wurtsboro	1.6	48.3	112.7
Rock Hill	7.0	55.3	105.7
Bridgeville	1.6	56.9	104.1
Monticello	3.8	60.7	100.3
Bushville	5.7	66.4	94.6
Strongtown	3.3	69.7	91.3
Ferndale	0.9	70.6	90.4
Liberty	2.3	72.9	88.1
Parksville	4.1	77.0	84.0
Livingston Manor	5.6	82.6	78.4
Roscoe	6.7	89.3	71.7
Cooks Falls	6.2	95.5	65.5
Elk Brook	2.8	98.3	62.7
Bealsville	5.0	103.3	57.7
East Branch	1.9	105.2	55.8
Fish's Eddy	4.9	110.1	50.9
Hancock	8.4	118.5	42.5
Rood's Creek	6.0	124.5	36.5
Deposit	6.6	131.1	29.9
Damascus	12.5	143.6	17.4
Windsor	2.2	145.8	15.2
West Windsor	6.7	152.5	8.5
Binghamton	8.5	161.0	0.0



One of the Pretty Lake Scenes at Laurel Springs, N. J.

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CROSSING MOUNTAINOUS PENNSYLVANIA.

Part of the Transcontinental Route from Philadelphia Westward to Pittsburg, Thence to Lake Chatauqua and Buffalo and Return Over the Poconos.

CROSSING and recrossing the mountains of Pennsylvania, the itinerary outlined as No. 50 will make its appeal to those who enjoy rich scenery and are not adverse to testing the merits of the car. The start is made from Philadelphia, and it is possible to utilize portions of this itinerary in making a transcontinental tour from almost any point in the East.

Philadelphia is left by way of the beautiful Fairmount park. Bryn Mawr is the seat of Bryn Mawr College for girls. Paoli is the scene of an American defeat in 1777. Fine views of the Chester valley are obtained a little later. Lancaster was the state capital from 1799 to 1812, when it was removed to Harrisburg. The Susquehanna is crossed at York, which is noted for its slate quarries and old sulphur springs.



One of the Many State Monuments on the Gettysburg Battlefield.

Gettysburg is the most elaborately and accurately marked battlefield in the world, having more monuments and memorials than all other battlefields combined. The National Cemetery is a beautiful spot and the night's stay in this historic environment is none too long. It is possible to locate the points at which the different detachments of the opposing forces made history in the memorable conflict. Seminary ridge, guarded here and there by guns; Cemetery hill, with its earthworks still intact; Culp's hill, with its battle scarred trees; Cemetery ridge, with its long line of monuments; Devil's Den, with its bullet marked boulders; the Peach Orchard, the Whirlpool of Death and the Bloody angle, are all spots that every American desires to visit.

Splendid mountain scenery compensates for the poorer roads leading to Bedford. Chambersburg was the site of Lee's camp, when he decided to march on Gettysburg, and the second day's route thus reverses that taken by the Confederate general after destroying the stores at Chambersburg. Near Bedford are the famous Bedford springs, and some excellent drives are to be enjoyed in this vicinity. Most tourists will desire to make this the night stop, proceeding to Altoona in a separate stage.

The road to Altoona is gradually being turned into macadam. While it is possible to make direct connections with Pittsburg from Bedford, it is more desirable to take the longer itinerary outlined herein. The way leads along the Alleghenies for the entire length. Beyond Altoona the roads are by no means the best in the country, although the rich mountain views obtained amply repay the tourist for visiting the section.

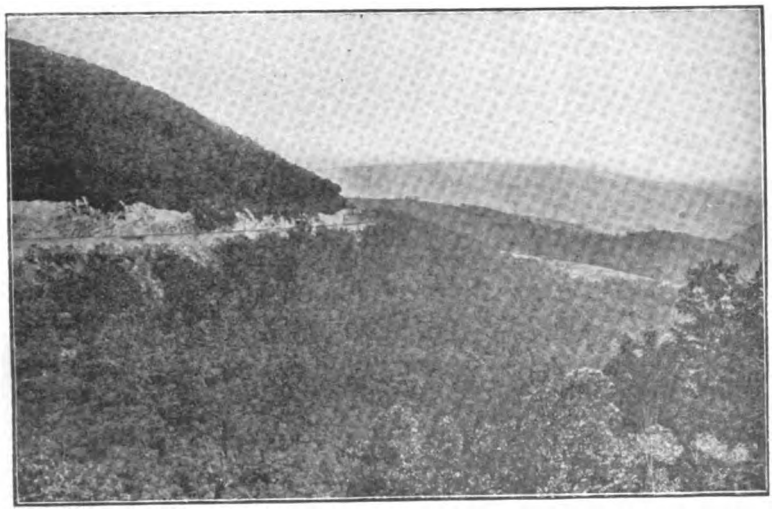
Pittsburg is best known as the Smoky City, and is famous for its steel works. It was settled in 1753 by the French, who built a line of forts along the Ohio and Allegheny rivers, that at this point being named Fort Duquesne. This was destroyed in 1758, and later was succeeded by Fort Pitt. The history of Pittsburg as such dates from 1765. Its commercial advantage is gained through the fact that it is in the centre of the richest coal district in the world.

Across the river is Allegheny, formerly a separate municipality, but incorporated with Pittsburg in 1897. Here may be seen Phipps Conservatory, ranking among the finest in America; the Carnegie Institute and the Carnegie library. In Pittsburg itself is located the Allegheny county court house, the main tower of which is 420 feet high and commands a splendid view of the valley.

The road to Sheffield and Warren is through the oil fields. There are some charming mountain views on the way to Butler, after which the tourist will find plenty to occupy his attention in studying the oil wells. After leaving Warren the next point of interest is Lake Chautauqua, one of the most remarkable sheets of water in western New York. The lake is nearly 20 miles long and although but seven miles from Lake Erie, is 720 feet above its level and its waters flow into the far-away Gulf of Mexico.

Several well known resorts are located on this lake, but perhaps the best known is that of Chautauqua. This is the home of the world renowned Chautauqua literary and scientific circle, where summer after summer, students from all over the world assemble, in the midst of surroundings

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The Allegheny Mountains of Pennsylvania Present Magnificent Views.

which cannot help but stimulate, and pursue their studies of the languages and scientific subjects.

Jamestown, at the eastern extremity of the lake, is only a short distance from Celoron, which resembles very much a seacoast resort. Excellent opportunity is offered for fresh water bathing, boating and fishing. All of the various resorts on the lake are connected by steamboats.

The route from Westfield to Buffalo is a portion of the main transcontinental route from East to West, or vice versa. At Buffalo the tour turns back toward Philadelphia, touching at Silver Springs, near Silver lake, practically the most western of the chain of small lakes in central New York.

Portage has a history dating back to Indian days. The settlement was so named because of the fact that the Indians were compelled to carry their canoes around the falls of the Genesee river. At this point the river makes three separate falls, at some little distance apart, and offers a pleasing sight. A splendid railroad bridge now replaces the portage at a considerable height, giving a view of all three.

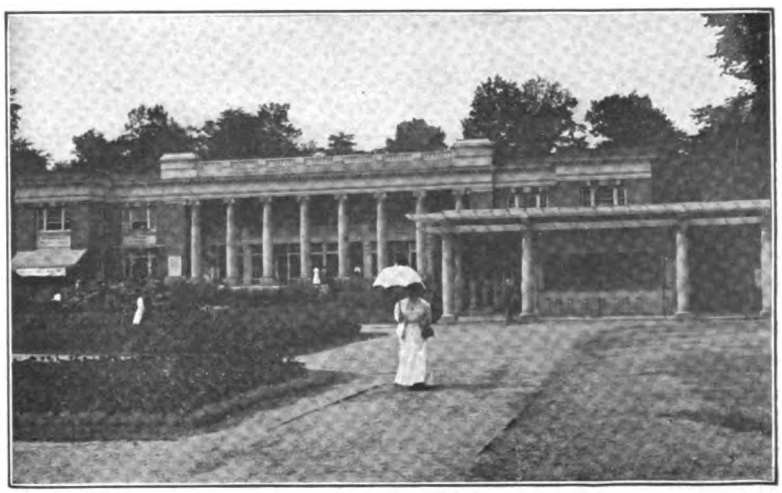
Dansville is in the centre of the hop growing country, and for miles the fields appear on either side of the road. A little later the tour enters the grape country, in the valley of the Canisteo river, and during the remainder of the distance into Elmira luscious fruit tempts the tourist on every hand. Incidentally, it may be stated that this district is somewhat noted for its wine cellars.

Beyond Bath is Corning, with its cut glass factories. Then comes an excellent macadam road, along the Chemung river into Elmira. This night stop first became a permanent settlement in 1788, and was incorporated as the village of Newton in 1815. The name was changed to Elmira in 1828. It is now the seat of Elmira College and other institutions of learning. Perhaps it is best known as the site of the state reformatory. Its chief industries are rolling mills, railroad car shops, steel bridge works, automobiles, etc.

For the first 20 miles beyond Elmira the tour lies along the Pennsylvania line, before it finally crosses it at Athens. From this point mountains begin to make their appearance. The route is along the Susquehanna river and affords some excellent scenery all of the way. The Lehigh Valley railroad here winds its way among the peaks in a manner almost miraculous and adds its share to the general picturesqueness. Perhaps the view is at its best at Tunkhannock, but the tourist will find sufficient cause for rejoicing all the way.

The night stop is at Wilkesbarre, located in the Wyoming valley. This is the shipping point for the rich and extensive anthracite coal beds in this valley. It was founded in 1769 and occupies a commanding position in upper Pennsylvania. A short distance to the west is Eagles Mere, or the "Lake of the Eagles." This is situated 2200 feet above sea level and is embedded like a brilliant emerald among the virgin forests. It is 1.5 miles long and one mile wide, and in many places 60 feet deep. Excellent opportunity for bathing is afforded, the beaches being covered with clean, sloping white sand.

More mountains are encountered on the way back to Philadelphia, these being known as the Poconos, one of the groups which go to make up the Blue Ridge. They share with the Catskills and the mountains of West Virginia and North Carolina, an average altitude of 2000 feet, with heavily wooded slopes, through which brightly rushing streams leap from crag to crag. The end of the journey is over better known ways in the Delaware river valley over the latter portion of the route from Delaware Water Gap as listed in itinerary No. 51.



Colonnade and Pergola at Point Chautauqua, N. Y.

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ITINERARY NO. 50.

Night Stops—Philadelphia, Gettysburg, Altoona, Pittsburg and Sheffield, Penn.; Buffalo and Elmira, N. Y.; Wilkesbarre, Penn. Eight Days, 999.8 Miles.

Philadelphia-Gettysburg, 118.7 Miles.

	Miles to	Total Miles Out	Return
Philadelphia	0.0	0.0	118.7
Ardmore	9.4	9.4	109.3
Bryn Mawr	2.1	11.5	107.2
Wayne	3.9	15.4	103.3
Devon	1.5	16.9	101.8
Berwyn	1.4	18.3	100.4
Dalesford	1.2	19.5	99.2
Paoli	1.2	20.7	98.0
Malvern	1.5	22.2	96.5
Whitford	7.4	29.6	89.1
Downington	3.3	32.9	85.8
Coatesville	6.6	39.5	79.2
Ladsburyville	3.9	43.4	75.3
Strasburg	10.2	53.6	65.1
Paradise	2.7	56.3	62.4
Lancaster	9.6	65.9	52.8
Columbia	10.2	76.1	42.6
Wrightsville	1.9	78.0	40.7
York	11.8	89.8	28.9
Thomasville	7.1	96.9	21.8
Abbotstown	7.7	104.6	14.1
New Oxford	4.2	108.8	9.9
Gettysburg	9.9	118.7	0.0

Gettysburg-Altoona, 118 Miles.

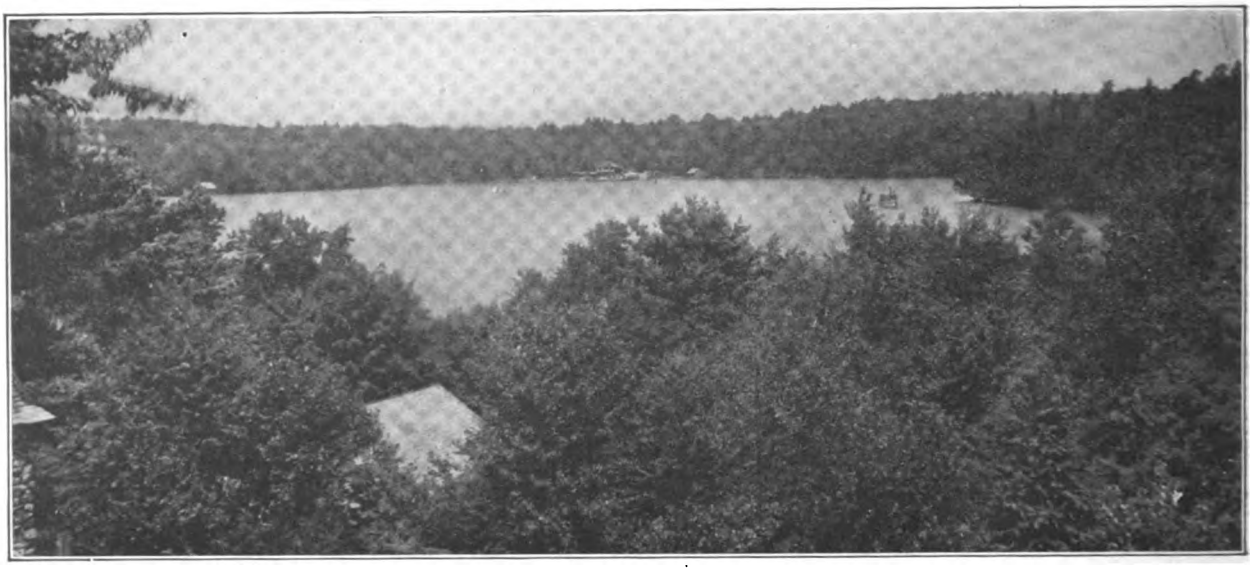
	Miles to	Total Miles Out	Return
Gettysburg	0.0	0.0	118.0
Seven Stars	3.9	3.9	114.1
McKnightstown	1.9	5.8	112.2
Cashtown	1.9	7.7	110.3
Fayetteville	11.4	19.1	98.9
Chambersburg	5.5	24.6	93.4
St. Thomas	7.4	32.0	86.0
Fort Loudon	6.0	38.0	80.0
McConnellsburg	8.1	46.1	71.9
Harrisonville	6.4	52.5	65.5
Breezewood	11.4	63.9	54.1
Everett	8.4	72.3	45.7
Mt. Dallas	1.1	73.4	44.6
Bedford	6.7	80.1	37.9
St. Clansville	10.0	90.1	27.9
Osterburg	1.3	91.4	26.6
Claysburg	9.5	100.9	17.1
East Freedom	4.8	105.7	12.3
Newry	2.8	108.5	9.5
Duncansville	1.9	110.4	7.6
Altoona	7.6	118.0	0.0

Altoona-Pittsburg, 119.2 Miles.

	Miles to	Total Miles Out	Return
Altoona	0.0	0.0	119.2
Ashville	10.2	10.2	109.0
Chest Springs	3.5	13.7	105.5
Carrolltown	6.8	20.5	98.7
Spangler	5.3	25.8	93.4
Barnsboro	1.5	27.3	91.9
North Barnsboro	0.4	27.7	91.5
Garman's Mills	1.7	29.4	89.8
Pine Flats	6.8	36.2	83.0
Saxonburg	7.4	30.7	103.3
Harmaston	2.1	32.8	101.1
Butler	9.1	41.9	92.0
Chicora	11.3	53.2	80.7
Kaylor	5.2	58.4	75.5
East Brady	4.5	62.9	71.0
Rimersburg	8.2	71.1	62.8
Curllsville	5.2	76.3	57.6
Reedsburg	4.9	81.2	52.7
Clarion	5.2	86.4	47.5
Lucinda	9.5	95.9	38.0
Snydersburg	1.8	97.7	36.2
Leeper	3.8	101.5	32.4
McDonald's	4.9	106.4	27.5
Marienville	7.0	113.4	20.5
Sheffield	20.5	133.9	0.0

Sheffield-Buffalo, 118.4 Miles.

	Miles to	Total Miles Out	Return
Sheffield	0.0	0.0	118.4
Warren	12.6	12.6	105.8
North Warren	2.2	14.8	103.6
Russell, N. Y.	5.1	19.9	98.5
Jamestown	13.4	33.3	85.1
Stow	11.4	44.7	73.7
Chautauqua	5.2	49.9	68.5



Eagles Mere, a Beautiful Lake and State Park of Virgin Forest Within Easy Driving Distance of Wilkesbarre.

Kenwood	1.5	37.7	81.5
Penn Run	4.1	41.8	77.4
Indiana	8.7	50.5	68.7
Homer City	5.8	56.3	62.9
Graceton	2.8	59.1	60.1
Black Lack	3.4	62.5	56.7
Blairsville	5.4	67.9	51.3
New Alexandria	9.4	77.3	41.9
Crabtree	3.3	80.6	38.6
Greensburg	6.1	86.7	32.5
Grapeville	4.1	90.8	28.4
Adamsburg	2.3	93.1	26.1
Irwin	3.0	96.1	23.1
Jacksonville	1.2	97.3	21.9
Circleville	0.6	97.9	21.3
E. McKeesport	5.8	103.7	15.5
Wilmerding	1.5	105.2	14.0
Wilkinsburg	6.7	111.9	7.3
Pittsburg	7.3	119.2	0.0

Pittsburg-Sheffield, 133.9 Miles.

	Miles to	Total Miles Out	Return
Pittsburg	0.0	0.0	133.9
Undercliff	10.7	10.7	123.2
Connersville	12.6	23.3	110.6
Mayville	3.9	53.8	64.6
Westfield	5.4	59.2	59.2
Portland	6.9	66.1	52.3
Brocton	1.4	67.5	50.9
Fredonia	6.8	74.3	44.1
Sheridan	6.0	80.3	38.1
Silver Creek	5.9	86.2	32.2
Irving	3.4	89.6	28.8
Evans	7.6	97.2	21.2
Buffalo	21.2	118.4	0.0

Buffalo-Elmira, 154.6 Miles.

	Miles to	Total Miles Out	Return
Buffalo	0.0	0.0	154.6
Ebenezer	8.0	8.0	146.6
East Aurora	9.6	17.6	137.0
Wales Center	4.2	21.8	132.8
Harris	4.4	26.2	128.4
North Sheldon	2.8	29.0	125.6
Varysburg	4.2	33.2	121.4
Orangeville	3.4	36.6	118.0
Halls Corners	2.7	39.3	115.3
Warsaw	3.3	42.6	112.0
South Warsaw	3.0	45.6	109.0
Rock Glen	1.0	46.6	108.0
Silver Springs	2.8	49.4	105.2
Chace	1.3	50.7	103.9

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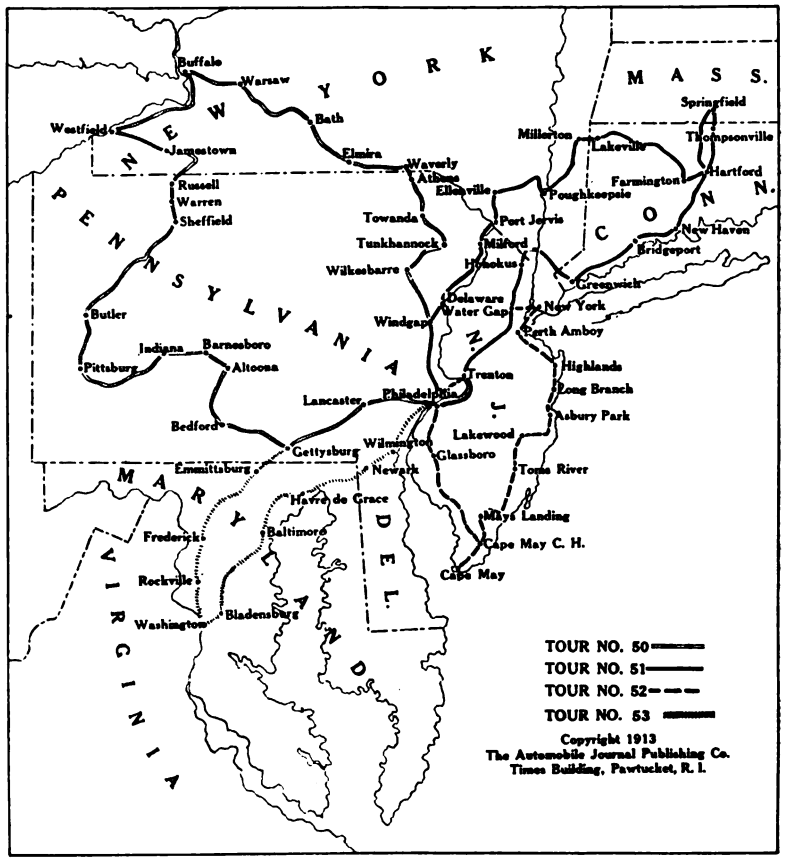
Castile	2.6	53.3	101.3
Portageville	6.5	59.8	94.8
Hunts	4.3	64.1	90.5
Dalton	2.0	66.1	88.5
Swains	7.6	73.7	80.9
Garwoods	1.8	75.5	79.1
Canaseraga	2.3	77.8	76.8
Dansville	7.7	85.5	69.1
Perkinsville	4.3	89.8	64.8
Cohocton	8.8	98.6	56.0
Avoca	7.6	106.2	48.4
Kanona	4.2	110.4	44.2
Bath	3.8	114.2	40.4
Savona	6.5	120.7	33.9
Campbell	4.5	125.2	29.4
Coopers	5.2	130.4	24.2
Painted Post	3.0	133.4	21.2
Corning	2.6	136.0	18.6
Big Flats	7.1	143.1	11.5
Elmira Heights	8.3	151.4	3.2
Elmira	3.2	154.6	0.0

Elmira-Wilkesbarre, 108.6 Miles.

	Miles to	Total Miles Out	Return
Elmira	0.0	0.0	108.6
Wellsburg	6.9	6.9	101.7
Lowman	1.1	8.0	100.6
Chemung	6.1	14.1	94.5
Waverly	4.5	18.6	90.0
Athens, Penn.	3.6	22.2	86.4
Ulster	8.1	30.3	78.3
Towanda	8.1	38.4	70.2
Wysox	2.6	41.0	67.6
Standing Stone	4.2	45.2	63.4
Rummerfield	2.9	48.1	60.5
Wyalusing	7.1	55.2	53.4
Laceyville	8.4	63.6	45.0
Skinner's Ferry	1.8	65.4	43.2
Meshoppen	5.6	71.0	37.6
Russell Hill	3.7	74.7	33.9
Tunkhannock	5.3	80.0	28.6
Peterboro	8.5	88.5	20.1
Bowman Creek	2.9	91.4	17.2
Beaumont	2.1	93.5	15.1
Kunkle	2.4	95.9	12.7
Dallas Station	3.2	99.1	9.5
Luzerne	6.4	105.5	3.1
Wilkesbarre	3.1	108.6	0.0

Wilkesbarre-Philadelphia, 128.4 Miles.

	Miles to	Total Miles Out	Return
Wilkesbarre	0.0	0.0	128.4
Ashville Plains	5.2	5.2	123.2
Fairview	1.5	6.7	121.7



Glen Summit	1.1	7.8	120.6
Bear Creek	8.9	16.7	111.7
Stoddartsville	9.2	25.9	102.5
Blakeslee	2.1	28.0	100.4
Pocono	4.3	32.3	96.1
Effort	9.8	42.1	86.3
Broadheadsville	2.7	44.8	83.6
McInhaney	1.9	46.7	81.7
Saylorsburg	4.1	50.8	77.6
Windgap	2.6	53.4	75.0
Windgap Village	2.4	55.8	72.6
Belfast	4.3	60.1	68.3
Nazareth	5.0	65.1	63.3
Bethlehem	9.6	74.7	53.7
Coopersburg	8.3	83.0	45.4
Quakertown	6.1	89.1	39.3
Sellersville	6.5	95.6	32.8
Montgomeryville	9.2	104.8	23.6
Springhouse	4.6	109.4	19.0
Ambler	2.3	111.7	16.7
National Cemetery	8.7	120.4	8.0
N. Philadelphia	5.0	125.4	3.0
Philadelphia	3.0	128.4	0.0

OVER THE HILLS INTO NEW ENGLAND.

An Itinerary Outlined to Connect with Philadelphia and the South by Avoiding the Heavily Congested Traffic in New York City.

IN RESPONSE to the growing demand for an itinerary connecting New England with the South without the necessity for crossing New York City, that outlined herein has been selected as presenting features which will win instant approval. Many tourists, particularly women, find driving in the Metropolis to be a severe test of their nervous temperament. Tour No. 51 may be used in combination with any of the itineraries connecting these two sections of the country.

Leaving Philadelphia, the way leads first to Camden, N. J., thence to Burlington, where Howe defeated Washington in 1777, resulting in the British occupancy of Philadelphia. Near here the Pennsylvania state fleet of 27 gunboats bravely fought the British squadron as it attempted to ascend the Delaware.

Bordentown was selected by Joseph Bonaparte, a brother of Napoleon, who made him king of Naples, as a refuge after the disaster at Waterloo. He purchased an estate of 1400 acres, just north of the city and lived there until 1832. Later the state purchased the property and it is now known as Bonaparte park.

Beyond Trenton, the state capital, is Princeton, the site of Princeton University, founded in Elizabeth in 1746, and removed to this city in 1757. The battle of Princeton was one of the early and signal successes of Washing-

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ton's campaign against the British. Nassau hall was utilized as a barracks for a time during the war and later the Continental Congress held sessions there.

The night stop is at Suffern, pleasantly situated among the Suffern hills, more of which are traversed the second day on the way into the valley of the Hudson, which is crossed by the Nyack ferry into Tarrytown. The route then leads across Westchester county into Connecticut.

Near Greenwich is an old cemetery where stood the church around which Gen. Israel Putnam and his band of 60 men fought off the British as long as possible, and then, since leaving by the highway would expose him to danger, he drove his horse down a flight of stone steps. The next day Gen. Putnam made a successful attack upon the enemy at Stamford.

This tour continues along the so-called shore line to Bridgeport and New Haven, passing a number of pleasantly situated seaside resorts, thence by way of North Haven with its many brickyards to Wallingford, famous for the part its silversmiths have played in the industrial history of the country. The hanging hills are passed on the way to Meriden, also well known in the silver business. West Peak, near by, commands a view extending from Hartford on the north to New Haven and over Long Island sound on the south.

Berlin is accredited with being the birthplace of the tin making industry in America, the first tinware having been produced here in 1775. For many years it was the home of a large number of tin peddlers who traversed the entire country from Mobile, Ala., to Montreal, Que.

The route from Hartford, the state capital, northward to Springfield, Mass., is on the east side of the Connecticut river, and the return is on the west side, thereby affording ample opportunity to enjoy the splendid roads and the particular beauty of the rich tobacco country. After the return to Hartford the tour turns westward along the Farmington river, through Satan's Kingdom with its wild tumbling waters, and into the Naugatuck valley at Winsted.

Then begins the ascent to Norfolk and Canaan, over some of the highest land in the state, and with a sweeping view of the Berkshire hills to the north and the Litchfield hills to the south. Many caves of unknown extent are to be found in these hills, which overlook a number of pretty little lakes. At Salisbury, the iron mines will attract deserved attention. Lakeville shelters an interesting summer colony of New Yorkers. More iron mines are passed on the way to Sharon, and the tour then enters New York State, for the night stop at Poughkeepsie, the seat of Vassar College for girls.

Crossing the Hudson the itinerary enters some of the most interesting country in the vicinity of the Catskills. New Paltz, on the west bank of the Wallkill, was settled by Huguenot refugees from France in 1683. Many of its old stone houses, with high, steep pitched roofs, remain today much the same as when they were erected over 200 years ago. The surrounding country, with its smiling, well tilled fields and vine clad hillsides, still bears the imprint of the thrifty Frenchmen, who reclaimed it from the wilderness.

Napanoch is a favorite resort of artists, who take particular pleasure in transferring to canvas the many charming views of the section. Ellenville is located right under the shadow of the Shawangunk mountains, which rise to a height of 2500 feet and are crowned with castellated, massive bluffs, stretching for miles along their crest. Summitsville overlooks the entire length of the Mamakating valley.

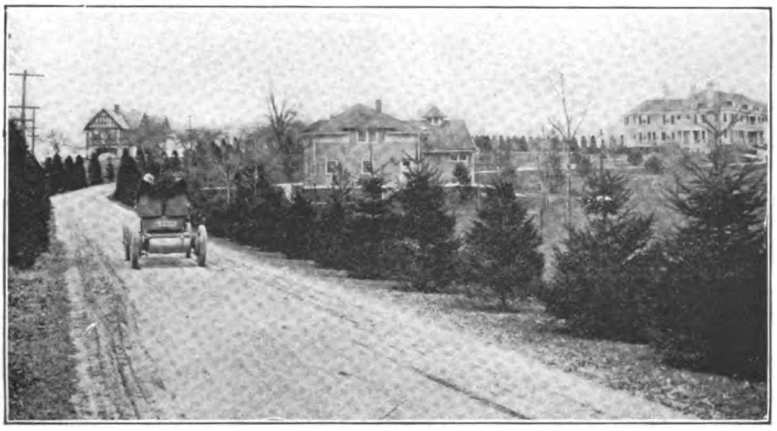
Wurstboro was first settled by the Dutch in 1660, and is surrounded by a number of lakes, which furnish excellent fishing grounds. The same may be said for Westbrookville and Cuddebackville, on the way to Port Jervis. The last named may be regarded as the hub of the summer resort region. It is at the junction of three states—New York, Pennsylvania and New Jersey—this point being on a rock at the confluence of the Never Sink and Delaware rivers. Other points of interest are the old Barrett toll bridge and the Indian fort in the northern part of the town. Pretty drives may be taken into the Never Sink valley, Hawk Nest road and Saw Kill falls.

Dingman's Ferry is near Dingman's Falls, the prettiest in Pike county. These are four in number, the highest being Soap-



Mts. Tammany and Minsi in the Delaware Water Gap.

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Westchester County's Splendid Roads at Briarcliff Manor, N. Y.

Trough, while Silver Thread has a sheer drop of 150 feet. A thick growth of forest completely arches the falls, forming a sort of natural tunnel, up through which one may see only a scrap of blue sky.

At Delaware Water Gap, the Delaware river flows between two high mountains. That on the Pennsylvania side is named Minsi, but that on the Jersey shore has the more commanding cognomen of Tammany, although it goes without saying that such has not always been the case. The tops of these peaks are each over 1600 feet from the bed of the river.

Bethlehem offers much of historic interest, as well as considerable picturesque scenery, notably the very old Moravian school and cemetery, the latter with the grave of Uncas, mentioned in more detail elsewhere. Splendid views reward the tourist throughout the remainder of the distance into Philadelphia.

ITINERARY NO. 51.

Night Stops—Philadelphia, Penn.; Suffern, N. Y.; Springfield, Mass.; Poughkeepsie, N. Y.; Delaware Water Gap, Penn. Five Days, 594.6 Miles.

Philadelphia-Suffern, 130.3 Miles.

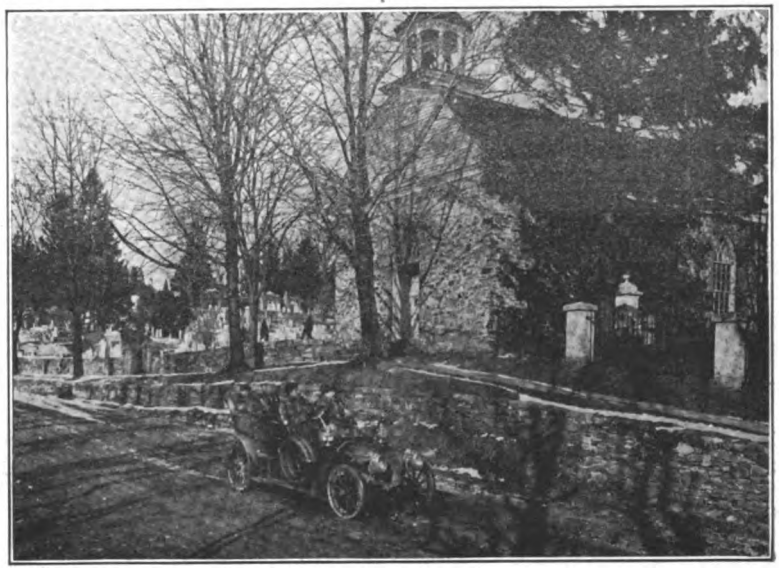
	Miles to	Total Miles Out	Return
Philadelphia	0.0	0.0	130.3
Camden, N. J.	1.3	1.3	129.0
Bridgeboro	12.3	13.6	116.7
Burlington	5.3	18.9	111.4
Columbus	7.3	26.2	104.1
Bordentown	5.4	31.6	98.7
Trenton	7.2	38.8	91.5
Lawrenceville	5.9	44.7	85.6
Princeton	5.1	49.8	80.5
Kingston	3.0	52.8	77.5
Franklin Park	6.8	59.6	70.7
New Brunswick	6.2	65.8	64.5
Metuchen	5.5	71.3	59.0
Iselin	2.1	73.4	56.9
Elizabeth	10.9	84.3	46.0
Newark	6.2	90.5	39.8
Passaic	9.5	100.0	30.3
Hohokus	10.5	110.5	19.8
Suffern, N. Y.	19.8	130.3	0.0

Suffern-Springfield, 140.4 Miles.

	Miles to	Total Miles Out	Return
Suffern	0.0	0.0	140.4
Spring Valley	5.9	5.9	134.5
Nanuet	2.4	8.3	132.1
Nyack	5.3	13.6	126.8
Tarrytown	0.7	14.3	126.1
Elmsford	3.3	17.6	122.8
White Plains	3.7	21.3	119.1
Port Chester	6.2	27.5	112.9
Greenwich, Conn.	3.1	30.6	109.8
Stamford	5.1	35.7	104.7
Darien	4.5	40.2	100.2
Norwalk	4.2	44.4	96.0
Westport	3.3	47.7	92.7
Fairfield	1.6	49.3	91.1
Bridgeport	4.5	53.8	86.6
Stratford	3.8	57.6	82.8
Milford	4.6	62.2	78.2
Woodmont	4.7	66.9	73.5
Savin Rock	4.0	70.9	69.5
West Haven	1.1	72.0	68.4
New Haven	3.6	75.6	64.8
North Haven	8.5	84.1	56.3
Wallingford	5.0	89.1	51.3
Tracy	3.3	92.4	48.0
Meriden	3.2	95.6	44.8
Berlin	6.1	101.7	38.7
Hartford	10.9	112.6	27.8
East Hartford	1.6	114.2	26.2
South Windsor	4.1	118.3	22.1
E. Windsor Hill	3.5	121.8	18.6
Warehouse Point	5.1	126.9	13.5
Thompsonville	5.6	132.5	7.9
Longmeadow, Mass.	3.8	136.3	4.1
Springfield	4.1	140.4	0.0

Springfield-Poughkeepsie, 125 Miles.

	Miles to	Total Miles Out	Return
Springfield	0.0	0.0	125.0
Suffield, Conn.	10.4	10.4	114.6
Windsor Locks	3.5	13.9	111.1
Windsor	5.6	19.5	105.5
Hartford	6.5	26.0	99.0
West Hartford	3.6	29.6	95.4
Farmington	5.2	34.8	90.2
Unionville	3.8	38.6	86.4
Canton	4.6	43.2	81.8
Cherry Brook	2.4	45.6	79.4
New Hartford	4.2	49.8	75.2
Winsted	6.1	55.9	69.1
Norfolk	9.9	65.8	59.2
East Canaan	5.0	70.8	54.2
Canaan	2.4	73.2	51.8
Salisbury	7.9	81.1	43.9
Lakeville	1.8	82.9	42.1
Millerton, N. Y.	3.9	86.8	38.2
Amenia	9.0	95.8	29.2
Lithgow	4.8	100.6	24.4
Mabbettsville	3.2	103.8	21.2
Millbrook Hollow	5.4	109.2	15.8
Washington Hollow	3.9	113.1	11.9
Pleasant Valley	4.8	117.9	7.1
Poughkeepsie	7.1	125.0	0.0



Washington Irving's Resting Place in Sleepy Hollow, New York.

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Sanburg Creek in the Catskill Foothills, Near Ellenville, N. Y.

Poughkeepsie-Delaware Water Gap, 108.6 Miles.

	Miles to	Total Miles Out	Return
Poughkeepsie	0.0	0.0	108.6
Highland	1.6	1.6	107.0
Lloyd	2.8	4.4	104.2
Ohioville	2.9	7.3	101.3
New Paltz	1.7	9.0	99.6
Tillson	6.6	15.6	93.0
Lawrenceville	2.1	17.7	90.9
High Falls	2.8	20.5	88.1
Accord Village	7.8	28.3	80.3
Napanoch	9.2	37.5	71.1
Ellenville	2.0	39.5	69.1
Spring Glen	4.5	44.0	64.6
Phillipsport	2.2	46.2	62.4
Summitsville	1.8	48.0	60.6
Wurtsboro	3.5	51.5	57.1
Westbrookville	4.9	56.4	52.2
Cuddebackville	4.6	61.0	47.6
Huguenot	3.5	64.5	44.1
Port Jervis	5.4	69.9	38.7
Milford, Penn.	6.0	75.9	32.7
Dingman's Ferry	8.5	84.4	24.2
Egypt Mills	8.4	92.8	15.8
Bushkill	3.4	96.2	12.4
Shoonmaker	1.8	98.0	10.6
Shawnee	7.2	105.2	3.4
Delaware Water Gap	3.4	108.6	0.0

Delaware Water Gap-Philadelphia, 90.3 Miles.

	Miles to	Total Miles Out	Return
Delaware Water Gap	0.0	0.0	90.3
Stormville	6.0	6.0	84.3
Saylorsburg	6.7	12.7	77.6
Windgap	2.6	15.3	75.0
Windgap Village	2.4	17.7	72.6
Belfast	4.3	22.0	68.3
Nazareth	5.0	27.0	63.3
Bethlehem	9.6	36.6	53.7
Coopersburg	8.3	44.9	45.4
Quakertown	6.1	51.0	39.3
Sellersville	6.5	57.5	32.8
Montgomeryville	9.2	66.7	23.6
Springhouse	4.6	71.3	19.0
Ambler	2.3	73.6	16.7
National Cemetery	8.7	82.3	8.0
N. Philadelphia	5.0	87.3	3.0
Philadelphia	3.0	90.3	0.0

ENCIRCLING THE STATE OF NEW JERSEY.

Following the Coast Line from New York to Cape May, Thence Along the Delaware Bay to Philadelphia and Return Over the Main Trunk Line.

SINCE New Jersey lifted the ban against non-resident automobile owners, motorists have found it rich touring ground. The itinerary presented herewith offers opportunity for visiting the entire coast line from New York City to Cape May, thence along Delaware bay to Philadelphia, and back to New York over the main route across centre of the state.

The outward journey crosses Staten island and enters New Jersey at Perth Amboy. Red Bank, on the Navesink river, is a famous yachting resort. Long Branch is one of the best known watering places in the United States and derives its name from the "long branch" of the Shrewsbury river near by. During President Grant's administration Long Branch was the summer capital, and President Garfield died in the cottage at Elberton.

Asbury Park is another popular seashore resort, adjoining which is Ocean Grove, once covered with the tents of the Methodist Association, but now the summer



Where the Delaware River Has Worn Its Way Through the Kittatinny Mountains at Delaware Water Gap.

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headquarters of bishops and deacons. No intoxicating liquors are allowed on the grounds and on Sundays all traffic of whatever nature is prohibited.

Lakewood, in the heart of the pine woods, is a winter as well as a summer resort, and there are numerous drives in the pine forests of that section. Georgian Court, the summer residence of George Gould, with its famous Italian gardens, etc., is within easy driving distance.

Atlantic City is situated on Absecon island, a sandy strip separated from the main land by salt marshes. Perhaps it is the best known seaside resort in America and hundreds of thousands of tourists visit it annually. It has nearly 1000 hotels, with accommodations for over 300,000 guests. Besides the famous board walk there are five piers extending into the ocean from 500 to 3000 feet, these being plentifully supplied with amusement pavilions, theatres, etc.

Cape May lies at the extreme southern end of the state, and was named for a Dutch navigator, Carolus Jacobsen Mey, who rounded the headland in 1623. Like Atlantic City, it has its board walk and piers, although on a somewhat smaller scale. The route from Cape May to Philadelphia lies through the rich market gardening country, which supplies the produce for that market.

The return to New York is over one of the most frequently used routes between the two cities, and offers a pleasant alternative to that given in itinerary No. 51 for those who desire to reach the New England territory and do not object to the congested traffic of the Metropolis.

ITINERARY NO. 52.

Night Stops—New York City; Lakewood and Cape May, N. J.; Philadelphia, Penn. Four Days, 387.3 Miles.

New York-Lakewood, 70.6 Miles.

	Miles to	Total Miles Out	Return
New York	0.0	0.0	70.6
Tompkinsville	1.1	1.1	69.5
New Dorp	5.5	6.6	64.0
Huguenot	5.4	12.0	58.6
Tottenville	3.4	15.4	55.2
Perth Amboy, N. J.	0.6	16.0	54.6
South Amboy	3.3	19.3	51.3
Morgan Station	2.5	21.8	48.8
Keyport	3.9	25.7	44.9
New Monmouth	6.3	32.0	38.6
Highlands	7.3	39.3	31.3
Seabright	2.2	41.5	29.1
Long Branch	4.5	46.0	24.6
Deal	2.4	48.4	22.2
Asbury Park	2.4	50.8	19.8
Belmar	2.2	53.0	17.6
Spring Lake	2.2	55.2	15.4
Manasquan	2.1	57.3	13.3
Point Pleasant	3.3	60.6	10.0
Burrsville	4.6	65.2	5.4
Lakewood	5.4	70.6	0.0

Lakewood-Cape May, 129.6 Miles.

	Miles to	Total Miles Out	Return
Lakewood	0.0	0.0	129.6
Toms River	9.8	9.8	119.8
Forked River	9.3	19.1	110.5
Waretown	3.8	22.9	106.7
Barnegat	1.8	24.7	104.9
Manahawken	4.3	39.0	100.6
West Creek	4.9	33.9	95.7
Parkerton	0.7	34.6	95.0
Tuckerton	2.2	36.8	92.8
New Gretna	6.1	42.9	86.7
Port Republic	6.6	49.5	80.1
Centerville	4.0	53.5	76.1
Absecon	3.9	57.4	72.2
Atlantic City	8.9	66.3	63.3
Pleasantville	6.8	73.1	56.5
Idlewood	3.5	76.6	53.0
Mays Landing	9.2	85.8	43.8
Estelville	4.7	90.5	39.1
Tuckahoe	7.9	98.4	31.2
Petersburg	2.0	100.4	29.2
Seaville	5.1	105.5	24.1
Ocean View	2.3	107.8	21.8
Cape May C. H.	8.7	116.5	13.1
Cape May	13.1	129.6	0.0

Cape May-Philadelphia, 90.2 Miles.

	Miles to	Total Miles Out	Return
Cape May	0.0	0.0	90.2
Cape May C. H.	13.1	13.1	77.1
Goshen	4.2	17.3	72.9
Dennisville	4.7	22.0	68.2
Eldora	5.0	27.0	63.2
Port Elizabeth	10.8	37.8	52.4
Millville	6.6	44.4	45.8
Vineland	7.5	51.9	38.3
North Vineland	2.8	54.7	35.5
Newfield	1.3	56.0	34.2
Malaga	2.6	58.6	31.6
Franklinville	3.4	62.0	28.2
Clayton	2.8	64.8	25.4
Glassboro	3.1	67.9	22.3
Pitman Grove	2.4	70.3	19.9
Woodbury	8.3	78.6	11.6
Gloucester	3.8	82.4	7.8
Camden	5.8	88.2	2.0
Philadelphia	2.0	90.2	0.0

Philadelphia-New York, 96.9 Miles.

	Miles to	Total Miles Out	Return
Philadelphia	0.0	0.0	96.9
Agonts	8.9	8.9	88.0
Bustleton	7.3	16.2	80.7
La Trappe	5.1	21.3	75.6



Atlantic City Possesses One of the Best Known Bathing Beaches and Recreation Spots in America.

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Langhorne	4.4	25.7	71.2	Kingston	3.0	49.1	47.8	Elizabeth 10.9		80.6	16.3
Glen Lake.....	1.3	27.0	69.9	Franklin Park...	6.8	55.9	41.0	West Elizabeth..	2.0	82.6	14.3
Trenton, N. J....	8.1	35.1	61.8	New Brunswick.	6.2	62.1	34.8	Newark	4.2	86.8	10.1
Lawrenceville ..	5.9	41.0	55.9	Metuchen 5.5		67.6	29.3	Jersey City.....10.1		96.9	0.0
Princeton	5.1	46.1	50.8	Iselin	2.1	69.7	27.2	Ferry to New York.			

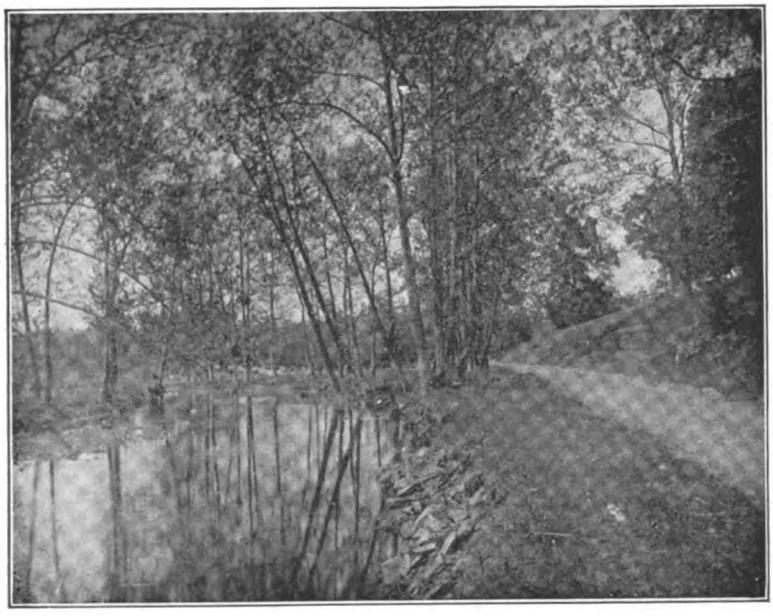
CROSSING THE MASON AND DIXON LINE.

A Three-Day Tour Designed to Afford Connections Between Washington, Philadelphia and Gettysburg, and Between the North and South.

OFFERED as the connecting link between the South and the North, itinerary No. 53 starts from Washington and visits Philadelphia and Gettysburg. It thus provides two means of communication between these two sections of the country, either of which may be followed with profit by the tourist who enjoys interesting scenery and good roads.

As outlined, the route from Washington to Philadelphia follows the main trunk line through Baltimore, Md., and Wilmington, Del. Good macadam marks a major portion of the way. Baltimore is one of the chief oyster packing centres of the world. It is a manufacturing city of importance and has a number of fine public buildings. Druid park, a 700-acre plot, with varied native forests, is beautifully laid out and contains a number of fine drives.

At Havre de Grace, the Susquehanna river is a full mile wide. At Perryville the road crosses a long railroad span, which has been transformed into a highway. Wilmington is noted for its parks, one of which is located in the Glen of the Brandywine, a name which is familiar to students of the Revolution, and another is Rockford park, where a handsome statue of Thomas F. Bayard is to be seen. Here also is to be found the famous Dupont powder works. The old Swedes Church was built in 1698 by the first Swedish colony to locate in America.



Along the Pennypack River in Southern Pennsylvania.

The route from Philadelphia to Gettysburg is identical with that offered for the first day in itinerary No. 50.

Emmitsburg, just across the Mason and Dixon line, is the seat of Mt. St. Mary's College, a Catholic institution, which was founded in 1808, and which has a reputation that is world wide. The Mother House of the Sisters of Charity is two miles distant.

Frederick, laid out in 1745, is in the centre of a rich limestone plain near the Catochin mountains, thus accounting for Whittier's "Green-walled by the hills of Maryland," in "Barbara Frietchie." The city was the terminus of a railroad opened in 1830, the grading work for which was done by Charles Carroll of Carrollton, then the only living signer of the Declaration of Independence. It was at Frederick that Lee established himself after defeating McClellan in 1862 and called upon the people of Maryland to rise against the Union. The people refused to obey and McClellan was able to dislodge him with 70,000 men. Francis Scott Key, the author of "The Star Spangled Banner," is buried in Mt. Olivet cemetery.

The remainder of the trip into the National Capital is over good macadam road and through interesting historic country.

ITINERARY NO. 53.

Night Stops—Washington, D. C.; Philadelphia and Gettysburg, Penn. Three Days, 348.8 Miles.

Washington-Philadelphia, 152.4 Miles.

	Miles to	Total Miles Out	Return
Washington	0.0	0.0	152.4
Blagdensburg, Md.	6.9	6.9	145.5
Beltsville	7.2	14.1	138.3
Laurel	6.0	20.1	132.3
Elk Ridge 10.7		30.8	121.6
Relay	1.3	32.1	120.3
Cantonsville	3.7	35.8	116.6
Baltimore	8.2	44.0	108.4
Towson	8.8	52.8	99.6
Lock Raven	4.2	57.0	95.4
Glenarm	3.7	60.7	91.7
Bel Air 10.4		71.1	81.3
Churchville	5.5	76.6	75.8
Havre de Grace.	9.9	86.5	65.9
Perryville	1.5	88.0	64.4
Northeast	7.4	95.4	57.0
Elkton	6.2	101.6	50.8
Newark, Del....	7.1	108.7	43.7
Marshallton	7.9	116.6	35.8
Elsmere Junction	2.6	119.2	33.2

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Wilmington	2.7	121.9	30.5
Chelsea, Penn.	9.7	131.6	20.8
Darby	14.1	145.7	6.7
Philadelphia	6.7	152.4	0.0

Philadelphia-Gettysburg, 118.7 Miles.

(For routing see Itinerary No. 50.)

Gettysburg-Washington, 77.7 Miles.

	Miles to	Total Miles Out	Return
Gettysburg	0.0	0.0	77.7
Emmittsburg, Md.	10.3	10.3	67.4
Thurmont	8.0	18.3	59.4
Lewiston	6.6	24.9	52.8
Frederick	9.3	34.2	43.5
Hyattstown	11.3	45.5	32.2
Clarksburg	3.9	49.4	28.3
Gaithersburg	8.1	57.5	20.2
Rockville	5.2	62.7	15.0
Bethesda	11.9	74.6	3.1
Washington, D. C.	3.1	77.7	0.0

DELIGHTFUL TOURS IN THE SOUTHLAND.

Washington-Atlanta-Tuscumbia-Nashville-Louisville-Cincinnati-Wheeling-Pittsburg-Washington—Atlanta-Savannah-Jacksonville—Tuscumbia-Memphis-New Orleans.

ROAD conditions in the South have improved decidedly since the running of the 1911 Glidden tour, and it must not be forgotten that the Atlanta-New York tours of 1909 and 1910 did their full share to bring the value of improved ways to the attention of the people in this district. The main itinerary outlined herein, No. 100, combines a portion of the 1911 Glidden tour along the Atlantic seaboard, with a portion of the 1910 Glidden in Tennessee and Kentucky. It is anticipated that the tourist will take up this routing at Washington, D. C., and return to that point by way of the Middle West. It may be added that this itinerary furnishes connecting links in two transcontinental tours.

Itinerary No. 101 is given for those who desire to reach Jacksonville, Fla. The start may be made from any point in the North, or any other section of the country for that matter. After reaching Atlanta over itinerary No. 100, the remainder of the route will be found to afford what is regarded as the best means of getting into Jacksonville by automobile. While some of the roads are not to be considered ideal, it may be suggested that there are drives in and out of Jacksonville which are the equal of those in any section of the country. Itinerary No. 102 takes the tourist to New Orleans and the same thing holds true of this in a measure. The Louisiana cities hold much of interest for the tourist.

Respecting the main tour, it may be added that the route lies through some of the richest historic sections in the South, with splendid views on the way to Atlanta from Washington, and again in Tennessee and Kentucky. The return to Washington from Louisville follows somewhat closely the old national highway in places. There ought to be little difficulty experienced in making the daily mileage as outlined.

ITINERARY NO. 100.

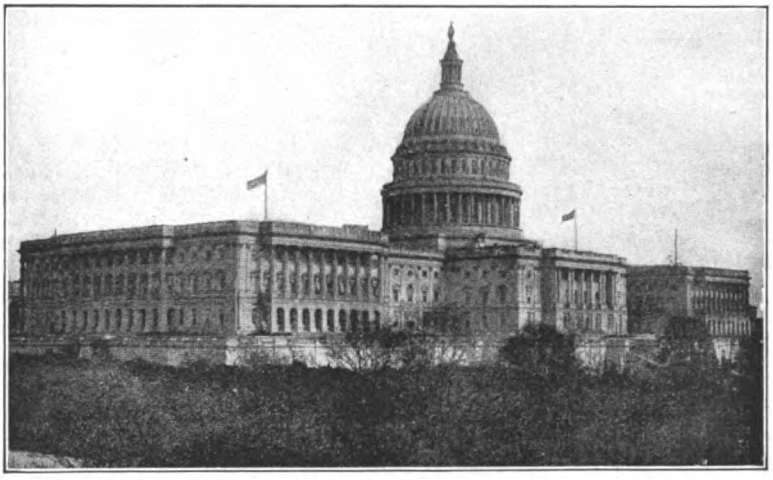
Night Stops—Washington, D. C.; Richmond, Va.; Henderson, Winston-Salem and Charlotte, N. C.; Greenville, S. C.; Atlanta, Ga.; Birmingham and Tuscumbia, Ala.; Nashville, Tenn.; Mammoth Cave and Louisville, Ky.; Cincinnati and Zanesville, O.; Pittsburg, Penn.; Cumberland, Md. Sixteen Days, 2150.2 Miles.

Washington-Richmond, 121.6 Miles.

	Miles to	Total Miles Out	Return
Washington	0.0	0.0	121.6
Alexandria, Va.	7.2	7.2	114.4
Lorton	12.2	19.4	102.2
Occoquan	3.5	22.9	98.7
Dumfries	10.7	33.6	88.0
Stafford	16.4	50.0	71.6
Fredericksburg	9.4	59.4	62.2
Massaponax	9.4	68.8	52.8
Castelman's Mill.	5.9	74.7	46.9
Golansville	13.2	87.9	33.7
Ashland	16.4	104.3	17.3
Richmond	17.3	121.6	0.0

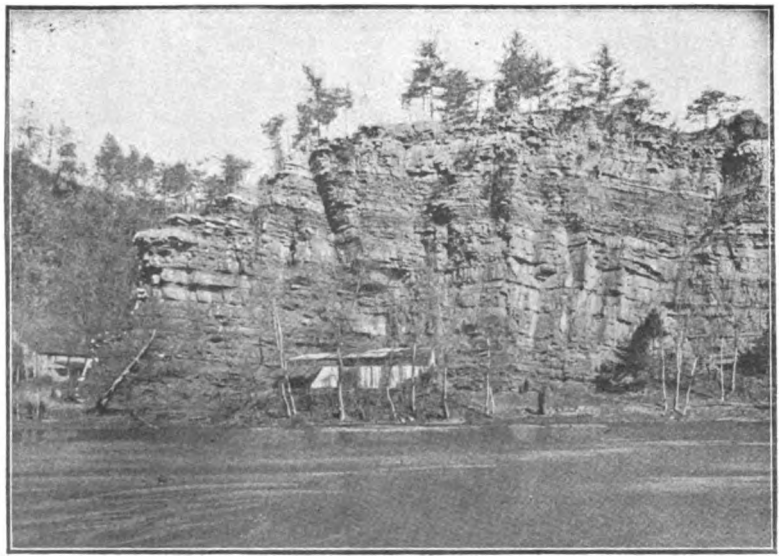
Richmond-Henderson, 145.9 Miles.

	Miles to	Total Miles Out	Return
Richmond	0.0	0.0	145.9
Petersburg	22.7	22.7	123.2
Carson	14.9	37.6	108.3
Loco	14.0	51.6	94.3
Jarrat	5.8	57.4	88.5
Emporia	9.9	67.3	78.6
Brink	7.7	75.0	70.9
Barley	6.9	81.9	64.0
Roanoke Rapids, N. C.	11.8	93.7	52.2
Holden	2.4	96.1	49.8
Thelma	6.7	102.8	43.1
King's Cross Roads	1.1	103.9	42.0
Sunlight	1.3	105.2	40.7
Littleton	5.3	110.5	35.4
Vaughan	5.8	116.3	29.6
Macon	5.4	121.7	24.2
Warrenton	5.7	127.4	18.5
Afton	4.8	132.2	13.7
Henderson	13.7	145.9	0.0



The National Capitol Building at Washington, D. C.

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Paint Rocks, French Broad River, North Carolina, One of the Most Interesting Monuments on the American Continent.

Henderson — Winston-Salem, 148.5 Miles.

	Miles to	Total Miles Out	Return
Henderson	0.0	0.0	148.5
Oxford	11.7	11.7	136.8
Providence	5.7	17.4	131.1
Tallyho	5.2	22.6	125.9
Stem	1.3	23.9	124.6
Knapp of Reeds	4.7	28.6	119.9
Bragtown	11.6	40.2	108.3
Durham	3.3	43.5	105.0
Chapel Hill	12.1	55.6	92.9
White Cross	9.0	64.6	83.9
Saxapahaw	9.7	74.3	74.2
Graham	12.1	86.4	62.1
Burlington	2.9	89.3	59.2
Gibsonville	6.7	96.0	52.5
Whitsett Cross Roads	2.7	98.7	49.8
Greensboro	13.6	112.3	36.2
Guildford	5.7	118.0	30.5
Summerfield	6.7	124.7	23.8
Kernersville	11.7	136.4	12.1
Centerville	9.8	146.2	2.3
Winston-Salem	2.3	148.5	0.0

Winston-Salem — Charlotte, 81.5 Miles.

	Miles to	Total Miles Out	Return
Winston-Salem	0.0	0.0	81.5
Midway	13.7	13.7	67.8
Brinkleys	3.2	16.9	64.6
Lexington	7.0	23.9	57.6
Spencer	14.6	38.5	43.0
Salisbury	2.8	41.3	40.2
China Grove	2.8	44.1	37.4
Landis	2.4	46.5	35.0
Kannapolis	4.7	51.2	30.3
Concord	7.9	59.1	22.4
Pharr's Mill	6.2	65.3	16.2
Newell	8.4	73.7	7.8
Charlotte	7.8	81.5	0.0

Charlotte-Greenville, 117.3 Miles.

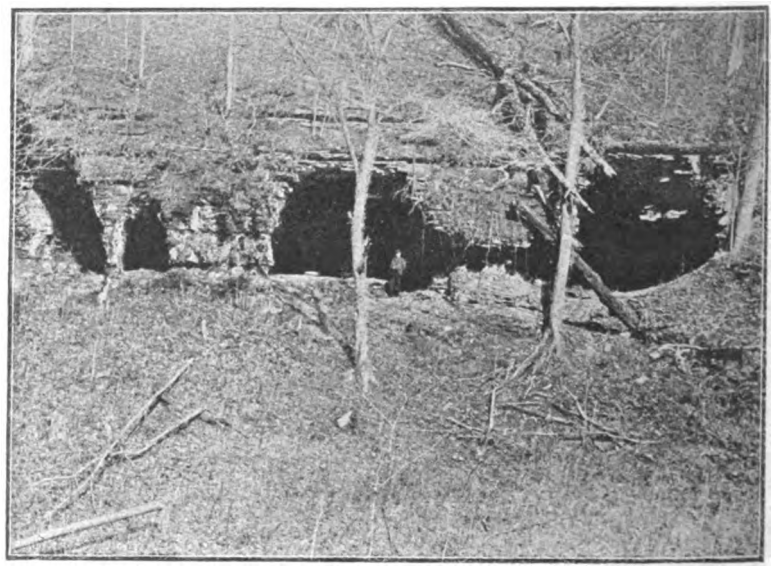
	Miles to	Total Miles Out	Return
Charlotte	0.0	0.0	117.3
Sloane's Ferry	10.9	10.9	106.4
Belmont	1.7	12.6	104.7
Lowell	4.7	17.3	100.0
Gastonia	5.5	22.8	94.5
Bessemer City	6.8	29.6	87.7
King's Mountain	6.0	35.6	81.7
Grover	8.1	43.7	73.6
Blacksburg, S. C.	6.3	50.0	67.3
Gaffney	9.1	59.1	58.2
Cowpens	11.9	71.0	46.3
Converse	3.1	74.1	43.2
Spartanburg	6.4	80.5	36.8
Fair Forest	5.3	85.8	31.5
Tucapau	6.5	92.3	25.0
Duncan	4.6	96.9	20.4
Greer	5.1	102.0	15.3
Taylors	5.6	107.6	9.7
Greenville	9.7	117.3	0.0

Greenville-Atlanta, 170.7 Miles.

	Miles to	Total Miles Out	Return
Greenville	0.0	0.0	170.7
Oak Grove	9.4	9.4	161.3
Piedmont	2.2	11.6	159.1
Anderson	21.0	32.6	138.1
Fair Play	23.0	55.6	115.1
Lavonia, Ga.	10.2	65.8	104.9
Bowersville	5.6	71.4	99.3
Canon	2.4	73.8	96.9
Royston	4.5	78.3	92.4
Franklin Springs	2.2	80.5	90.2
Pocataligo	12.7	93.2	77.5
Commerce	12.5	105.7	65.0
Apple Valley	4.5	110.2	60.5
Jefferson	4.9	115.1	55.6
Winder	3.6	118.7	52.0
Carl	6.0	124.7	46.0
Lawrenceville	12.3	137.0	33.7
Snellville	7.4	144.4	26.3
Stone Mountain	10.4	154.8	15.9
Clarkson	5.0	159.8	10.9
Scottdale	2.1	161.9	8.8
Ingleside	1.1	163.0	7.7
Decatur	1.6	164.6	6.1
Kirkwood	1.9	166.5	4.2
Atlanta	4.2	170.7	0.0

Atlanta-Birmingham, 190.2 Miles.

	Miles to	Total Miles Out	Return
Atlanta	0.0	0.0	190.2
Mabelton	13.2	13.2	177.0
Austel	3.6	16.8	173.4
Lithia Springs Station	2.6	19.4	170.8
Douglasville	6.4	25.8	164.4
Winston	5.2	31.0	159.2
Villa Rica	5.7	36.7	153.5
Temple	8.7	45.4	144.8
Bremen	7.8	53.2	137.0
Waco	2.7	55.9	134.3
Tallapoosa	7.4	63.3	126.9
Edwardsville, Ala.	17.2	80.5	109.7
Heflin	6.2	86.7	103.5
Iron City	6.7	93.4	96.8
Choccolocca	2.4	95.8	94.4
De Armanville	6.3	102.1	88.1
Oxford	2.7	104.8	85.4
Oxanna	1.8	106.6	83.6
Anniston	1.4	108.0	82.2
Peeks Hill	17.5	125.5	64.7
Greensport	7.8	133.3	56.9
Ashville	12.5	145.8	44.4
St. Claire Springs	10.6	156.4	33.8
Springville	4.7	161.1	29.1



Rock Houses in Nantahala Gorge, North Carolina, Vie with Mammoth Cave of Kentucky as an Exploration Ground.

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Argo	6.4	167.5	22.7
Trussville	7.9	175.4	14.8
Gate City	8.9	184.3	5.9
Birmingham	5.9	190.2	0.0

Birmingham-Tuscumbia, 139 Miles.

	Miles to	Total Miles Out	Return
Birmingham	0.0	0.0	139.0
Mount Pinson	15.3	15.3	123.7
Village Springs	6.5	21.8	117.2
Compton	2.5	24.3	114.7
Tidwell	8.5	32.8	106.2
Cleveland	7.0	39.8	99.2
Blountsville	8.1	47.9	91.1
Berlin	13.7	61.6	77.4
Cullman	5.2	66.8	72.2
Hartselles	22.3	89.1	49.9
Decatur	6.9	96.0	43.0
Trinity	6.1	102.1	36.9
Hillsboro	5.8	107.9	31.1
Wheeler	3.9	111.8	27.2
Courtland	3.1	114.9	24.1
Town Creek	6.1	121.0	18.0
Leighton	7.1	128.1	10.9

Nashville-Mammoth Cave, 103.2 Miles.

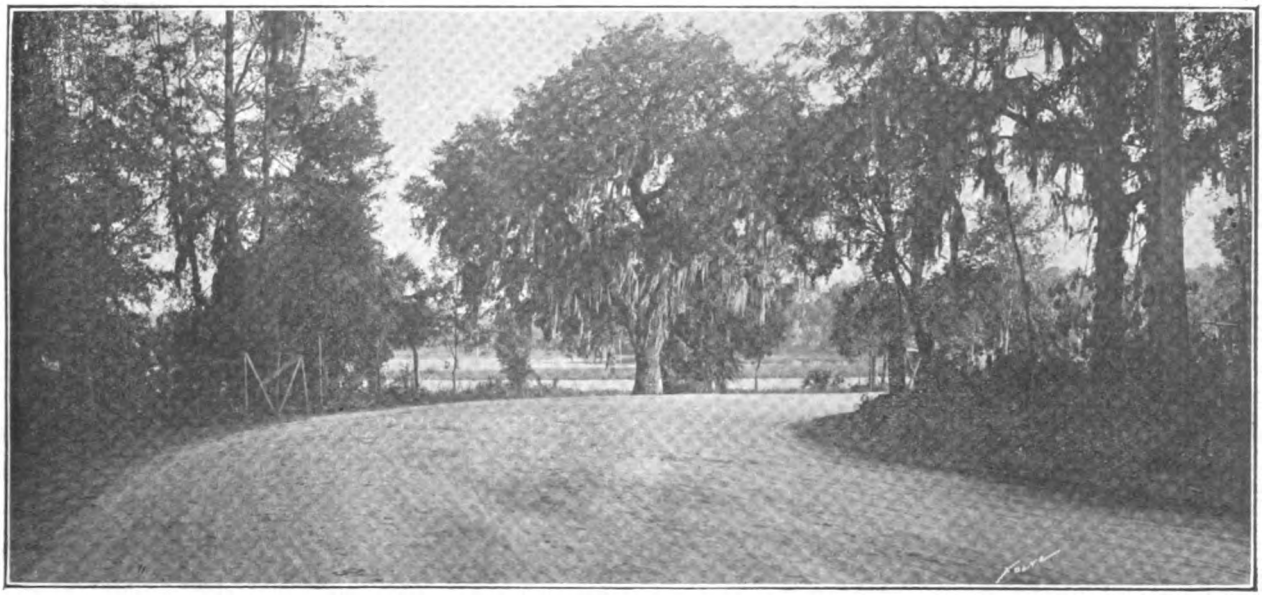
	Miles to	Total Miles Out	Return
Nashville	0.0	0.0	103.2
Goodlettsville	13.1	13.1	90.1
White House	12.9	26.0	77.2
Franklin, Ky.	20.5	46.5	56.7
Bowling Green	10.3	56.8	46.4
Glasgow Junction	35.2	92.0	11.2
Mammoth Cave	11.2	103.2	0.0

Mammoth Cave—Louisville, 116.2 Miles.

	Miles to	Total Miles Out	Return
Mammoth Cave	0.0	0.0	116.2
Cave City	10.4	10.4	105.8
Bear Wallow	6.4	16.8	99.4
Uno	4.4	21.2	95.0
Hardyville	4.4	25.6	90.6
Canmer	2.9	28.5	87.7
Magnolia	13.0	41.5	74.7
Buffalo	5.6	47.1	69.1
Athertonville	1.9	49.0	67.2
Homestead	2.1	112.7	23.4
Elizabethtown	3.8	116.5	19.6
Cleves, O.	3.5	120.0	16.1
Mack	6.7	126.7	9.4
Cincinnati	9.4	136.1	0.0

Cincinnati-Zanesville, 153.3 Miles.

	Miles to	Total Miles Out	Return
Cincinnati	0.0	0.0	153.3
Norwood	5.6	5.6	147.7
Pleasant Ridge	2.2	7.8	145.5
Silverton	1.5	9.3	144.0
Montgomery	3.6	12.9	140.4
Fosters	9.1	22.0	131.3
Hopkinsville	2.2	24.2	129.1
Morrow	5.1	29.3	124.0
Rochester	1.8	31.1	122.2
Clarksville	7.1	38.2	115.1
Sligo	4.2	42.4	110.9
Wilmington	5.0	47.4	105.9
Sabina	10.5	57.9	95.4
Washington C. H.	10.9	68.8	84.5
New Holland	9.5	78.3	75.0
Williamsport	7.5	85.8	67.5



Indicating Character of Roads to Be Encountered in Vicinity of Savannah, Ga., and the Typical Southern Foliage.

Tuscumbia	10.9	139.0	0.0

Tuscumbia-Nashville, 121.9 Miles.

	Miles to	Total Miles Out	Return
Tuscumbia	0.0	0.0	121.9
Sheffield	2.2	2.2	119.7
Florence	4.5	6.7	115.2
St. Florian	6.2	12.9	109.0
Green Hill	10.8	23.7	98.2
Loretto, Tenn.	7.9	31.6	90.3
Pleasant Point	5.8	37.4	84.5
Leoma	2.2	39.6	82.3
Dunn	1.9	41.5	80.4
Lawrenceburg	3.5	45.0	76.9
Summertown	13.9	58.9	63.0
Crestview	1.2	60.1	61.8
Williamsville	4.2	64.3	57.6
Sandy Hook	0.8	65.1	56.8
Mt. Pleasant	4.0	69.1	52.8
Ridley	1.5	70.6	51.3
Columbia	9.8	80.4	41.5
Neapolis	7.5	87.9	34.0
Brentwood	25.1	113.0	8.9
Nashville	8.9	121.9	0.0
New Haven	12.1	61.1	55.1
Bardstown	14.7	75.8	40.4
Mt. Washington	19.7	95.5	20.7
Louisville	20.7	116.2	0.0

Louisville-Cincinnati, 136.1 Miles.

	Miles to	Total Miles Out	Return
Louisville	0.0	0.0	136.1
St. Mathews	6.2	6.2	129.9
Middletown	6.3	12.5	123.6
Eastwood	5.1	17.6	118.5
Simpsonville	5.5	23.1	113.0
Shelbyville	7.5	30.6	105.5
Eminence	11.6	42.2	93.9
Newcastle	4.4	46.6	89.5
Campbellsburg	6.7	53.3	82.8
Carrollton	12.8	66.1	70.0
Vevay, Ind.	8.9	75.0	61.1
Markland	4.9	79.9	56.2
East Enterprise	6.9	86.8	49.3
Oberdeen	2.2	89.0	47.1
Rising Sun	9.4	98.4	37.7
Aurora	8.4	106.8	29.3
Lawrenceburg	3.8	110.6	25.5
Circleville	9.3	95.1	58.2
Amanda	11.5	106.6	46.7
Lancaster	9.3	115.9	37.4
Colfax	5.6	121.5	31.8
West Rushville	3.3	124.8	28.5
Rushville	1.1	125.9	27.4
Somerset	7.6	133.5	19.8
Sego	5.6	139.1	14.2
Fultonham	3.8	142.9	10.4
East Fultonham	0.8	143.7	9.6
South Zanesville	6.9	150.6	2.7
Zanesville	2.7	153.3	0.0

Zanesville-Pittsburg, 134.4 Miles.

	Miles to	Total Miles Out	Return
Zanesville	0.0	0.0	134.4
Norwich	11.9	11.9	122.5
New Concord	3.2	15.1	119.3
Cambridge	8.3	23.4	111.0
Washington	8.4	31.8	102.6
Elizabethtown	6.0	37.8	96.6
Fairview	5.6	43.4	91.0
Hendricksburg	3.4	46.8	87.6
Morristown	5.7	52.5	81.9

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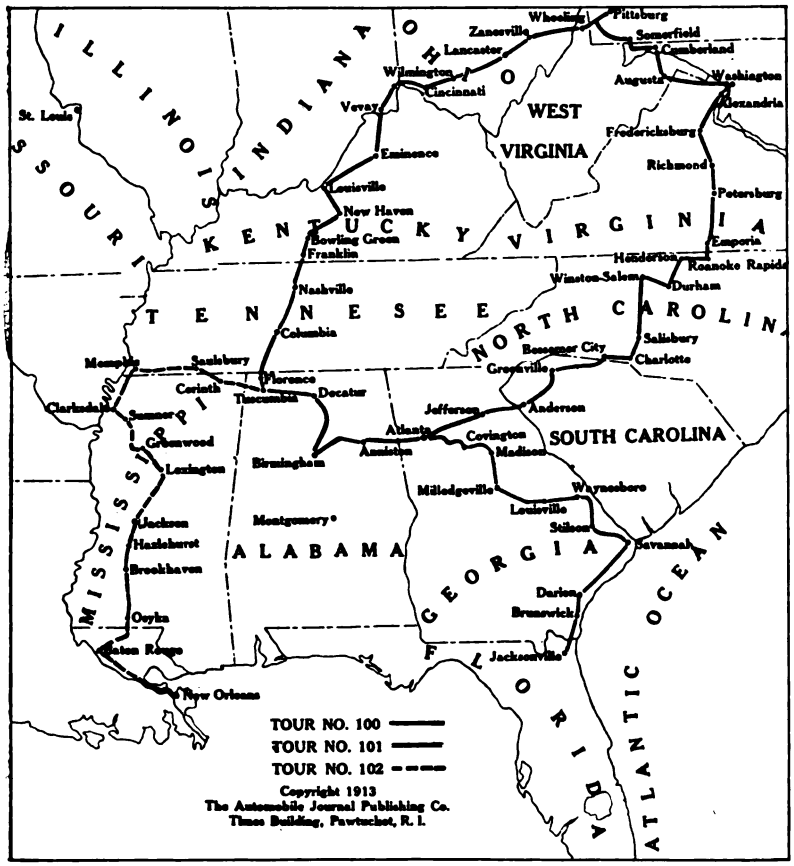
Loydsville	3.8	56.3	78.1
St. Clairsville	5.2	61.5	72.9
Bridgeport	9.7	71.2	63.2
Wheeling, W. Va.	1.2	72.4	62.0
Elm Grove	6.3	78.7	55.7
West Alexander, Penn.	10.4	89.1	45.3
Claysville	5.9	95.0	39.4
Washington	10.0	105.0	29.4
Cannonsburg	8.8	113.8	20.6
Bridgeville	9.4	123.2	11.2
Carnegie	4.1	127.3	7.1
Pittsburg	7.1	134.4	0.0

Pittsburg-Cumberland, 129.3 Miles.

	Miles to	Total Miles Out	Return
Pittsburg	0.0	0.0	129.3
Carnegie	7.1	7.1	122.2

Cumberland-Washington, 141.1 Miles.

	Miles to	Total Miles Out	Return
Cumberland	0.0	0.0	141.1
S. Cumberland	2.0	2.0	139.1
Frankford, W. Va.	11.1	13.1	128.0
Springfield	5.8	18.9	122.2
Wappocoma	2.0	20.9	120.2
Romney	7.1	28.0	113.1
Frenchburg	7.2	35.2	105.9
Augusta	2.0	37.2	103.9
Hanging Rock	7.0	44.2	96.9
Capon Bridge	6.9	51.1	90.0
Parishville	5.3	56.4	84.7
Gore	1.8	58.2	82.9
Hayfield	4.4	62.6	78.5
Chambersville	4.1	66.7	74.4



Bridgeville	4.1	11.2	118.1
Cannonsburg	9.4	20.6	108.7
Washington	8.8	29.4	99.9
Scenery Hill	12.5	41.9	87.4
Beallsville	3.4	45.3	84.0
Centerville	2.9	48.2	81.1
Brownsville	5.5	53.7	75.6
Davidson	3.4	57.1	72.2
Haddonfield	5.7	62.8	66.5
Uniontown	3.4	66.2	63.1
Hopwood	2.6	68.8	60.5
Fayette Springs	5.1	73.9	55.4
Farmington	3.7	77.6	51.7
Somerfield	10.8	88.4	40.9
Addison	5.4	93.8	35.5
Oakton	1.1	94.9	34.4
Keyser, Md.	3.4	98.3	31.0
Grantsville	5.3	103.6	25.7
Frostburg	14.1	117.7	11.6
Elkhart Mines	1.8	119.5	9.8
Cumberland	9.8	129.3	0.0
Winchester, Va.	4.3	71.0	70.1
Berryville	11.1	82.1	59.0
Round Hill	11.8	93.9	47.2
Purcellville	3.6	97.5	43.6
Hamilton	2.8	100.3	40.8
Leesburg	6.4	106.7	34.4
Falls Church	26.7	133.4	7.7
Ballston Spa	4.8	138.2	2.9
Washington, D. C.	2.9	141.1	0.0

ITINERARY NO. 101.

Night Stops—Atlanta, Milledgeville, Savannah and Brunswick, Ga.; Jacksonville, Fla., and Return. Four Days, 476.3 Miles.

Atlanta-Milledgeville, 117.8 Miles.

	Miles to	Total Miles Out	Return
Atlanta	0.0	0.0	117.8
Decatur	7.9	7.9	109.9
Ingleside	1.6	9.5	108.3
Scottdale	2.2	11.7	106.1
Clarkson	1.1	12.8	105.0
Stone Mountain	5.1	17.9	99.9
Redam	5.2	23.1	94.7
Lathonia	3.6	26.7	91.1
Conyers	6.6	33.3	84.5
Covington	11.4	44.7	73.1
Social Circle	11.8	56.5	61.3
Rutledge	7.3	63.8	54.0
Madison	9.7	73.5	44.3
Eatonton	22.7	96.2	21.6
Milledgeville	21.6	117.8	0.0

Milledgeville-Savannah, 182 Miles.

	Miles to	Total Miles Out	Return
Milledgeville	0.0	0.0	182.0
Sandersville	29.3	29.3	152.7
Davisboro	13.2	42.5	139.5
Louisville	13.0	55.5	126.5
Waynesboro	24.7	80.2	101.8
Perkin	13.8	94.0	88.0
Millen	7.5	101.5	80.5
Scarboro	7.7	109.2	72.8
Rockyford	4.7	113.9	68.1
Stateboro	16.7	130.6	51.4
Pretoria	4.5	135.1	46.9
Stilson	12.5	147.6	34.4
Blitchton	12.0	159.6	22.4
Eden	3.5	163.1	18.9
Pooler	9.2	172.3	9.7
Savannah	9.7	182.0	0.0

Savannah-Brunswick, 77 Miles.

	Miles to	Total Miles Out	Return
Savannah	0.0	0.0	77.0
Freedman's Grove	27.0	27.0	50.0
Riceboro	7.5	34.5	42.5
Eulonia	17.0	51.5	25.5
Darien	11.5	63.0	14.0
Brunswick	14.0	77.0	0.0

Brunswick-Jacksonville, 99.5 Miles.

	Miles to	Total Miles Out	Return
Brunswick	0.0	0.0	99.5
Old Sterling	10.5	10.5	89.0
Brookman	10.5	21.0	78.5
Tarboro	19.7	40.7	58.8
Owen's Ferry	3.5	44.2	55.3
King's Ferry	14.3	58.5	41.0
Callahan	18.5	77.0	22.5
Jacksonville	22.5	99.5	0.0

ITINERARY NO. 102.

Night Stops—Tuscumbia, Ala.; Memphis, Tenn.; Sumner and Jackson, Miss.; Baton Rouge and New Orleans, La., and Return. Five Days, 742.9 Miles.

Tuscumbia-Memphis, 159.4 Miles.

	Miles to	Total Miles Out	Return
Tuscumbia	0.0	0.0	159.4
Barton	11.7	11.7	147.7

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Cherokee	4.7	16.4	143.0
Iuka, Miss.	18.3	34.7	124.7
Burnsville	9.6	44.3	115.1
Corinth	15.5	59.8	99.6
Essary Springs, Tenn.	20.5	80.3	79.1
Rogers Spring	12.8	93.1	66.3
Saulsbury	7.5	100.6	58.8
Grand Junction	6.9	107.5	51.9
La Grange	3.5	111.0	48.4
Moscow	9.8	120.8	38.6
Rossville	8.4	129.2	30.2
Piperton	4.2	133.4	26.0
Collierville	2.5	135.9	23.5
Germantown	8.9	144.8	14.6
Whites	5.2	150.0	9.4
Aulon	4.1	154.1	5.3
Memphis	5.3	159.4	0.0

Memphis-Sumner, 120 Miles.

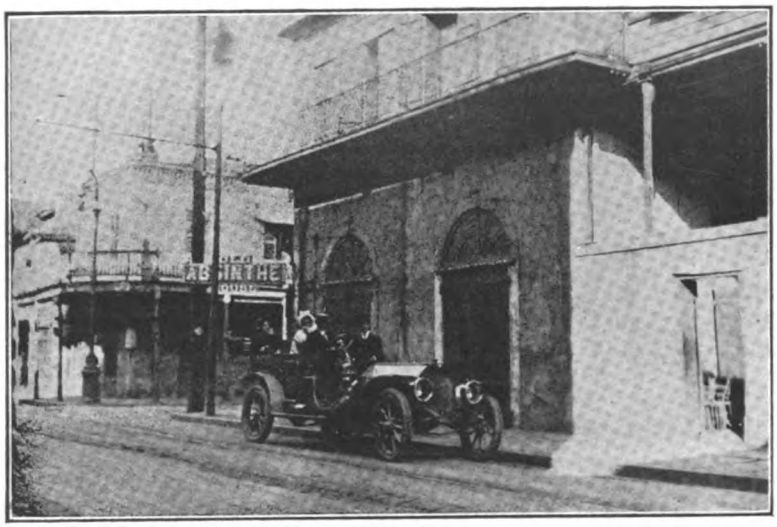
	Miles to	Total Miles Out	Total Miles Return
Memphis	0.0	0.0	120.0
Lynchburg, Miss.	15.0	15.0	105.0
Glover	5.7	20.7	99.3
Lake Cormorant	3.7	24.4	95.6
Clacks	6.8	31.2	88.8
Robinsonville	3.8	35.0	85.0
Hollywood	7.0	42.0	78.0
Tunica	4.5	46.5	73.5
Clayton	8.7	55.2	64.8
Dundee	7.2	62.4	57.6
Lula	6.8	69.2	50.8
Rich	3.5	72.7	47.3
Coahoma	6.7	79.4	40.6
Cloverhill	7.8	87.2	32.8
Clarksdale	6.1	93.3	26.7
Tutwiler	20.9	114.2	5.8
Sumner	5.8	120.0	0.0

Sumner-Jackson, 165.5 Miles.

	Miles to	Total Miles Out	Total Miles Return
Sumner	0.0	0.0	165.5
Whitehead	13.0	13.0	152.5
Glendora	1.8	14.8	150.7
Black Bayou	1.7	16.5	149.0
Schlater	11.5	28.0	137.5
Greenwood	22.5	50.5	115.0
Lexington	40.2	90.7	74.8
Franklin	8.0	98.7	66.8
Goodman	8.5	107.2	58.3
Pickens	8.5	115.7	49.8
Canton	23.2	138.9	26.6
Guckstadt	9.2	148.1	17.4
Madison	4.3	152.4	13.1
Ridgeland	2.3	154.7	10.8
Tougaloo	2.5	157.2	8.3
Jackson	8.3	165.5	0.0

Jackson-Baton Rouge, 179 Miles.

	Miles to	Total Miles Out	Total Miles Return
Jackson	0.0	0.0	179.0
Terry	17.3	17.3	161.7
Crystal Springs	9.1	26.4	152.6
Haxlehurst	9.6	36.0	143.0
Beauregard	11.8	47.8	131.2
Wesson	1.7	49.5	129.5
Brookhaven	9.9	59.4	119.6
Norfield	7.4	66.8	112.2
Johnston	10.9	77.7	101.3
Osyka	28.5	106.2	72.8
Kentwood, La.	5.5	111.7	67.3
Greensburg	17.3	129.0	50.0
Baton Rouge	50.0	179.0	0.0



The Old Absinthe House, One of the Ancient Landmarks in New Orleans.

Baton Rouge-New Orleans, 119 Miles.

	Miles to	Total Miles Out	Total Miles Return
Baton Rouge	0.0	0.0	119.0
Darrow	43.5	43.5	75.5
La Place	41.0	84.5	34.5
Kenner	23.0	107.5	11.5
New Orleans	11.5	119.0	0.0

ITINERARIES COVERING THE MIDDLE WEST.

Buffalo to Chicago and Return by Way of Detroit and Canadian Points---Detroit to Cincinnati, Indianapolis and South Bend---Chicago-Indianapolis-St. Louis.

WHILE the Middle West does not offer the scenic grandeurs of New England and the East or the Pacific Coast and the Far West, there is abundant reason for outlining the itineraries presented herewith, aside from the desire to present additional routings which may be utilized in making transcontinental tours. An effort has been made to include in these itineraries a section of the country which not only will appeal to those who are making through tours, but those who are searching for good roads and plenty to divert the attention.

Itinerary No. 125 is outlined to connect Buffalo with Chicago over the so-called main transcontinental route. The return offers an option, with opportunity to visit some of the interesting centres of the industry, including Detroit, and a decidedly picturesque portion of Canada. The roads, both going and returning, are of such character as to leave no room for criticism.

Itinerary No. 126 connects Detroit with the South, and while it will be found that the first portion of this tour, as outlined, passes through that section of the Middle West which was visited by disastrous floods earlier in the year, advices received within a few days indicate that the condition of the roads is such that the tourist need have no hesitancy in attempting the trip. In the vicinity of Dayton, many bridges were washed away, but it is stated that most of these have been replaced with temporary structures, and where this has been found impracticable, ferries are being maintained for the present.

The road between Cincinnati and Indianapolis is said not to have been affected seriously. Advices from Indianapolis within the past few weeks state that no trouble should be experienced over the route selected. There is a shorter route between Connersville and Indianapolis, but it is understood

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that in one or two places this will offer some difficulties for the present. The route selected presents good macadam throughout a greater portion of the distance between the cities named.

Itinerary No. 127 offers the transcontinental tourist two options. Going from east to west, Indianapolis may be reached by way of Pittsburg and Cincinnati, utilizing other itineraries mentioned herein. The connection between Indianapolis and St. Louis is that being utilized by the Indiana Manufacturers' Association. Those who desire may follow the main transcontinental route to Chicago and then go to St. Louis by reversing the latter portion of this itinerary.

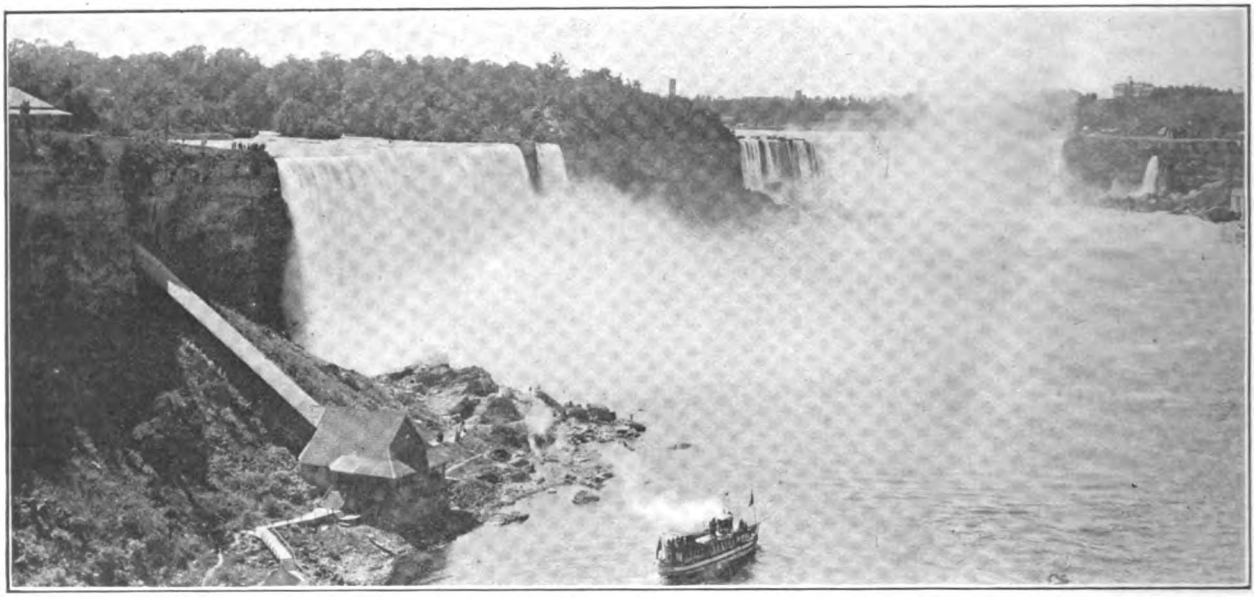
Portland	1.4	52.3	82.3
Westfield	6.9	59.2	75.4
Forsythe	5.3	64.5	70.1
Ripley	3.8	68.3	66.3
State Line	3.0	71.3	63.3
Northeast, Penn.	4.4	75.7	58.9
Harbor Creek	7.2	82.9	51.7
Wesleyville	3.8	86.7	47.9
Erie	3.3	90.0	44.6
Fairview	12.4	102.4	32.2
Girard	3.8	106.2	28.4
East Springfield	5.5	111.7	22.9
West Springfield	3.8	115.5	19.1
Conneaut, O.	4.6	120.1	14.5
Amboy	3.4	123.5	11.1
Kingsville	4.6	128.1	6.5
Ashtabula	6.5	134.6	0.0

Ashtabula-Toledo, 178.3 Miles.

	Miles to	Total Miles Out	Return
Ashtabula	0.0	0.0	178.3
Saybrook	5.6	5.6	172.7
Geneva	4.2	9.8	168.5
Unionville	4.3	14.1	164.2
Madison	2.5	16.6	161.7
Stony Bridge	2.0	165.4	12.9
Toledo	12.9	178.3	0.0

Toledo-South Bend, 166 Miles.

	Miles to	Total Miles Out	Return
Toledo	0.0	0.0	166.0
Java	17.0	17.0	149.0
Swanton	6.5	23.5	142.5
Delta	6.8	30.3	135.7
Wauseon	8.6	38.9	127.1
Archbold	10.3	49.2	116.8
Stryker	7.1	56.3	109.7
Bryan	8.1	64.4	101.6
Edgerton	11.6	76.0	90.0
Butler, Ind.	7.0	83.0	83.0
Waterloo	7.7	90.7	75.3
Kendallville	13.5	104.2	61.8
Brimfield	7.0	111.2	54.8
Wawaka	4.5	115.7	50.3
Ligonier	6.2	121.9	44.1
Millersburg	9.2	131.1	34.9
Goshen	9.4	140.5	25.5
Elkhart	10.2	150.7	15.3
Osceola	6.0	156.7	9.3
Mishawaka	5.3	162.0	4.0
South Bend	4.0	166.0	0.0



Panoramic View of the American and Horseshoe Falls at Niagara, as Seen from the Upper Arch Bridge.

ITINERARY NO. 125.

Night Stops—Buffalo, N. Y.; Ashtabula and Toledo, O.; South Bend, Ind.; Chicago, Ill.; St. Joseph, Battle Creek and Detroit, Mich.; London, Ont. Nine Days, 1189 Miles.

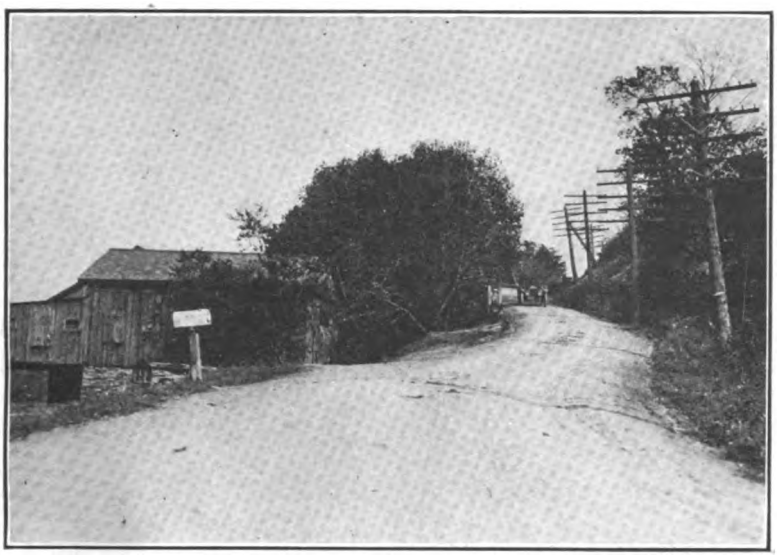
Buffalo-Ashtabula, 134.6 Miles.

	Miles to	Total Miles Out	Return
Buffalo	0.0	0.0	134.6
Evans	21.2	21.2	113.4
Irving	7.6	28.8	105.8
Silver Creek	3.4	32.2	102.4
Sheridan	5.9	38.1	96.5
Fredonia	6.0	44.1	90.5
Brocton	6.8	50.9	83.7
Painesville	11.1	27.7	150.6
Mentor	5.8	33.5	144.8
Willoughby	4.9	38.4	139.9
Wickliffe	5.8	44.2	134.1
Euclid	2.8	47.0	131.3
Cleveland	10.3	57.3	121.0
Rocky River	8.0	65.3	113.0
Finney's Corners	1.8	67.1	111.2
Dover	4.4	71.5	106.8
Bement	3.4	74.9	103.4
Ridgeville	3.7	78.6	99.7
Elyria	4.7	83.3	95.0
Amherst	7.4	90.7	87.6
Henrietta	3.3	94.0	84.3
Birmingham	2.7	96.7	81.6
Berlinville	8.8	105.5	72.8
Norwalk	7.0	112.5	65.8
Monroeville	4.8	117.3	61.0
N. Monroeville	3.8	121.1	57.2
Bellevue	6.0	127.1	51.2
Clyde	7.6	134.7	43.6
Sandusky Jct.	6.9	141.6	36.7
Fremont	0.7	142.3	36.0
Woodville	14.6	156.9	21.4
Lemoyne	6.5	163.4	14.9

South Bend-Chicago, 101.1 Miles.

	Miles to	Total Miles Out	Return
South Bend	0.0	0.0	101.1
New Carlisle	13.6	13.6	87.5
La Porte	12.3	25.9	75.2
Pinhook	8.4	34.3	66.8
Westville	2.7	37.0	64.1
Valparaiso	10.3	47.3	53.8
Wheeler	7.5	54.8	46.3
Hobart	5.2	60.0	41.1
Gary	4.0	64.0	37.1
Highlands	7.4	71.4	29.7
Hessville	2.2	73.6	27.5
Gibson	1.1	74.7	26.4
Grasselli	1.0	75.7	25.4
Calumet	0.9	76.6	24.5
East Chicago	1.1	77.7	23.4
Whiting	3.0	80.7	20.4
South Chicago	5.3	86.0	15.1
Bryn Mawr	3.0	89.0	12.1
Chicago	12.1	101.1	0.0

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State Line Hill on the Way from Buffalo, N. Y., to Erie, Penn.

Chicago-St. Joseph, 122.8 Miles.

	Miles to	Total Miles Out	Return
Chicago	0.0	0.0	122.8
Washington Park	6.2	6.2	116.6
Burnside	5.2	11.4	111.4
Roseland	3.1	14.5	108.3
Kensington	0.7	15.2	107.6
Riverdale	2.6	17.8	105.0
Dolton	0.7	18.5	104.3
Oak Glen	6.3	24.8	98.0
Lansing	1.4	26.2	96.6
Munster	0.7	26.9	95.9
Highlands, Ind.	3.1	30.0	92.8
Gary	7.4	37.4	85.4
Hobart	4.0	41.4	81.4
Porter	13.1	54.5	68.3
Michigan City	16.2	70.7	52.1
Rolling Prairie	14.8	85.5	37.3
Hudson Lake	5.0	90.5	32.3
Galien, Mich.	7.8	98.3	24.5
Glendora	5.9	104.2	18.6
Hill's Corners	6.0	110.2	12.6
Baroda	1.0	111.2	11.6
Stevensville	4.4	115.6	7.2
St. Joseph	7.2	122.8	0.0

St. Joseph-Battle Creek, 75 Miles.

	Miles to	Total Miles Out	Return
St. Joseph	0.0	0.0	75.0
Benton Harbor	1.4	1.4	73.6
Riverside	6.1	7.5	67.5
Coloma	4.2	11.7	63.3
Watervliet	2.3	14.0	61.0
Hartford	4.8	18.8	56.2
Lawrence	5.8	24.6	50.4
Paw Paw	8.8	33.4	41.6
Almena	5.6	39.0	36.0
Kalamazoo	12.6	51.6	23.4
Galesburg	8.6	60.2	14.8
Gull Lake Junction	5.3	65.5	9.5
Battle Creek	9.5	75.0	0.0

Battle Creek-Detroit, 116.5 Miles.

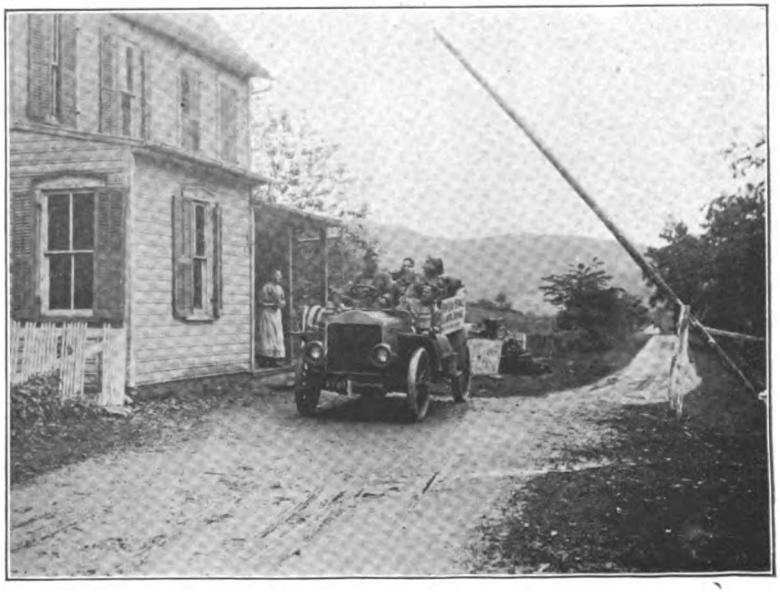
	Miles to	Total Miles Out	Return
Battle Creek	0.0	0.0	116.5
Cresco	8.0	8.0	108.5
Marshall	5.1	13.1	103.4
Albion	11.3	24.4	92.1
Parma	7.9	32.3	84.2
Jackson	10.3	42.6	73.9
Grass Lake	10.1	52.7	63.8
Chelsea	11.3	64.0	52.5
Lima Center	8.6	72.6	43.9
Ann Arbor	10.1	82.7	33.8
Ypsilanti	8.4	91.1	25.4
Wayne	12.2	103.3	13.2
Dearborn	7.2	110.5	6.0
Detroit	6.0	116.5	0.0

Detroit-London, 142 Miles.

	Miles to	Total Miles Out	Return
Detroit	0.0	0.0	142.0
Windsor, Ont.	0.4	0.4	141.6
Old Castle	8.9	9.3	132.7
Maidstone	3.5	12.8	129.2
Essex	4.5	17.3	124.7
Olinda	5.3	22.6	119.4
Ruthven	7.8	30.4	111.6
Leamington	3.6	34.0	108.6
Wheatley	7.8	41.8	100.2
Cedar Springs	26.7	68.5	73.5
Blenheim	4.1	72.6	69.4
Ridgetown	9.9	82.5	59.5
Highgate	6.4	88.9	53.1
Clachan	7.7	96.6	45.4
Wardsville	7.5	104.1	37.9
Wood Green	3.1	107.2	34.8
Strathburn	3.0	110.2	31.8
Melbourne	9.3	119.5	22.5
Delaware	9.4	128.9	13.1
Lambeth	6.6	135.5	6.5
London	6.5	142.0	0.0

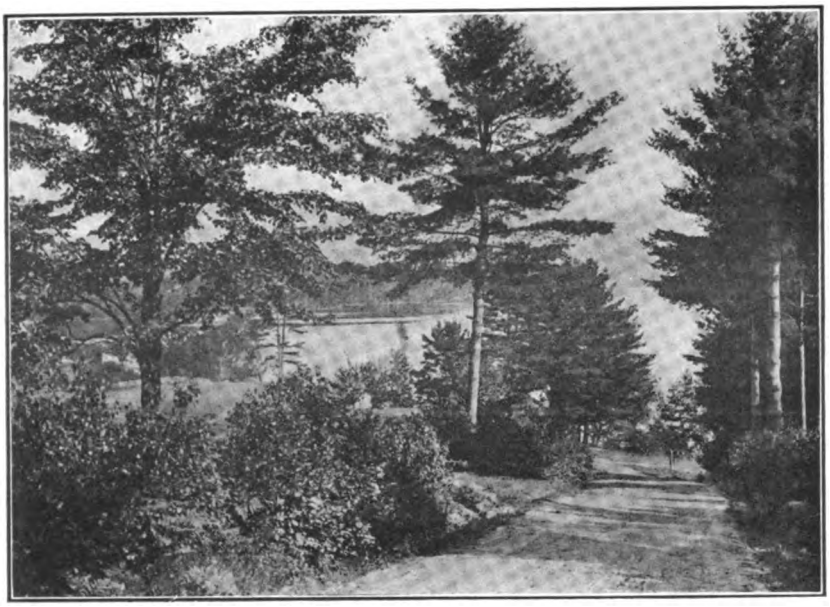
London-Buffalo, 152.7 Miles.

	Miles to	Total Miles Out	Return
London	0.0	0.0	152.7
Crumlin	5.8	5.8	146.9
Thamesford	8.3	14.1	138.6
Ingersoll	6.3	20.4	132.3
Beachville	4.7	25.1	127.6
Woodstock	4.7	29.8	122.9
Oxford	4.5	34.3	118.4
Cathcart	8.1	42.4	110.3
Brantford	13.9	56.3	96.4
Gainsville	3.3	59.6	93.1
Ancaster	13.2	72.8	79.9
Hamilton	6.8	79.6	73.1
Stony Creek	6.7	86.3	66.4
Winona	5.6	91.9	60.8
Grimsby	5.1	97.0	55.7
Beamsville	4.9	101.9	50.8
Vineland	4.2	106.1	46.6
Jordan	1.8	107.9	44.8
St. Catharines	7.1	115.0	37.7
Homer	3.3	118.3	34.4
St. Davids	4.9	123.2	29.5
Stamford	2.1	125.3	27.4
Niagara Falls, Ont.	4.8	130.1	22.6
Niagara Falls, N. Y.	1.0	131.1	21.6
Echota Station	2.5	133.6	19.1
La Salle	3.0	136.6	16.1
Gratwick	4.5	141.1	11.6
N. Tonawanda	1.7	142.8	9.9
Tonawanda	0.4	143.2	9.5
Buffalo	9.5	152.7	0.0



One of the Many Pennsylvania Toll Gates at Charmion.

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Pleasing View on the Way to Lake Rosseau in Western Ontario.

ITINERARY NO. 126.

Night Stops—Detroit, Mich.; Lima and Cincinnati, O.; Indianapolis and South Bend, Ind. Five Days, 718.6 Miles.

Detroit-Lima, 138.2 Miles.

	Miles to	Total Miles Out	Return
Detroit	0.0	0.0	138.2
Ecorse	8.9	8.9	129.3
Wyandotte	2.8	11.7	126.5
Trenton	4.3	16.0	122.2
Old Port	12.5	28.5	109.7
Monroe	9.2	37.7	100.5
La Salle	4.5	42.2	96.0
Erie	5.5	47.7	90.5
Toledo, O.	10.7	58.4	79.8
Maumee	9.0	67.4	70.8
Perrysburg	1.5	68.9	69.3
Bowling Green	12.6	81.5	56.7
Portage	3.3	84.8	53.4
Van Buren	12.7	97.5	40.7
Mortimer	2.0	99.5	38.7
Findlay	5.9	105.4	32.8
Mt. Cory	11.8	117.2	21.0
Bluffton	5.8	123.0	15.2
Beaver Dam	6.3	129.3	8.9
Lima	8.9	138.2	0.0

Lima-Cincinnati, 130.1 Miles.

	Miles to	Total Miles Out	Return
Lima	0.0	0.0	130.1
Snyder	5.4	5.4	124.7
Cridersville	2.3	7.7	122.4
Wapakoneta	7.9	15.6	114.5
Botkins	7.2	22.8	107.3
Anna	5.0	27.8	102.3
Sidney	7.7	35.5	94.6
Piqua	12.7	48.2	81.9
Troy	8.5	56.7	73.4
Eagleshurg	8.1	64.8	65.3
Vandalia	2.4	67.2	62.9
Chambersburg	2.3	69.5	60.6
Dayton	7.7	77.2	52.9
Centerville	9.3	86.5	43.6
Ridgeville	6.9	93.4	36.7
Lebanon	6.9	100.3	29.8
Hageman	4.5	104.8	25.3
Mason	3.8	108.6	21.5
Pisgah	4.2	112.8	17.3
Sharon	4.0	116.8	13.3
Reading	3.7	120.5	9.6
Cincinnati	9.6	130.1	0.0

Cincinnati-Indianapolis, 124 Miles.

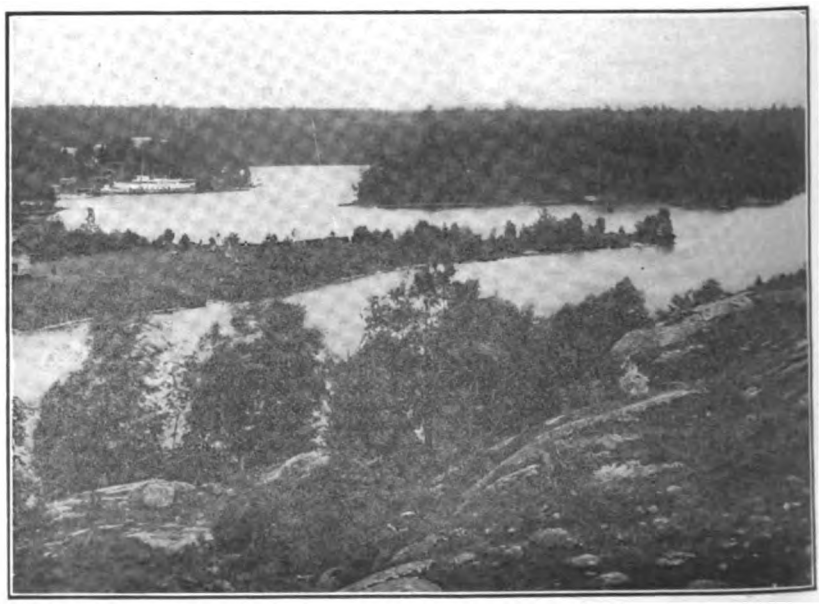
	Miles to	Total Miles Out	Return
Cincinnati	0.0	0.0	124.0
Cheviot	7.8	7.8	116.2
Dent	2.5	10.3	113.7
Miami	3.8	14.1	109.9
Harrison	7.9	22.0	102.0
New Trenton, Ind.	6.1	28.1	95.9
Cedar Grove	5.1	33.2	90.8
Brookville	6.6	39.8	84.2
Everton	11.6	51.4	72.6
Connersville	6.7	58.1	65.9
Milton	10.3	68.4	55.6
Cambridge City.	2.2	70.6	53.4
Dublin	1.9	72.5	51.5
Strawn	4.6	77.1	46.9
Lewisville	3.3	80.4	43.6
Dunreith	4.5	84.9	39.1
Ogden	1.8	86.7	37.3
Raysville	2.3	89.0	35.0
Knightstown	0.8	89.8	34.2
Charlottesville	4.6	94.4	29.6
Cleveland	2.0	96.4	27.6
Greenfield	6.5	102.9	21.1
Cumberland	10.0	112.9	11.1
Indianapolis	11.1	124.0	0.0

Indianapolis-South Bend, 136 Miles.

	Miles to	Total Miles Out	Return
Indianapolis	0.0	0.0	136.0
Augusta	9.7	9.7	126.3
Rosston	11.3	21.0	115.0
Kirklin	10.4	31.4	104.6
Boyleston	6.8	38.2	97.8
Middlefork	8.6	46.8	89.2
Burlington	4.5	51.3	84.7
Darwin	2.6	53.9	82.1
Carroll	3.2	57.1	78.9
Logansport	13.0	70.1	65.9
Meta	8.7	78.8	57.2
Rochester	13.9	92.7	43.3
Argos	14.5	107.2	28.8
Plymouth	5.1	112.3	23.7
Lapas	8.2	120.5	15.5
Lakeville	4.9	125.4	10.6
South Bend	10.6	136.0	0.0

South Bend-Detroit, 190.3 Miles.

	Miles to	Total Miles Out	Return
South Bend	0.0	0.0	190.3
Mishawaka	4.0	4.0	186.3
Osceola	5.3	9.3	181.0
Elkhart	10.2	19.5	170.8
Middlebury	13.5	33.0	157.3
Shipshewana	6.3	39.3	151.0
Howe	12.6	51.9	138.4
Breaton	5.7	57.6	132.7
Orland	7.3	64.9	125.4



Lake Joseph at Port Cockburn Presents Much Beautiful Island Scenery.

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Kinderhook, Mich.	14.0	78.9	111.4
Cold Water	9.6	88.5	101.8
Quincy	6.2	94.7	95.6
Allen	5.9	100.6	89.7
Jonesville	5.6	106.2	84.1
Milne's Corners	4.1	110.3	80.0
Moscow	5.0	115.3	75.0
Somerset Center	4.9	120.2	70.1
Somerset	1.9	122.1	68.2
Cambridge Junction	8.0	130.1	60.2
Clinton	13.1	143.2	47.1
Saline	11.9	155.1	35.2
Ypsilanti	9.8	164.9	25.4
Wayne	12.2	177.1	13.2
Dearborn	7.2	184.3	6.0
Detroit	6.0	190.3	0.0

ITINERARY NO. 127.

Night Stops—Chicago, Ill.; Lafayette, Indianapolis and Terre Haute, Ind.; St. Louis, Mo.; Springfield and Bloomington, Ill. Seven Days, 779.4 Miles.

Chicago-Lafayette, 136.1 Miles.

	Miles to	Total Miles Out	Return
Chicago	0.0	0.0	136.1
Highlands, Ind.	30.0	30.0	106.1
Schererville	4.6	34.6	101.5
Crown Point	9.2	43.8	92.3
Thayer	17.7	61.5	74.6
Roselawn	3.0	64.5	71.6
Aix	15.5	80.0	56.1
Rensselaer	7.4	87.4	48.7
Remington	11.9	99.3	36.8
Wolcott	6.3	105.6	30.5
Montmorenci	20.0	125.6	10.5
Lafayette	10.5	136.1	0.0

Lafayette-Indianapolis, 66 Miles.

	Miles to	Total Miles Out	Return
Lafayette	0.0	0.0	66.0
Dayton	7.5	7.5	58.5
Mulberry	3.8	11.3	54.7
Frankfort	12.7	24.0	42.0
Antioch	3.5	27.5	38.5
Mechanicsburg	5.1	32.6	33.4
Pike	2.3	34.9	31.1
Lebanon	5.4	40.3	25.7
Royalton	10.8	51.1	14.9
Bootjack	4.9	56.0	10.0
Flacksville	5.5	61.5	4.5
Indianapolis	4.5	66.0	0.0

Indianapolis-Terre Haute, 70.5 Miles.

	Miles to	Total Miles Out	Return
Indianapolis	0.0	0.0	70.5
Bridgeport	9.0	9.0	61.5
Plainfield	4.8	13.8	56.7
Belleville	4.9	18.7	51.8
Stilesville	8.1	26.8	43.7
Mt. Meridian	7.0	33.8	36.7
Coatsville	6.1	39.9	30.6
Manhattan	3.5	43.4	27.1
Reelsville	2.4	45.8	24.7
Harmony	5.9	51.7	18.8
Brazil	3.1	54.8	15.7
Seeleyville	7.6	62.4	8.1
Terre Haute	8.1	70.5	0.0

Terre Haute-St. Louis, 173 Miles.

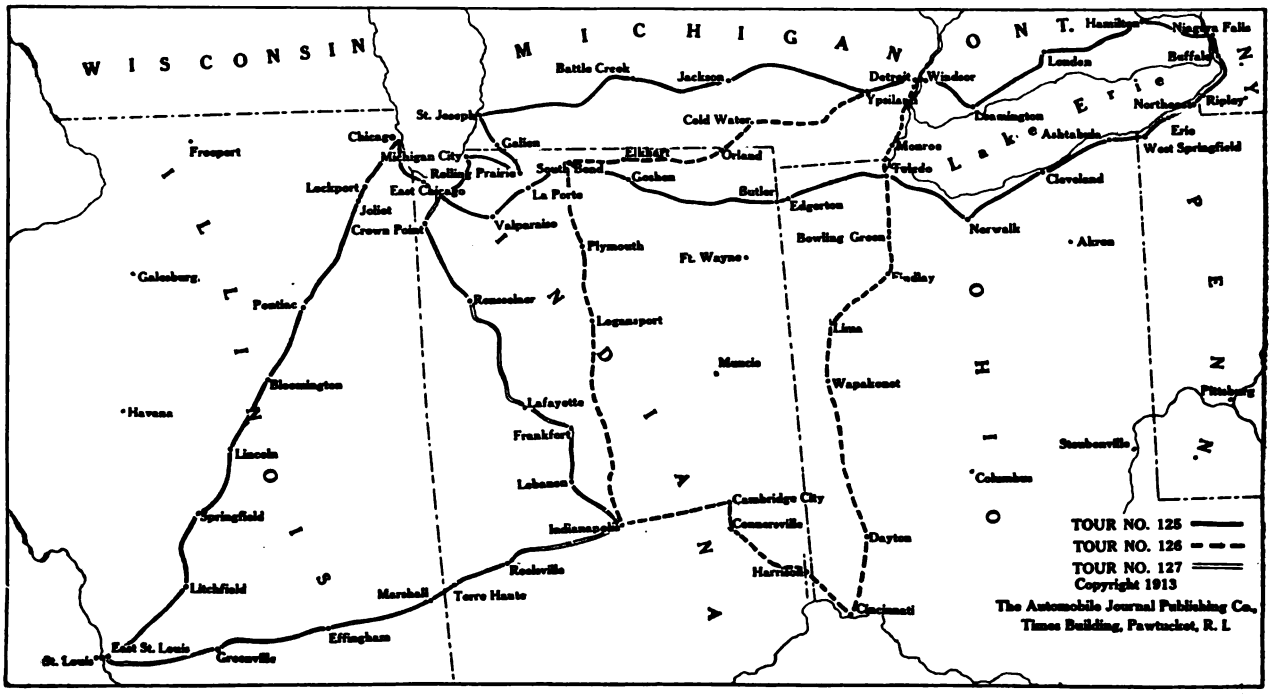
	Miles to	Total Miles Out	Return
Terre Haute	0.0	0.0	173.0
Cohn, Ill.	13.8	13.8	159.2
Marshall	3.0	16.8	156.2
Clarks	5.0	21.8	151.2
Martinsville	5.8	27.6	145.4
Oakleaf	4.1	31.7	141.3
Casey	2.2	33.9	139.1
Greenup	9.8	43.7	129.3
Jewett	5.2	48.9	124.1
Woodbury	3.1	52.0	121.0
Montrose	4.7	56.7	116.3
Teutopolis	5.3	62.0	111.0
Effingham	3.9	65.9	107.1
Dexter	10.1	76.0	97.0
Altamont	4.3	80.3	92.7
Brownstown	11.7	92.0	81.0
Bluff City	5.9	97.9	75.1
Vandalia	2.3	100.2	72.8
Hagerstown	4.3	104.5	68.5
Mulberry	6.7	111.2	61.8
Greenville	8.7	119.9	53.1
Stubblefield	4.9	124.8	48.2
Pocahontas	4.7	129.5	43.5
Highland	10.3	139.8	33.2
St. Jacobs	6.2	146.0	27.0
Troy	6.8	152.8	20.2
Collinsville	7.3	160.1	12.9
East St. Louis	10.8	170.9	2.1
St. Louis, Mo.	2.1	173.0	0.0

St. Louis-Springfield, 107.8 Miles.

	Miles to	Total Miles Out	Return
St. Louis	0.0	0.0	107.8
E. St. Louis, Ill.	2.1	2.1	105.7
Collinsville	10.8	12.9	94.9
Troy	3.0	15.9	91.9
Marysville	1.2	17.1	90.7
Edwardsville	8.3	25.4	82.4
Hamel	8.2	33.6	74.2
Staunton	11.0	44.6	63.2
Mt. Olive	6.4	51.0	56.8
Litchfield	10.9	61.9	45.9
Glenarm	31.6	93.5	14.3
Cotton Hill	6.2	99.7	8.1
Springfield	8.1	107.8	0.0

Springfield-Bloomington, 76.5 Miles.

	Miles to	Total Miles Out	Return
Springfield	0.0	0.0	76.5
Williamsville	15.0	15.0	61.5
Elkhart	8.0	23.0	53.5
Lincoln	14.5	37.5	39.0
McLean	20.9	58.4	18.1
Shirley	11.2	69.6	6.9
Bloomington	6.9	76.5	0.0



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Bloomington-Chicago, 149.5 Miles.												
	Miles to	Total Miles Out	Return									
Bloomington	0.0	0.0	149.5	Towanda	8.2	8.2	141.3	Minooka	13.3	92.7	56.8
				Lexington	10.1	18.3	131.2	Joliet	13.9	106.6	42.9
				Pontiac	22.9	41.2	108.3	Lockport	4.0	110.6	38.9
				Odell	10.8	52.0	97.5	LaGrange	19.5	130.1	19.4
				Dwight	8.1	60.1	89.4	Forest Park	9.5	139.6	9.9
				Morris	19.3	79.4	70.1	Chicago	9.9	149.5	0.0

THE FAR WEST AND THE PACIFIC COAST.

Suggestions for Transcontinental Touring, Reaching the Great Northwest, Traversing the Coast Line, the Rocky Mountain Districts and Entering Manitoba.

WITHIN the past few years the people of the Far West have done much to encourage transcontinental touring by the construction of good roads. The eight itineraries outlined in this section are believed to include all that could be desired in this respect, although it will not be contended that improved ways are to be found throughout their entire length. The accompanying map indicates what may be regarded as the most desirable touring country in these states, although many shorter tours may be enjoyed with several cities as temporary headquarters.

Itinerary No. 150 presents what is sometimes called the main transcontinental route from Chicago. Probably it offers less difficulty than any other crossing the Rocky mountains, and it has the advantage of being available for a larger portion of each year. With the exception of portions of the route in Wyoming and Nevada it is not anticipated that the tourist will experience unnecessary delays or that there will be difficulty in following the route as outlined.

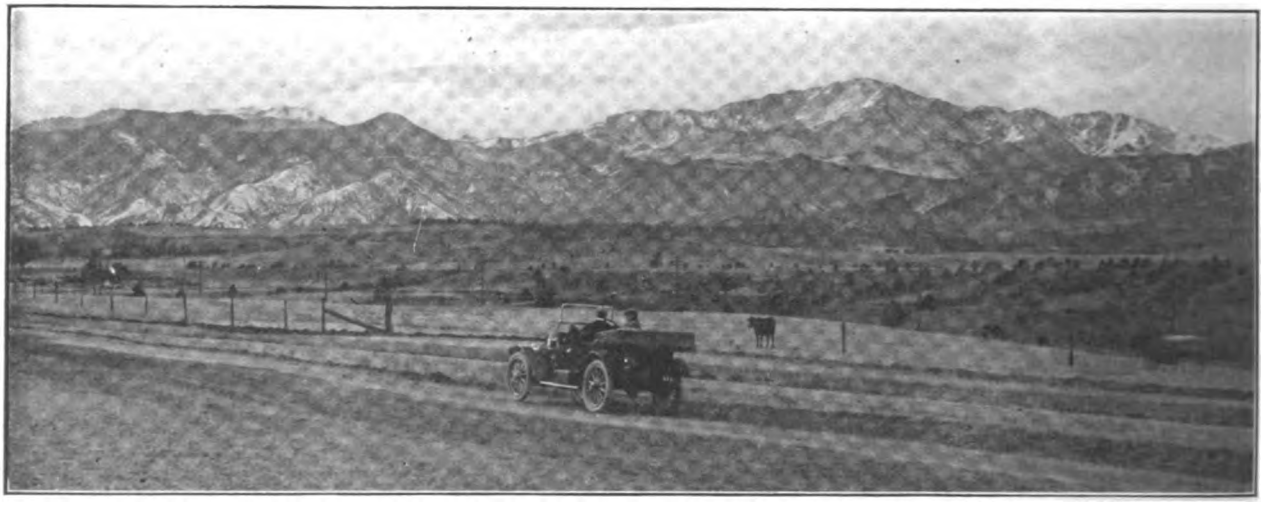
Itinerary No. 151 is offered as an optional route between Los Angeles and Memphis, and is often termed the southern route. Good roads should be encountered in Arkansas and Texas, and in Arizona and California. The difficult portions are in eastern Arizona, New Mexico and western Texas.

Itinerary No. 152 connects St. Louis and Denver, and other routings outlined give the necessary options from this point. It may be added that this is the route to be followed by the Indiana Manufacturers' Association and is of interest because of its historic associations, as well as the improved ways encountered.

Itinerary No. 153 follows very closely that utilized for this year's national reliability tour. That portion between Minneapolis and Helena was used by the Minnesota State Automobile Association for its tour in 1911. The first section offers no difficulties, the roads being of macadam for the most part. Crossing North Dakota and Montana is to be attempted with caution, and it may be added that it were best to have at least two cars in the party. Accompanying this itinerary is a routing connecting Grand Forks, N. D., with Winnipeg, Man.

Itinerary No. 154 connects St. Louis with Forrest City, Ark., and affords opportunity for the tourist to utilize the southern tour from the Pacific Coast and return to the Atlantic seaboard by way of St. Louis and Chicago, or St. Louis, Indianapolis, Cincinnati, Pittsburg, etc. In addition it offers another connection with the South from Chicago in combination with other tours listed herein.

Itinerary No. 155 runs along the Pacific Coast south from San Francisco. The opening of the new Rincon causeway makes this route much less difficult than formerly. Itinerary No. 156 connects California with Seattle. Some criticism may be offered in that no connection between Seattle and Helena, Mont., is offered, but



On the Denver-Colorado Springs Highway, Where for Forty Miles the Road Parallels the Mountain Range, with Pike's Peak in the Background.

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Macadam Way Invites Tourist to View Wonders of Garden of the Gods.

The Automobile Journal is advised that no route now outlined between these two sections is practical for the average motorist. The effort has been to include only such routes as could be attempted by those who are accustomed to average driving conditions, and while transcontinental touring calls for special preparation in any instance, it is not deemed expedient to include itineraries which could not be expected to meet with approval.

Perhaps itinerary No. 157 is in some respects the most difficult of any presented. Advices from Colorado Springs and Phoenix suggest that the roads over this route have been improved very materially, and while there are long distances between habitations in many instances, it is stated that the tourist should be able to make the trip without discomfort.

It seems unnecessary to comment at length upon the scenic grandeurs of the Rocky mountain and Pacific Coast districts. The automobile offers a splendid opportunity to "See America First," and an effort has been made to give the necessary information as to how to reach the principal centres.

The transcontinental tourist hardly will make the journey without frequent stops, and abundant opportunity may be had to enjoy any number of side trips, full information concerning which may be gained upon arrival, although The Automobile Journal is prepared to offer suggestions covering any specific section, not outlined herein, upon request.

ITINERARY NO. 150.

Chicago to San Francisco.

Night Stops—Chicago, Ill.; Clinton and Marshalltown, Ia.; Omaha and Kearney, Neb.; Julesburg and Denver, Col.; Cheyenne, Rawlins and Green River, Wyo.; Salt Lake City and Kelton, Utah; Elkton and Reno, Nev.; Sacramento and San Francisco, Cal. 16 Days, 2766.2 Miles.

Chicago-Clinton, 147.5 Miles.

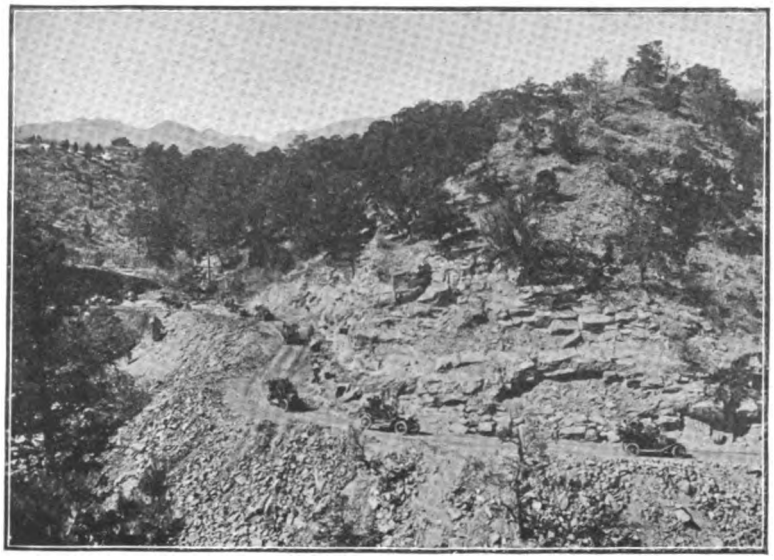
	Miles to	Total Miles Out	Return
Chicago	0.0	0.0	147.5
Austin	7.9	7.9	139.6
Oak Park	3.4	11.3	136.2
Maywood	0.8	12.1	135.4
Elmhurst	5.3	17.4	130.1
Lombard	4.1	21.5	126.0
West Chicago	9.1	30.6	116.9
Geneva	5.5	36.1	111.4
Elburn	8.4	44.5	103.0
De Kalb	15.8	60.3	87.2
Creston	11.2	71.5	76.0
Rochelle	6.1	77.6	69.9
Ashton	12.0	89.6	57.9
Franklin Groves	4.6	94.2	53.3
Dixon	9.7	103.9	43.6
Sterling	14.4	118.3	29.2
Emerson	3.6	121.9	25.6
Morrison	10.7	132.6	14.9
Union Grove	3.7	136.3	11.2
Fulton	7.6	143.9	3.6
Lyons, Ia	1.3	145.2	2.3
Clinton	2.3	147.5	0.0

Clinton-Marshalltown, 167.4 Miles.

	Miles to	Total Miles Out	Return
Clinton	0.0	0.0	167.4
Elvira	9.5	9.5	157.9
De Witt	11.6	21.1	146.3
Grand Mount	5.7	26.8	140.6
Wheatland	10.3	37.1	130.3
Lowden	6.2	43.3	124.1
Clarence	8.5	51.8	115.6
Mechanicsville	10.8	62.6	104.8
Lisbon	7.0	69.6	97.8
Mt. Vernon	1.8	71.4	96.0
Marion	13.2	84.6	82.8
Cedar Rapids	5.8	90.4	77.0
Belle Plains	36.5	126.9	40.5
Chelsea	6.5	133.4	34.0
Tama	11.5	144.9	22.5
Montour	8.5	153.4	14.0
Marshalltown	14.0	167.4	0.0

Marshalltown-Omaha, 219.3 Miles.

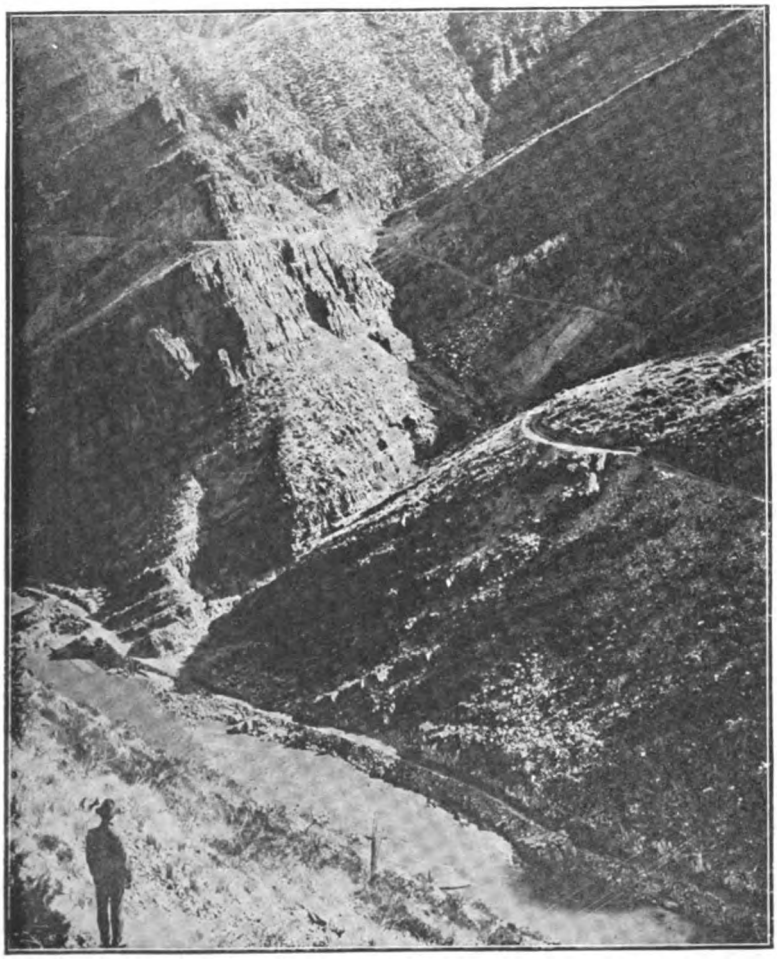
	Miles to	Total Miles Out	Return
Marshalltown	0.0	0.0	219.3
State Center	14.5	14.5	204.8
Colo	8.8	23.3	196.0



Typical Mountain Road in Rockies at Red Hill, Near Colorado Springs.

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Nevada	7.3	30.6	188.7
Ames	8.1	38.7	180.6
Jordan	10.6	49.3	170.0
Boone	5.6	54.9	164.4
Ogden	10.3	65.2	154.1
Beaver	6.4	71.6	147.7
Grand Junction	4.6	76.2	143.1
Jefferson	7.9	84.1	135.2
Scranton	10.0	94.1	125.2
Ralston	6.7	100.8	118.5
Glidden	5.0	105.8	113.5
Carroll	7.5	113.3	106.0
West Side	12.6	125.9	93.4
Vail	5.9	131.8	87.5
Denison	9.1	140.9	78.4
Arlon	8.5	149.4	69.9
Fremont	17.2	37.5	159.0
Ames	8.3	45.8	150.7
North Bend	8.2	54.0	142.5
Rogers	7.2	61.2	135.3
Schuyler	8.2	69.4	127.1
Benton	8.9	78.3	118.2
Columbus	7.6	85.9	110.6
Duncan	8.7	94.6	101.9
Silver Creek	8.3	102.9	93.6
Ravens	5.7	108.6	87.9
Clarks	5.5	114.1	82.4
Central City	12.9	127.0	69.5
Chapman	5.8	132.8	63.7
Grand Island	17.3	150.1	46.4
Alda	8.0	158.1	38.4
Wood River	10.0	168.1	28.4



Road Through Superstition Mountains, En Route to Roosevelt Dam from Phoenix, Ariz.

Dow City	2.5	151.9	67.4
Dunlap	8.6	160.5	58.8
Woodbine	11.6	172.1	47.2
Logan	10.1	182.2	37.1
Missouri Valley	9.7	191.9	27.4
Loveland	4.7	196.6	22.7
Crescent	10.4	207.0	12.3
Council Bluffs	7.9	214.9	4.4
Omaha, Neb	4.4	219.3	0.0

Omaha-Kearney, 196.5 Miles.

	Miles to	Total Miles Out	Return
Omaha	0.0	0.0	196.5
Elkhorn	17.1	17.1	179.4
Waterloo	3.2	20.3	176.2
Shelton	8.5	176.6	19.9
Gibbon	6.2	182.8	13.7
Buda	8.5	191.3	5.2
Kearney	5.2	196.5	0.0

Kearney-Julesburg, 196.5 Miles.

	Miles to	Total Miles Out	Return
Kearney	0.0	0.0	196.5
Odessa	9.6	9.6	186.9
Elm Creek	7.0	16.6	179.9
Overton	9.9	26.5	170.0
Lexington	10.3	36.8	159.7
Cozad	18.3	55.1	141.4
Willow Island	5.1	60.2	136.3
Gothenburg	7.8	68.0	128.5
Brady Island	13.3	81.3	115.2
Maxwell	9.4	90.7	105.8
North Platte	15.6	106.3	90.2
Hershy	13.6	119.9	76.6
Sutherland	6.6	126.5	70.0
Paxton	12.2	138.7	57.8
Korty	6.8	145.5	51.0
Roscoe	6.1	151.6	44.9
Ogalalla	7.3	158.9	37.6
Brule	11.0	169.9	26.6
Julesburg, Col.	26.6	196.5	0.0

Julesburg-Denver, 204.9 Miles.

	Miles to	Total Miles Out	Return
Julesburg	0.0	0.0	204.9
Ovid	8.3	8.3	196.6
Sedgwick	8.2	16.5	188.4
Red Lion	10.5	27.0	177.9
Crook	6.9	33.9	171.0
Proctor	8.3	42.2	162.7
Iliff	7.4	49.6	155.3
Sterling	12.3	61.9	143.0
Atwood	6.5	68.4	136.5
Merino	6.0	74.4	130.5
Hillrose	19.2	93.6	111.3
Brush	9.7	103.3	101.6
Fort Morgan	9.5	112.8	92.1
Morville	35.5	148.3	56.6
Bennett	24.8	173.1	31.8
Watkins	9.5	182.6	22.3
Sable	12.3	194.9	10.0
Denver	10.0	204.9	0.0

Denver-Cheyenne, 113 Miles.

	Miles to	Total Miles Out	Return
Denver	0.0	0.0	113.0
Broomfield	16.5	16.5	96.5
Lafayette	6.0	22.5	90.5
Longmont	12.8	35.3	77.7
Berthoud	11.9	47.2	65.8
Loveland	7.3	54.5	58.5
Fort Collins	13.0	67.5	45.5
Wellington	11.7	79.2	33.8
Cheyenne, Wyo.	33.8	113.0	0.0

Cheyenne-Rawlins, 195.5 Miles.

	Miles to	Total Miles Out	Return
Cheyenne	0.0	0.0	195.5
Borie	9.5	9.5	186.0
Otto	5.0	14.5	181.0
Granite Canyon	4.7	19.2	176.3
Buford	8.1	27.3	168.2
Laramie	31.3	58.6	136.9
Medicine Bow	74.0	132.6	62.9
Carbon	9.4	142.0	53.5
Hanna	13.0	155.0	40.5
Fort Steele	25.6	180.6	14.9
Greenville	7.9	188.5	7.0
Rawlins	7.0	195.5	0.0

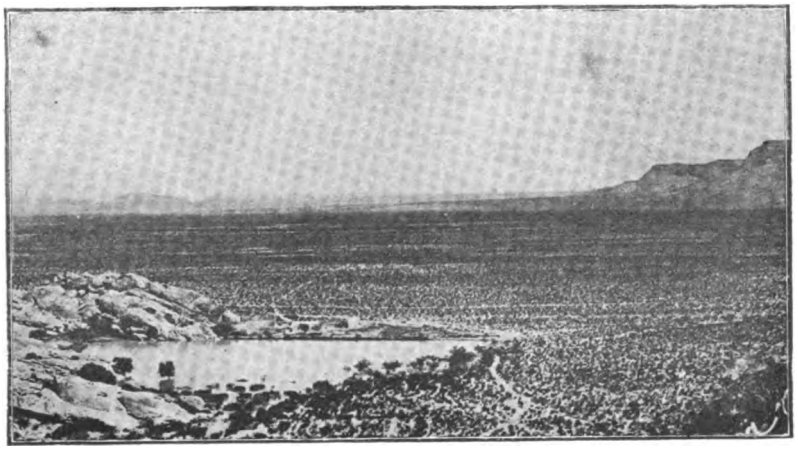
Rawlins-Green River, 157.5 Miles.

	Miles to	Total Miles Out	Return
Rawlins	0.0	0.0	157.5
Latham	30.0	30.0	127.5
Wamsutter	10.0	40.0	117.5
Red Desert	8.5	48.5	109.0
Tipton	8.0	56.5	101.0
Monell	12.0	68.5	89.0
Bitter Creek	25.0	93.5	64.0
Black Buttes	10.0	103.5	54.0
Mallville	6.0	109.5	48.0
Point of Rocks	6.0	115.5	42.0
Rock Springs	26.0	141.5	16.0
Green River	16.0	157.5	0.0

Green River-Salt Lake City, 190.1 Miles.

	Miles to	Total Miles Out	Return
Green River	0.0	0.0	190.1
Bryan	13.7	13.7	176.4
Granger	20.9	34.6	155.5
Liman	29.1	63.7	126.4

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Salt Desert in Neuva Alta Range of New Mexico.

Fort Bridger	5.7	69.4	120.7
Dog Springs	10.4	79.8	110.3
Spring Valley	7.1	86.9	103.2
Evanston	18.7	105.6	84.5
Wabatch, Utah	10.2	115.8	74.3
Castle Rock	7.1	122.9	67.2
Emery	7.9	130.8	59.3
Coalville	14.6	145.4	44.7
Wanship	13.2	158.6	31.5
Gorgoza	9.1	167.7	22.4
Dale	10.3	178.0	12.1
Salt Lake City	12.1	190.1	0.0

Salt Lake City-Kelton, 147.8 Miles.

	Miles to	Total Miles Out	Return
Salt Lake City	0.0	0.0	147.8
Bountiful	9.1	9.1	138.7
Centerville	2.2	11.3	136.5
Farmington	7.7	19.0	128.8
Kaysville	2.1	21.1	126.7
Layton	2.5	23.6	124.2
Clearfield	4.7	28.3	119.5
Ogden	9.1	37.4	110.4
North Ogden	8.9	46.3	101.5
Willard	5.0	51.3	96.5
Brigham	9.4	60.7	87.1
Honeyville	9.3	70.0	77.8
Deweyville	4.3	74.3	73.5
Tremonton	6.3	80.6	67.2
Blue Springs	19.8	100.4	47.4
Snowville	18.5	118.9	28.9
Curlew	7.3	126.2	21.6
Kelton	21.6	147.8	0.0

Kelton-Elko, 182.8 Miles.

	Miles to	Total Miles Out	Return
Kelton	0.0	0.0	182.8
Terrace	23.9	23.9	158.9
Lucin	26.7	50.6	132.2
Tacoma, Nev.	12.3	62.9	119.9
Montella	13.2	76.1	106.7
Loray	12.3	88.4	94.4
Cobre	5.2	93.6	89.2
Fenlon	18.3	111.9	70.9
Wells	19.2	131.1	51.7
Deeth	21.6	152.7	30.1
Halliek	10.7	163.4	19.4
Elko	19.4	182.8	0.0

Elko-Austin, 175 Miles.

	Miles to	Total Miles Out	Return
Elko	0.0	0.0	175.0
Hylton & Hanna Stores	33.0	33.0	142.0
Sadler's Ranch	17.0	50.0	125.0
Eureka	55.0	105.0	70.0
Austin	70.0	175.0	0.0

Austin-Reno, 183.5 Miles.

	Miles to	Total Miles Out	Return
Austin	0.0	0.0	183.5
Alpine Ranch	47.5	47.5	136.0
Eastgate	12.5	60.0	123.5
Westgate	20.0	80.0	103.5
Sand Springs	10.0	90.0	93.5
Fallon	27.0	117.0	66.5
Leetville	8.0	125.0	58.5
Hazen	8.5	133.5	50.0
Fernley	12.5	146.0	37.5
Wadsworth	3.5	149.5	34.0
Sparks	30.0	179.5	4.0
Reno	4.0	183.5	0.0

Reno-Sacramento, 152.7 Miles.

	Miles to	Total Miles Out	Return
Reno	0.0	0.0	152.7
Lawton	6.5	6.5	146.2
Verdi	5.5	12.0	140.7
Truckee, Cal.	23.0	35.0	117.7
Emigrant Gap	32.0	67.0	85.7
Alta	12.0	79.0	73.7
Gold Run	4.0	83.0	69.7
Magra	3.5	86.5	66.2
Colfax	7.5	94.0	58.7
Welmar	5.2	99.2	53.5
Clipper Gap	6.7	105.9	46.8
Auburn	6.0	111.9	40.8
Folsom	19.0	130.9	21.8
Sacramento	21.8	152.7	0.0

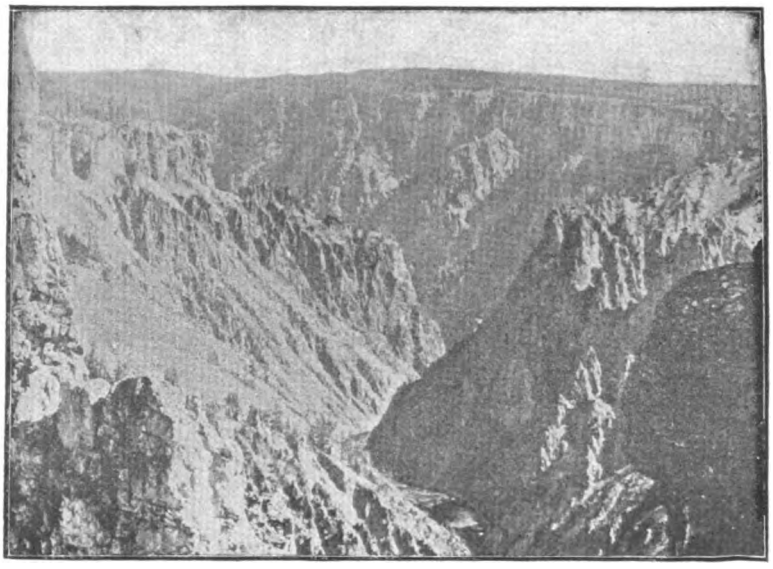
Sacramento-San Francisco, 136.2 Miles.

	Miles to	Total Miles Out	Return
Sacramento	0.0	0.0	136.2
Elk Grove	14.8	14.8	121.4
McConnell	3.1	17.9	118.3
Arno	2.2	20.1	116.1
Galt	6.2	26.3	109.9
Woodbridge	7.3	33.6	102.6
Lodi	3.0	36.6	99.6
Stockton	15.8	52.4	83.8
French Camp	5.0	57.4	78.8
Banta	11.9	69.3	66.9
Janney	7.0	76.3	59.9
Alta Mont	11.6	87.9	48.3
Greenville	2.7	90.6	45.6
Livermore	4.6	95.2	41.0
Dublin	10.3	105.5	30.7
East Oakland	22.1	127.6	8.6
Oakland	3.1	130.7	5.5
San Francisco	5.5	136.2	0.0

ITINERARY NO. 151.

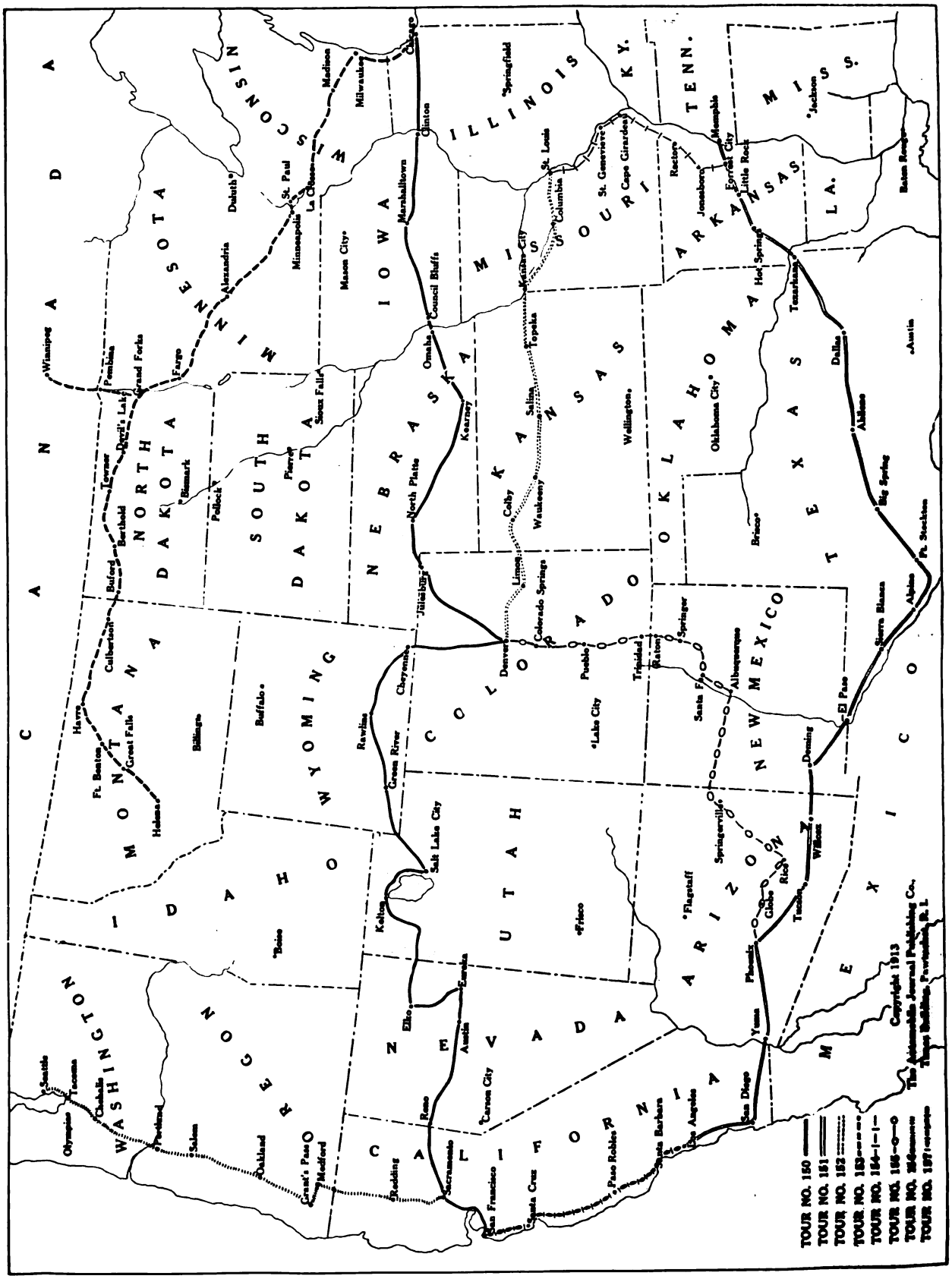
Memphis to Los Angeles.

Night Stops—Memphis, Tenn.; Clarendon, Hot Springs and Texarkana, Ark.; Dallas, Abilene, Big Spring, Fort Stockton, Alpine, Sierra Blanca and El Paso, Tex.; Deming, N. M.; Willcox, Tucson, Phoenix and Yuma, Ariz.; El Centro, San Diego and Los Angeles, Cal. Eighteen Days, 2423.7 Miles.



Scenic Grandeur of the Grand Canyon of the Yellowstone.

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Memphis-Clarendon, 93.2 Miles.

	Miles to	Total Miles Out	Return
Memphis	0.0	0.0	93.2
Ferry to Mound City, Ark.			
Marion	6.0	6.0	87.2
Madison	37.5	43.5	49.7
Forrest City	4.5	48.0	45.2
Beck's Spur	4.0	52.0	41.2
Goodwin	10.5	62.5	30.7
Wheatley	5.2	67.7	25.5
Brinkley	10.0	77.7	15.5
Clarendon	15.5	93.2	0.0

Clarendon-Hot Springs, 139.6 Miles.

	Miles to	Total Miles Out	Return
Clarendon	0.0	0.0	139.6
Ferry to Roe.			
Stuttgart	21.4	21.4	118.2
Hazen	20.5	41.9	97.7
Carlisle	9.0	50.9	88.7
Lonoka	11.1	62.0	77.6
Argenta	23.2	85.2	54.4
Little Rock	1.1	86.3	53.3
Collegeville	15.2	101.5	38.1
Benton	8.2	109.7	29.9
Fairplay Crossing	6.2	115.9	23.7
Fuller Crossing	1.5	117.4	22.2
Lonsdale	6.8	124.2	15.4
Hot Springs	15.4	139.6	0.0

Hot Springs-Texarkana, 138.3 Miles.

	Miles to	Total Miles Out	Return
Hot Springs	0.0	0.0	138.3
Lawrence	6.4	6.4	131.9
Social Hill	18.9	25.3	113.0
Friendship	9.6	34.9	103.4
Arkadelphia	9.3	44.2	94.1
Dobyville	15.9	60.1	78.2
Okolona	6.0	66.1	72.2
Boughton	12.7	78.8	59.5
Prescott	5.2	84.0	54.3
Emmet	8.5	92.5	45.8
Hope	9.1	101.6	36.7
Fulton	14.2	115.8	22.5
Homan	7.8	123.6	14.7
Mandeville	8.3	131.9	6.4
Texarkana	6.4	138.3	0.0

Texarkana-Dallas, 217 Miles.

	Miles to	Total Miles Out	Return
Texarkana	0.0	0.0	217.0
Leary, Tex.	10.4	10.4	206.6
Hooks	4.6	15.0	202.0
New Boston	7.3	22.3	194.7
Boston	1.3	23.6	193.4
De Kalb	12.7	36.3	180.7
Annona	19.2	55.5	161.5
Clarksville	9.4	64.9	152.1
Detroit	13.5	78.4	138.6
Blossom	9.0	87.4	129.6
Paris	9.7	97.1	119.9
Brookston	10.2	107.3	109.7
Hightown	2.7	110.0	107.0
Petty	3.6	113.6	103.4
Honey Grove	6.7	120.3	96.7
Windom	5.4	125.7	91.3
Dodd City	4.5	130.2	86.8
Bonham	6.3	136.5	80.5
Whitewright	15.4	151.9	65.1
Pilot Grove	6.4	158.3	58.7
Sedalia	5.8	164.1	52.9
Anna	7.2	171.3	45.7
Melissa	4.7	176.0	41.0
McKinney	7.7	183.7	33.3
Plano	14.1	197.8	19.2
Richardson	6.0	203.8	13.2
Vickery	6.1	209.9	7.1
Dallas	7.1	217.0	0.0

Dallas-Abilene, 207.1 Miles.

	Miles to	Total Miles Out	Return
Dallas	0.0	0.0	207.1
Grand Prairie	13.1	13.1	194.0
Arlington	6.5	19.6	187.5
Handley	6.5	26.1	181.0
Fort Worth	5.5	31.6	175.5
Ben Brook	10.3	41.9	165.2
Aledo	9.9	51.8	155.3
Annetta	6.3	58.1	149.0
Weatherford	7.6	65.7	141.4
Mineral Wells	22.3	88.0	119.1
Palo Pinto	12.1	100.1	107.0
Caddo	26.6	126.7	80.4
Breckenridge	15.4	142.1	65.0
Albany	24.9	167.0	40.1
Hambly	33.3	200.3	6.8
Abilene	6.8	207.1	0.0

Abilene-Big Spring, 110.6 Miles.

	Miles to	Total Miles Out	Return
Abilene	0.0	0.0	110.6
Tye Station	7.9	7.9	102.7
Merkel	8.3	16.2	94.4
Trent	6.5	22.7	87.9
Sweetwater	18.7	41.4	69.2
Roscoe	8.8	50.2	60.4
Loraine	10.9	61.1	49.5
Colorado	9.4	70.5	40.1
Westbrook	10.3	80.8	29.8
Iatan	9.6	90.4	20.2
Conhonia	8.4	98.8	11.8
Big Spring	11.8	110.6	0.0

Big Spring-Fort Stockton, 177.7 Miles.

	Miles to	Total Miles Out	Return
Big Spring	0.0	0.0	177.7
Stanton	24.2	24.2	153.5
Midland	19.4	43.6	134.1
Warfield	10.4	54.0	123.7
Odessa	12.0	66.0	111.7
Y Ranch	31.4	97.4	80.3
Acock Range	12.2	109.6	68.1
Edwards Ranch	7.2	116.8	60.9
Grand Falls	28.0	144.8	32.9
Fort Stockton	32.9	177.7	0.0

Fort Stockton-Alpine, 90.7 Miles.

	Miles to	Total Miles Out	Return
Fort Stockton	0.0	0.0	90.7
Marathon	58.3	58.3	32.4
Alpine	32.4	90.7	0.0

Alpine-Sierra Blanca, 131.6 Miles.

	Miles to	Total Miles Out	Return
Alpine	0.0	0.0	131.6
Marfa	26.4	26.4	105.2
Aragon	10.9	37.3	94.3
Valentine	24.7	62.0	69.6
Wendell	8.7	70.7	60.9
Chispa	7.3	78.0	53.6
Lobo	12.0	90.0	41.6
Dalberg	13.5	103.5	28.1
Chocar	4.7	108.2	23.4
Torbert	4.4	112.6	19.0
Grayton	9.1	121.7	9.9
Sierra Blanca	9.9	131.6	0.0



A Glimpse of the Beautiful Foxtail Grass, Which Blooms on the Ranges in Central Texas.

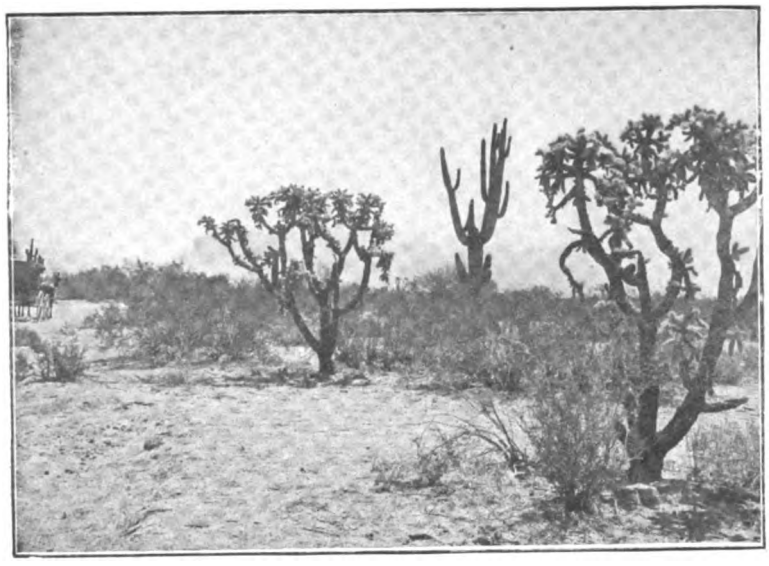
Sierra Blanca-El Paso, 92.4 Miles.

	Miles to	Total Miles Out	Return
Sierra Blanca	0.0	0.0	92.4
Etholen	4.3	4.3	88.1
Lasca	5.4	9.7	82.7
Finley	13.1	22.8	69.6
Fort Hancock	15.7	38.5	53.9
Polvo	13.8	52.3	40.1
Fabans	10.8	63.1	29.3
El Paso	29.3	92.4	0.0

El Paso-Deming, 103.2 Miles.

	Miles to	Total Miles Out	Return
El Paso	0.0	0.0	103.2
Montoya, N. M.	9.9	9.9	93.3
Canutillo	2.8	12.7	90.5
La Tuna	5.8	18.5	84.7
Berino	5.3	23.8	79.4
Mesquite	8.2	32.0	71.2
San Miguel	3.1	35.1	68.1
Afton	14.4	49.5	53.7
Kenzin	2.8	52.3	50.9

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Desert Vegetation in Arizona—The Scraggly Cholla and the Giant Cactus.

Pronto	5.2	57.5	45.7
Aden	4.2	61.7	41.5
Cambray	12.9	74.6	28.6
Deming	28.6	103.2	0.0

Deming-Willcox, 137.1 Miles.

	Miles to	Total Miles Out	Return
Deming	0.0	0.0	137.1
Tunis	8.4	8.4	128.7
Gage	11.2	19.6	117.5
Willa	9.0	28.6	108.5
Ladia	5.7	34.3	102.8
Separ	5.8	40.1	97.0
Lisbon	9.2	49.3	87.8
Lordsburg	10.8	60.1	77.0
Stein's Pass	20.3	80.4	56.7
Vanar, Ariz	7.5	87.9	49.2
San Simon	7.9	95.8	41.3
Holt	12.1	107.9	29.2
Bowie	4.4	112.3	24.8
Cholla	4.2	116.5	20.6
Luzena	3.4	119.9	17.2
Glade	9.3	129.2	7.9
Willcox	7.9	137.1	0.0

Willcox-Tucson, 89.2 Miles.

	Miles to	Total Miles Out	Return
Willcox	0.0	0.0	89.2
Cochise	11.1	11.1	78.1
Dragoon	9.8	20.9	68.3
Benson	18.7	39.6	49.6
Mescal	10.4	50.0	39.2
Vail	19.1	69.1	20.1
Esmond	4.5	73.6	15.6
Wilmot	8.5	82.1	7.1
Tucson	7.1	89.2	0.0

Tucson-Phoenix, 126.8 Miles.

	Miles to	Total Miles Out	Return
Tucson	0.0	0.0	126.8
Rillito	18.2	18.2	108.6
Red Rock	16.2	34.4	92.4
Florence	34.5	68.9	57.9
Mesa	42.1	111.0	15.8
Tempe	7.0	118.0	8.8
Phoenix	8.8	126.8	0.0

Phoenix-Yuma, 206.9 Miles.

	Miles to	Total Miles Out	Return
Phoenix	0.0	0.0	206.9
Cashion	12.0	12.0	194.9
Coldwater	2.5	14.5	192.4
Liberty	12.0	26.5	180.4
Buckeye	6.0	32.5	174.4
Palo Verge	6.7	39.2	167.7
Arlington	11.0	50.2	156.7
Agua Caliente	42.7	92.9	114.0
Palomas	10.5	103.4	103.5
Castle Dome	59.3	162.7	44.2
Gila City	25.5	188.2	18.7
Done	0.5	188.7	18.2
Yuma	18.2	206.9	0.0

Yuma-El Centro, 102 Miles.

	Miles to	Total Miles Out	Return
Yuma	0.0	0.0	102.0
Ogilby, Cal	29.5	29.5	72.5
Drylyn	7.3	36.8	65.2
Glamis	11.2	48.0	54.0
Mammoth	13.5	61.5	40.5
Brawley	27.0	88.5	13.5
Imperial	9.5	98.0	4.0
El Centro	4.0	102.0	0.0

El Centro-San Diego, 124.2 Miles.

	Miles to	Total Miles Out	Return
El Centro	0.0	0.0	124.2
Devil's Canyon	46.0	46.0	78.2
El Campo	25.5	71.5	52.7
Potrero	9.5	81.0	43.2
Dulzura	13.2	94.2	30.0
Jamul	8.5	102.7	21.5
Oakdale	1.7	104.4	19.8
Spring Valley	7.3	111.7	12.5
San Diego	12.5	124.2	0.0

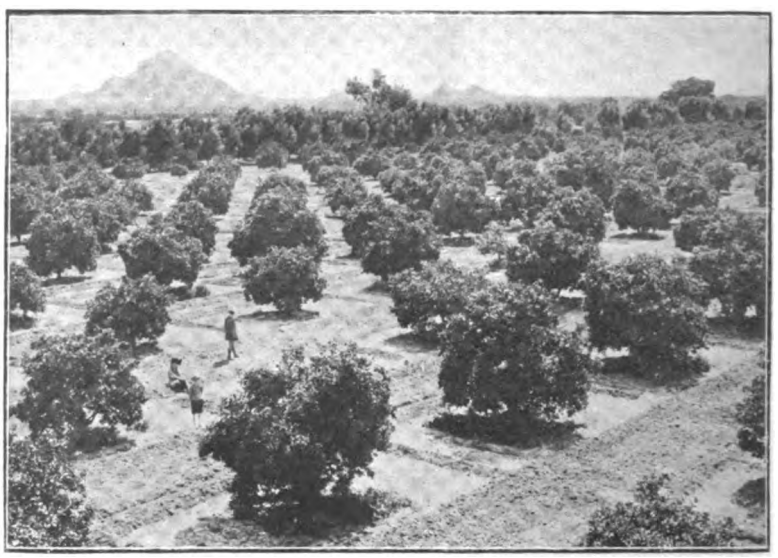
San Diego-Los Angeles, 136.1 Miles.

	Miles to	Total Miles Out	Return
San Diego	0.0	0.0	136.1
La Jolla	14.5	14.5	121.6
Del Mar	10.5	25.0	111.1
Encinitas	6.2	31.2	104.9
Merle	0.5	31.7	104.4
La Costa	3.5	35.2	100.9
Carlsbad	5.2	40.4	95.7
Oceanside	3.2	43.6	92.5
Stuart	4.7	48.3	87.8
Las Flores	3.0	51.3	84.8
San Luis Capistrane	23.5	74.8	61.3
Irvine	14.2	89.0	47.1
Tustin	6.0	95.0	41.1
Santa Ana	3.0	98.0	38.1
Anaheim	7.5	105.5	30.6
Fullerton	2.7	108.2	27.9
La Harba	5.0	113.2	22.9
Bethel	5.7	118.9	17.2
Whittier	3.2	122.1	14.0
Montebello	4.0	126.1	10.0
Los Angeles	10.0	136.1	0.0

ITINERARY NO. 152.

St. Louis to Denver.

Night Stops—St. Louis, Co-



Orange Groves at the Foot of the Mountain, Typical of Southern California and Arizona.

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The Devil's Doorway, Overlooking Devil's Lake, One of Wisconsin's Vacation Spots.

lumbia and Kansas City, Mo.; Topeka, Salina, Waukeeney and Colby, Kan.; Limon and Denver, Col. Eight Days, 973.8 Miles.

St. Louis-Columbia, 140.5 Miles.

	Miles to	Total Miles Out	Return
St. Louis	0.0	0.0	140.5
Wellston	6.5	6.5	134.0
Pattonville	7.7	14.2	126.3
St. Charles	5.8	20.0	120.5
Harvester	6.6	26.6	113.9
Colterville	4.2	30.8	109.7
Dardenne	6.2	37.0	103.5
Wentzville	8.0	45.0	95.5
Foristell	7.0	52.0	88.5
Wright City	4.5	56.5	84.0
Truesdale	8.5	65.0	75.5
Warrenton	1.0	66.0	74.5
Jonesburg	9.7	75.7	64.8
High Hill	4.2	79.9	60.6
Danville	8.7	88.6	51.9
Mineola	2.6	91.2	49.3
Williamsburg	8.3	99.5	41.0
Calwood	9.4	108.9	31.6
Fulton	8.0	116.9	23.6
Millersburg	11.0	127.9	12.6
Columbia	12.6	140.5	0.0

Columbia-Kansas City, 159 Miles.

	Miles to	Total Miles Out	Return
Columbia	0.0	0.0	159.0
Midway	8.0	8.0	151.0
Rocheport	6.3	14.3	144.7
New Franklin	15.7	30.0	129.0
Booneville	3.0	33.0	126.0
Lamine	8.7	41.7	117.3
Arrow Rock	11.7	53.4	105.6
Marshall	17.0	70.4	88.6
Malta Bend	12.2	82.6	76.4
Waverly	9.5	92.1	66.9
Dover	11.2	103.3	55.7
Lexington	11.0	114.3	44.7
Myrick	1.5	115.8	43.2
Wellington	5.8	121.6	37.4
Levasy	10.5	132.1	26.9
Buckner	3.6	135.7	23.3
Blue Town	8.2	143.9	15.1
Independence	6.1	150.0	9.0
Centropolis	4.2	154.2	4.8
Kansas City	4.8	159.0	0.0

Kansas City-Topeka, 78.5 Miles.

	Miles to	Total Miles Out	Return
Kansas City	0.0	0.0	78.5
Muncie	10.0	10.0	68.5
Bonner Springs	8.0	18.0	60.5
Lenape	6.8	24.8	53.7
De Sota	2.3	27.1	51.4
Eudora	9.5	36.6	41.9
Lawrence	8.2	44.8	33.7
Midland	3.0	47.8	30.7
Buck Creek	5.5	53.3	25.2
Perry	7.2	60.5	18.0
Grantville	10.5	71.0	7.5
Topeka	7.5	78.5	0.0

Topeka-Salina, 132.3 Miles.

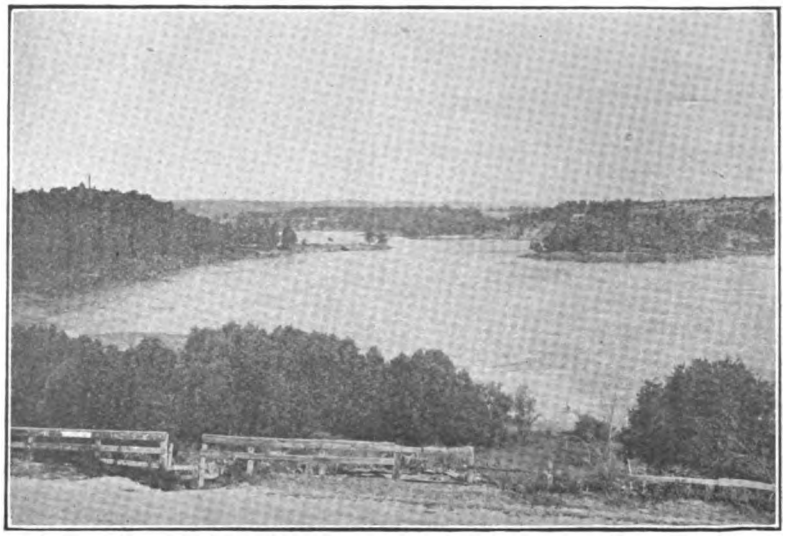
	Miles to	Total Miles Out	Return
Topeka	0.0	0.0	132.3
Silver Lake	13.8	13.8	118.5
Kingsville	2.6	16.4	115.9
Rossville	3.1	19.5	112.8
St. Marys	7.4	26.9	105.4
Belvue	7.2	34.1	98.2
Wamego	7.8	41.9	90.4
St. George	5.7	47.6	84.7
Manhattan	12.7	60.3	72.0
Ogden	12.2	72.5	59.8
Fort Riley	5.5	78.0	54.3
Junction City	4.0	82.0	50.3
Chapman	15.0	97.0	35.3
Detroit	4.0	101.0	31.3
Abilene	6.3	107.3	25.0
Solomon	9.0	116.3	16.0
Salina	16.0	132.3	0.0

Salina-Waukeeney, 143 Miles.

	Miles to	Total Miles Out	Return
Salina	0.0	0.0	143.0
Bavaria	8.5	8.5	134.5
Brookville	6.5	15.0	128.0
Carneiro	10.0	25.0	118.0
Kanopolis	8.5	33.5	109.5
Ellsworth	10.5	44.0	99.0
Wilson	14.0	58.0	85.0
Dorrance	7.5	65.5	77.5
Bunker Hill	7.5	73.0	70.0
Russell	9.5	82.5	60.5
Gorham	8.7	91.2	51.8
Walker	3.0	94.2	48.8
Victoria	4.0	98.2	44.8
Hays	10.5	108.7	34.3
Ellis	15.0	123.7	19.3
Ogallah	10.5	134.2	8.8
Waukeeney	8.8	143.0	0.0

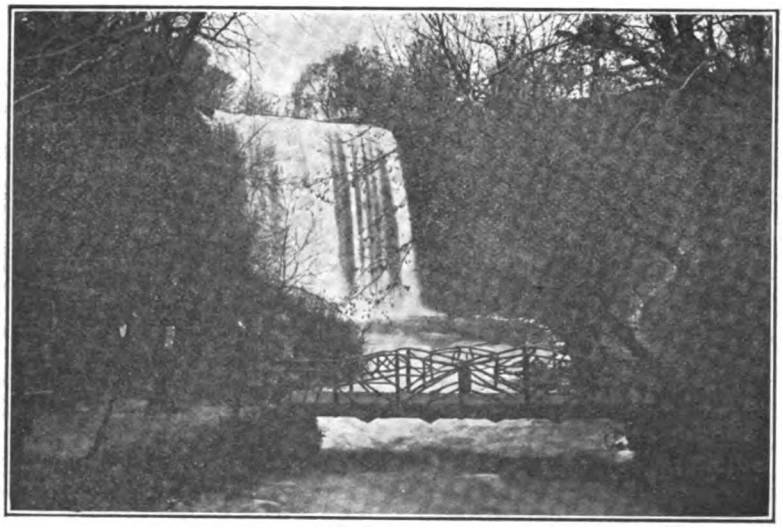
Waukeeney-Colby, 82.5 Miles.

	Miles to	Total Miles Out	Return
Waukeeney	0.0	0.0	82.5
Voda	6.5	6.5	76.0
Collyer	5.4	11.9	70.6
Quinter	7.6	19.5	63.0
Buffalo Park	8.6	28.1	54.4
Grainfield	5.6	33.7	48.8
Grinnell	9.0	42.7	39.8
Campus	5.8	48.5	34.0
Oakley	6.5	55.0	27.5



Lake Mallalieu, Near Hudson, Wis., Reached by Chicago & Northwestern Railway.

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Falls of the Minnehaha, Within Easy Driving Distance from Minneapolis, Minn.

Mingo	15.5	70.5	12.0
Colby	12.0	82.5	0.0

Colby-Limon, 149 Miles.

	Miles to	Total Miles Out	Return
Colby	0.0	0.0	149.0
Levant	8.8	8.8	140.2
Brewster	10.2	19.0	130.0
Goodland	18.0	37.0	112.0
Buelton	9.8	46.8	102.2
Kanorado	8.0	54.8	94.2
Burlington, Col.	13.0	67.8	81.2
Muskoka	8.5	76.3	72.7
Stratton	9.3	85.6	63.4
Vona	9.0	94.6	54.4
Siebert	6.7	101.3	47.7
Flagler	11.3	112.6	36.4
Arriba	11.9	124.5	24.5
Bovena	6.0	130.5	18.5
Genoa	5.8	136.3	12.7
Limon	12.7	149.0	0.0

Limon-Denver, 89 Miles.

	Miles to	Total Miles Out	Return
Limon	0.0	0.0	89.0
River Bend	6.0	6.0	83.0
Agate	15.5	21.5	67.5
Deer Trail	11.7	33.2	55.8
Peoria	5.8	39.0	50.0
Byers	6.5	45.5	43.5
Bennett	22.0	67.5	21.5
Watkins	9.5	77.0	12.0
Denver	12.0	89.0	0.0

ITINERARY NO. 153.

Chicago to Helena.

Night Stops—Chicago, Ill.; Milwaukee, Madison and La Crosse, Wis.; Minneapolis and Alexandria, Minn.; Fargo, Grand Forks, Devil's Lake, Towner, Berthold and Williston, N. D.; Culbertson, Glasgow, Malta, Havre, Great Falls and Helena, Mont. Seventeen Days. 1802.6 Miles.

Chicago-Milwaukee, 94 Miles.

	Miles to	Total Miles Out	Return
Chicago	0.0	0.0	94.0
Evanston	13.2	13.2	80.8
Hubbards Hill	5.8	19.0	75.0
Highland Park	6.5	25.5	68.5
Lake Forest	6.5	32.0	62.0
North Chicago	5.0	37.0	57.0
Waukegan	2.5	39.5	54.5
Corliss	29.7	69.2	24.8
Franksville	4.7	73.9	20.1
Rawson	10.5	84.4	9.6
Milwaukee	9.6	94.0	0.0

Milwaukee-Madison, 81.3 Miles.

	Miles to	Total Miles Out	Return
Milwaukee	0.0	0.0	81.3
Brookfield	13.0	13.0	68.3
Waukesha	4.0	17.0	64.3
Delafield	10.7	27.7	53.6
Concord	11.1	38.8	42.5
Johnson's Creek	9.4	48.2	33.1
Aztalan	4.2	52.4	28.9
Lake Mills	2.5	54.9	26.4
Vilas	18.0	72.9	8.4
Madison	8.4	81.3	0.0

Madison-La Crosse, 145.5 Miles.

	Miles to	Total Miles Out	Return
Madison	0.0	0.0	145.5
Ashton	10.0	10.0	135.5
Springfield Corners	4.5	14.5	131.0
Sauk City	10.5	25.0	120.5
Prairie du Sac	1.5	26.5	119.0
Baraboo	15.7	42.2	103.3
Abelman	9.4	51.6	93.9
Reedsburg	8.2	59.8	85.7
Lavalle	7.8	67.6	77.9
Wonewoc	7.5	74.6	70.9
Union Center	5.0	79.6	65.9
Elroy	4.5	84.1	61.4
Kendall	7.0	91.1	54.4
Ontario	13.7	104.8	40.7
Cashton	10.2	115.0	30.5
Portland	5.8	120.8	24.7
Middle Ridge	6.0	126.8	18.7
Newburg Corners	3.0	129.8	15.7
St. Joseph	2.5	132.3	13.2
La Crosse	13.2	145.5	0.0

La Crosse-Minneapolis, 172 Miles.

	Miles to	Total Miles Out	Return
La Crosse	0.0	0.0	172.0
La Crescent, Minn.	3.3	3.3	168.7
Ridgeway	17.7	21.0	151.0
Witoka	3.5	24.5	147.5
Winona	9.5	34.0	138.0
Lewiston	14.5	48.5	123.5
Utica	4.7	53.2	118.8
St. Charles	5.8	59.0	113.0
Dover	3.6	62.6	109.4
Eyota	5.2	67.8	104.2
Chester	6.8	74.6	97.4
Rochester	6.5	81.1	90.9
Oronoco	11.0	92.1	79.9
Pine Island	7.0	99.1	72.9
Zumbrota	6.5	105.6	66.4
Hader	8.4	114.0	58.0
Wastedo	3.5	117.5	54.5



Along the Shore of Lake Harriet, Near Minneapolis, Minn.—Photo by F. W. Raets.

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Cannon Falls	8.0	125.5	46.5
Rich Valley	20.7	146.2	25.8
Westcott	6.0	152.2	19.8
St. Paul	10.0	162.2	9.8
Minneapolis	9.8	172.0	0.0

Minneapolis-Alexandria, 140 Miles.

	Miles to	Total Miles Out	Return
Minneapolis	0.0	0.0	140.0
Crystal Lake	5.0	5.0	135.0
Robinsonville	0.5	5.5	134.5
Osseo	6.8	12.3	127.7
Anoka	6.2	18.5	121.5
Dayton	8.0	26.5	113.5
Elk River	3.5	30.0	110.0
Becker	17.0	47.0	93.0
Clear Lake	7.0	54.0	86.0
Cable	6.0	60.0	80.0
St. Cloud	6.3	66.3	73.7
St. Joseph	7.3	73.6	66.4
Avon	7.3	80.9	59.1
Albany	7.0	87.9	52.1
Freeport	8.5	96.4	43.6
Melrose	6.5	102.9	37.1
Sauk Center	9.0	111.9	28.1
Osakis	17.0	128.9	11.1
Alexandria	11.1	140.0	0.0

Reynolds	5.5	74.7	20.8
Thompson	7.2	81.9	13.6
Merrifield	4.7	86.6	8.9
Grand Forks	8.9	95.5	0.0

Grand Forks-Devil's Lake, 99.5 Miles.

	Miles to	Total Miles Out	Return
Grand Forks	0.0	0.0	99.5
Ojata	12.7	12.7	86.8
Emerado	4.3	17.0	82.5
Arvilla	5.8	22.8	76.7
Larimore	6.0	28.8	70.7
McCanna	10.0	38.8	60.7
Niagara	7.5	46.3	53.2
Petersburg	6.5	52.8	46.7
Michigan	6.5	59.3	40.2
Mapes	5.7	65.0	34.5
Lakota	6.0	71.0	28.5
Bartlett	4.0	75.0	24.5
Dayen	5.0	80.0	19.5
Crary	5.5	85.5	14.0
Devil's Lake	14.0	99.5	0.0

Devil's Lake-Towner, 87.2 Miles.

	Miles to	Total Miles Out	Return
Devil's Lake	0.0	0.0	87.2

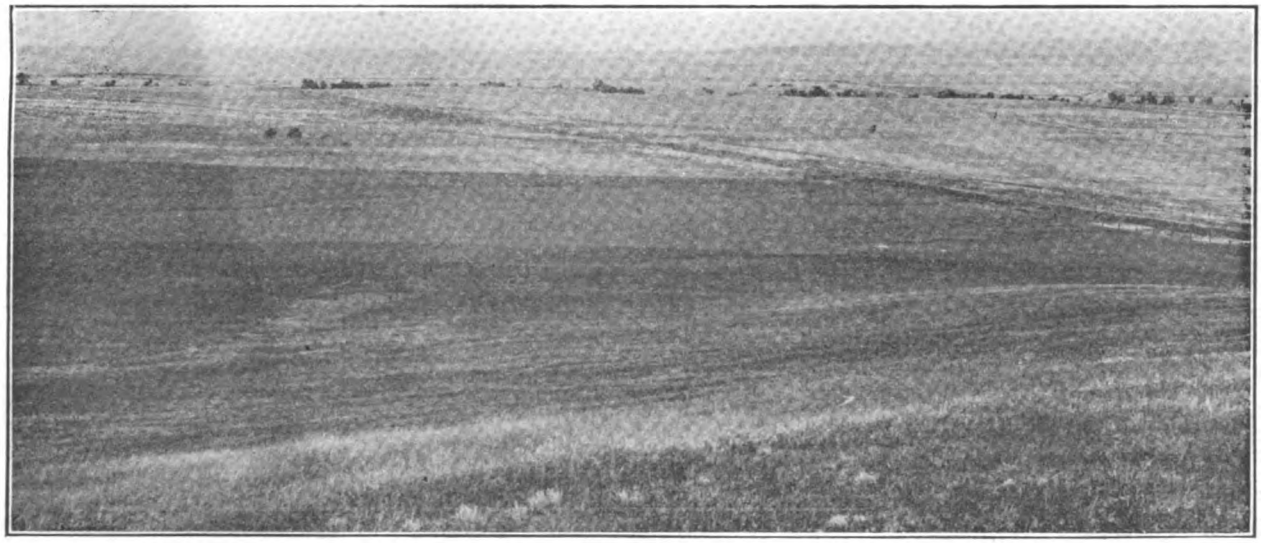
Tagus	10.0	10.0	103.0
Blaisdell	12.5	22.5	90.5
Palermo	7.3	29.8	83.2
Stanley	8.5	38.3	74.7
Ross	6.7	45.0	68.0
White Earth	13.5	58.5	54.5
Tioga	10.5	69.0	44.0
Ray	11.7	80.7	32.3
Williston	32.3	113.0	0.0

Williston-Culbertson, 64.3 Miles.

	Miles to	Total Miles Out	Return
Williston	0.0	0.0	64.3
Buford	33.0	33.0	31.3
Mondak	2.0	35.0	29.3
Lakeside, Mont.	8.5	43.5	20.8
Bainville	5.6	49.1	15.2
Lanark	7.2	56.3	8.0
Culbertson	8.0	64.3	0.0

Culbertson-Glasgow, 109.7 Miles.

	Miles to	Total Miles Out	Return
Culbertson	0.0	0.0	109.7
Fort Peck	7.5	7.5	102.2
Brockton	13.5	21.0	88.7
Popular	14.0	35.0	74.7



Irrigation Farming on the Prairies of the Great Northwest: The Buford-Trenton Project, Looking East from Buford, N. D.—Photo by Great Northern Railway.

Alexandria-Fargo, 124.2 Miles.

	Miles to	Total Miles Out	Return
Alexandria	0.0	0.0	124.2
Garfield	7.1	7.1	117.1
Brandon	6.5	13.6	110.6
Evansville	6.2	19.8	104.4
Melby	6.0	25.8	98.4
Ashby	4.3	30.1	94.1
Fergus Falls	24.2	54.3	69.9
Rothsay	23.0	77.3	46.9
Barnesville	17.0	94.3	29.9
Baker	8.5	102.8	21.4
Moorehead	19.7	122.5	1.7
Fargo, N. D.	1.7	124.2	0.0

Fargo-Grand Forks, 95.5 Miles.

	Miles to	Total Miles Out	Return
Fargo	0.0	0.0	95.5
Mapleton	13.5	13.5	82.0
Hillsboro	40.8	54.3	41.2
Taft	3.5	57.8	37.7
Buxton	11.4	69.2	26.3

Churches Ferry	30.0	30.0	57.2
Leeds	6.0	36.0	51.2
York	7.0	43.0	44.2
Knox	7.8	50.8	36.4
Pleasant Lake	4.2	55.0	32.2
Fero	7.0	62.0	25.2
Rugby	4.5	66.5	20.7
Turnbridge	5.0	71.5	15.7
Towner	15.7	87.2	0.0

Towner-Berthold, 75.2 Miles.

	Miles to	Total Miles Out	Return
Towner	0.0	0.0	75.2
Denbigh	13.3	13.3	61.9
Granville	14.5	27.8	47.4
Surrey	15.3	43.1	32.1
Minot	8.0	51.1	24.1
Burlington	8.3	59.4	15.8
Berthold	15.8	75.2	0.0

Berthold-Williston, 113 Miles.

	Miles to	Total Miles Out	Return
Berthold	0.0	0.0	113.0

Chelsea	8.3	43.3	66.4
Frazer	34.5	77.8	31.9
Wiota	10.3	88.1	21.6
Nashua	6.5	94.6	15.1
Glasgow	15.1	109.7	0.0

Glasgow-Malta, 77.7 Miles.

	Miles to	Total Miles Out	Return
Glasgow	0.0	0.0	77.7
Lahr Ranch	13.3	13.3	64.4
Vandalia	5.3	18.6	59.1
Hinsdale	11.5	30.1	47.6
Bowdoin	39.5	69.6	8.1
Malta	8.1	77.7	0.0

Malta-Havre, 95 Miles.

	Miles to	Total Miles Out	Return
Malta	0.0	0.0	95.0
Dodson	21.0	21.0	74.0
Coberg	10.3	31.3	63.7
Savoy	5.0	36.3	58.7
Harlem	13.7	50.0	45.0
Zurick	11.0	61.0	34.0

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Hart Lake in the Lake Chelan District of Montana—Photo by Great Northern Railway.

Chinook	8.7	69.7	25.3
Havre	25.3	95.0	0.0

Havre-Great Falls, 118.5 Miles.

	Miles to	Total Miles Out	Return
Havre	0.0	0.0	118.5
Ft. Assinniboine.	6.8	6.8	111.7
Big Sandy	28.5	35.3	83.2
Teton	32.5	67.8	50.7
Ft. Benton	7.2	75.0	43.5
Great Falls.....	43.5	118.5	0.0

Great Falls-Helena, 110 Miles.

	Miles to	Total Miles Out	Return
Great Falls	0.0	0.0	110.0
Cascade Hotel ..	28.5	28.5	81.5
St. Peter's Mission	14.0	42.5	67.5
Sullivan Hill	5.5	48.0	62.0
Wolf Creek	23.5	71.5	38.5
Silver	22.2	93.7	16.3
Helena	16.3	110.0	0.0

ITINERARY NO. 153A.

Grand Forks to Winnipeg.

Night Stops—Grand Forks and Pembina, N. D.; Winnipeg, Man. Two Days, 158.5 Miles.

Grand Forks-Pembina, 85.5 Miles.

	Miles to	Total Miles Out	Return
Grand Forks	0.0	0.0	85.5
Manvel	11.5	11.5	74.0
Ardoch	12.3	23.8	61.7
Minto	6.7	30.5	55.0
Grafton	10.4	40.9	44.6
Auburn	6.8	47.7	37.8
St. Thomas	7.0	54.7	30.8
Glasston	6.3	61.0	24.5
Hamilton	6.9	67.9	17.6
Pembina	17.6	85.5	0.0

Pembina-Winnipeg, 73 Miles.

	Miles to	Total Miles Out	Return
Pembina	0.0	0.0	73.0
Emerson, Man...	4.0	4.0	69.0
Letellier	12.5	16.5	56.5
St. Jean Baptiste	8.8	25.3	47.7
Morris	6.2	31.5	41.5
St. Nagarde	18.0	49.5	23.5
St. Norbert	13.6	63.1	9.9
Winnipeg	9.9	73.0	0.0

ITINERARY NO. 154.

St. Louis to Forrest City.

Night Stops—St. Louis, Ste. Genevieve and Cape Girardeau, Mo.; Rector, Jonesboro and Forrest City, Ark. Five Days, 392 Miles.

St. Louis-Ste. Genevieve, 104 Miles.

	Miles to	Total Miles Out	Return
St. Louis	0.0	0.0	104.0
Maxville	19.0	19.0	85.0
Antonia	7.5	26.5	77.5
Hillsboro	11.5	38.0	66.0
Victoria	4.5	42.5	61.5
De Soto	3.5	46.0	58.0
Bonne Terre.....	16.5	62.5	41.5
Des Loge	4.5	67.0	37.0
St. Francois	1.0	68.0	36.0
Flat River	0.7	68.7	35.3
Farmington	7.8	76.5	27.5
Valley Forge ...	2.7	79.2	24.8
Weingarten	12.5	91.7	12.3
New Offenburg..	2.0	93.7	10.3
Ste. Genevieve...	10.3	104.0	0.0

Ste. Genevieve-Cape Girardeau, 65 Miles.

	Miles to	Total Miles Out	Return
Ste. Genevieve...	0.0	0.0	65.0
Perryville	23.7	23.7	41.3
Longtown	6.8	30.5	34.5
Uniontown	5.2	35.7	29.3
Appleton	1.3	37.0	28.0
Fruitland	12.0	49.0	16.0
Jackson	5.2	54.2	10.8
Cape Girardeau..	10.8	65.0	0.0

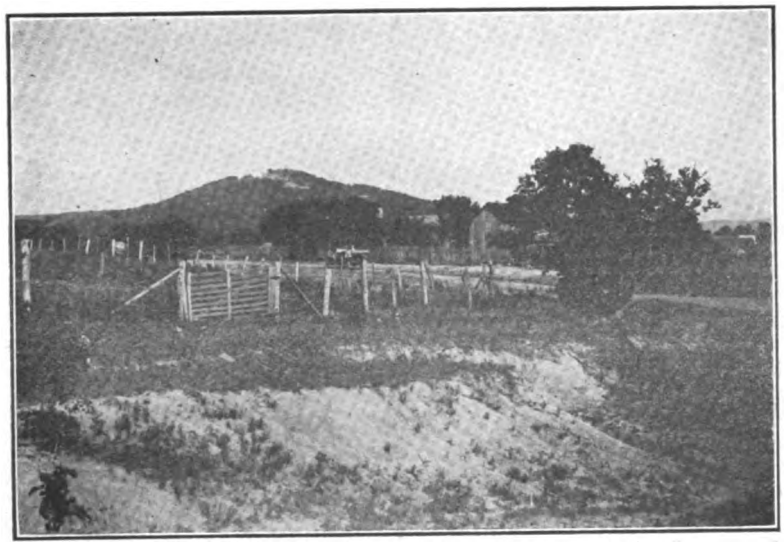
Cape Girardeau-Rector, 104 Miles.

	Miles to	Total Miles Out	Return
Cape Girardeau.	0.0	0.0	104.0
Dutchtown	9.5	9.5	94.5
Allenville	6.0	15.5	88.5
Aquilla	26.0	41.5	62.5
Bloomfield	5.3	46.8	57.2
Dexter	7.0	53.8	50.2
Campbell	26.0	79.8	24.2
St. Francis, Ark.	4.5	84.3	19.7
Piggott	9.0	93.3	10.7
Rector	10.7	104.0	0.0



Buck Creek Pass, Near Glacier Peak, Cascade Mountains, Montana—Photo Copyrighted by Kiser Photo Company.

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Shepherd Mountain, Near Pilot Knob, Mo., Where Confederate Guns Were Planted in 1864.

Rector-Jonesboro, 49.5 Miles.

	Miles to	Total Miles Out	Return
Rector	0.0	0.0	49.5
Marmaduke	10.7	10.7	38.8
Paragould	14.3	25.0	24.5
Brookland	13.5	38.5	11.0
Jonesboro	11.0	49.5	0.0

Jonesboro-Forrest City, 69.5 Miles.

	Miles to	Total Miles Out	Return
Jonesboro	0.0	0.0	69.5
Greenfield	17.7	17.7	51.8
Harrisburg	5.3	23.0	46.5
Whitehall	7.5	30.5	39.0
Wynne	20.5	51.0	18.5
Forrest City	18.5	69.5	0.0

ITINERARY NO. 155.

Denver to Phoenix.

Night Stops—Denver, Colorado Springs, Pueblo and Trinidad, Col.; Las Vegas, Santa Fe, Albuquerque and McCarty, N. M.; Springerville, Globe and Phoenix, Ariz. Ten Days, 942 Miles.

Denver-Colorado Springs, 69.2 Miles.

	Miles to	Total Miles Out	Return
Denver	0.0	0.0	69.2
Littleton	9.0	9.0	60.2
Ascequia	7.0	16.0	53.2
Gann	3.5	19.5	49.7
Sedalia	3.8	23.3	45.9
Perry Park	14.0	37.3	31.9
Palmer Lake	9.2	46.5	22.7
Monument Lake	3.0	49.5	19.7
Pring	3.5	53.0	16.2
Custard	2.5	55.5	13.7
Breed	5.7	61.2	8.0
Pike View	3.5	64.7	4.5
Colorado Springs	4.5	69.2	0.0

Colorado Springs-Pueblo, 42.5 Miles.

	Miles to	Total Miles Out	Return
Colorado Springs	0.0	0.0	42.5
Kelker	4.5	4.5	38.0
Fountain	8.5	13.0	29.5
Buttes	7.3	20.3	22.2
Pinion	10.5	30.8	11.7
Bragdon	3.5	34.3	8.2
Eden	2.0	36.3	6.2
Pueblo	6.2	42.5	0.0

Pueblo-Trinidad, 90 Miles.

	Miles to	Total Miles Out	Return
Pueblo	0.0	0.0	90.0
Walsenburg	50.5	50.5	39.5
Pryor	10.0	60.5	29.5
Acuilar	9.3	69.8	20.2
Chicosa	10.2	80.0	10.0
Bowen	4.5	84.5	5.5
Trinidad	5.5	90.0	0.0

Trinidad-Las Vegas, 141 Miles.

	Miles to	Total Miles Out	Return
Trinidad	0.0	0.0	141.0
Starkville	4.0	4.0	137.0
Gallinas	5.0	9.0	132.0
Morley	2.3	11.3	129.7
Raton, N. M.	14.0	25.3	115.7
Dorsey	17.2	42.5	98.5
Maxwell	11.5	54.0	87.0
French	5.0	59.0	82.0
Springer	10.7	69.7	71.3
Rayado	5.8	75.5	65.5
Colmor	4.8	80.3	60.7
Nolan	4.0	84.3	56.7
Wagon Mound	13.3	97.6	43.4
Watrous	23.0	120.6	20.4
Onara	9.7	130.3	10.7
Arriba	8.5	138.8	2.2
Las Vegas	2.2	141.0	0.0

Las Vegas-Santa Fe, 75.3 Miles.

	Miles to	Total Miles Out	Return
Las Vegas	0.0	0.0	75.3
Tecolote	12.0	12.0	63.3
Bernal	6.3	18.3	57.0
Fulton	15.3	33.6	41.7
Pajarita	7.0	40.6	34.7
Rowe	2.3	42.9	32.4
Pecos	6.7	49.6	25.7
Glorieta	6.0	55.6	19.7
Canoncito	4.5	60.1	15.2
Santa Fe	15.2	75.3	0.0

Santa Fe-Albuquerque, 66.7 Miles.

	Miles to	Total Miles Out	Return
Santa Fe	0.0	0.0	66.7
Agua Fria	5.0	5.0	61.7
La Bajada	16.2	21.2	45.5
Domingo	5.7	26.9	39.8
Algodones	14.3	41.2	25.5
Old Bernalillo	5.3	46.5	20.2
Bernalillo	2.3	48.8	17.9
Sandia	3.7	52.5	14.2
Alameda	6.2	58.7	8.0
Albuquerque	8.0	66.7	0.0

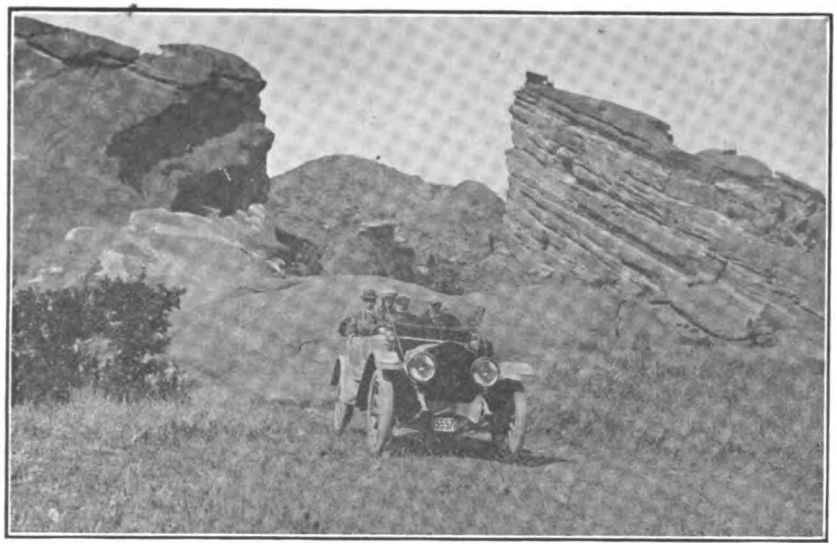
Albuquerque-McCarty, 82.3 Miles.

	Miles to	Total Miles Out	Return
Albuquerque	0.0	0.0	82.3



Nature's Handiwork as Shown by the Giant Shoe in the Quarry at Graniteville, Mo.

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Curious Natural Rock Formations in Red Rock Park, Near Denver.

Atrisco	3.3	3.3	79.0
Laguna	45.0	48.3	34.0
Casa Blanca	6.7	55.0	27.3
Enchanted Mesa	10.7	65.7	16.6
McCarty	16.6	82.3	0.0

McCarty-Springerville, 112 Miles.

	Miles to	Total Miles Out	Return
McCarty	0.0	0.0	112.0
Nation's Ranch	75.5	75.5	36.5
Laguna Salina	12.5	88.0	24.0
Springerville, Ariz.	24.0	112.0	0.0

Springerville-Globe, 148 Miles.

	Miles to	Total Miles Out	Return
Springerville	0.0	0.0	148.0
Cooley's Ranch	42.0	42.0	106.0
White Mountain Reservation	19.0	61.0	87.0
Forage	42.0	103.0	45.0
Rice	22.5	125.5	22.5
Globe	22.5	148.0	0.0

Globe-Phoenix, 115 Miles.

	Miles to	Total Miles Out	Return
Globe	0.0	0.0	115.0
Livingston	23.5	23.5	91.5
Roosevelt	11.3	34.8	80.2
Goldfield	43.2	78.0	37.0
Mesa	21.0	99.0	16.0
Frankenburg	5.3	104.3	10.7
Tempe	1.2	105.5	9.5
Phoenix	9.5	115.0	0.0

ITINERARY NO. 156.

Seattle to Sacramento.

Night Stops—Seattle and Chehalis, Wash.; Portland, Salem, Cottage Grove, Riddle and Medford, Ore.; Sisson, Redding, Chico and Sacramento, Cal. Ten Days, 938.2 Miles.

Seattle-Chehalis, 131 Miles.

	Miles to	Total Miles Out	Return
Seattle	0.0	0.0	131.0
Christopher	32.0	32.0	99.0
Tacoma	8.0	40.0	91.0
South Tacoma	11.0	51.0	80.0
Rainier	24.0	75.0	56.0
Olympia	21.0	96.0	35.0
Tenino	15.0	111.0	20.0
Centralia	16.0	127.0	4.0
Chehalis	4.0	131.0	0.0

Chehalis-Portland, 100.5 Miles.

	Miles to	Total Miles Out	Return
Chehalis	0.0	0.0	100.5
Cowlitz	18.2	18.2	82.3
Toledo	1.9	20.1	80.4
Castle Rock	16.0	36.1	64.4
Lexington	8.9	45.0	55.5
Kelso	1.5	46.5	54.0
Carrollton	7.0	53.5	47.0
Kalama	5.5	59.0	41.5
Woodlawn Ferry	10.1	69.1	31.4
La Centre	5.6	74.7	25.8
Vancouver	18.4	93.1	7.4
Portland, Ore.	7.4	100.5	0.0

Portland-Salem, 94 Miles.

	Miles to	Total Miles Out	Return
Portland	0.0	0.0	94.0
Oregon City	19.0	19.0	75.0
Salem	75.0	94.0	0.0

Salem-Cottage Grove, 99 Miles.

	Miles to	Total Miles Out	Return
Salem	0.0	0.0	99.0
Jefferson	18.8	18.8	80.2
Albany	9.2	28.0	71.0
Hamsburg	30.8	58.8	40.2
Junction City	4.7	63.5	35.5
Eugene	13.5	77.0	22.0
Goshen	6.9	83.9	15.1
Cottage Grove	15.1	99.0	0.0

Cottage Grove-Riddle, 80.2 Miles.

	Miles to	Total Miles Out	Return
Cottage Grove	0.0	0.0	80.2
Krewson	15.2	15.2	65.0
Drain	1.4	16.6	63.6
Yoncalles	17.4	34.0	46.2
Oakland	3.8	37.8	42.4
Southerlin	3.4	41.2	39.0
Roseburg	13.9	55.1	25.1
Dole	13.0	68.1	12.1
Myrtle Creek	5.1	73.2	7.0
Riddle	7.0	80.2	0.0

Riddle-Medford, 84 Miles.

	Miles to	Total Miles Out	Return
Riddle	0.0	0.0	84.0
Wolf Creek	28.3	28.3	55.7
Grant's Pass	20.2	48.5	35.5
Gold Hill	19.3	67.8	16.2
Tolo	4.7	72.5	11.5
Central Point	5.2	77.7	6.3
Medford	6.3	84.0	0.0

Medford-Sisson, 75.1 Miles.

	Miles to	Total Miles Out	Return
Medford	0.0	0.0	75.1
Ashland	2.8	2.8	72.3
Rawhide Toll Gate, Cal.	1.8	4.6	70.5
Siskiyou Pass	2.0	6.6	68.5
Coles	6.0	12.6	62.5
Hornbrook	11.9	24.5	50.6



Sunset on the Columbia River, Near Trinidad, Washington—Photo by Great Northern Railway.

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Montague	15.1	39.6	35.5
Edgewood	21.5	61.1	14.0
Weed	4.1	65.2	9.9
Sisson	9.9	75.1	0.0

Sisson-Redding, 83.9 Miles.

	Miles to	Total Miles Out	Return
Sisson	0.0	0.0	83.9
Shasta Springs	8.6	8.6	75.3
Dunsmuir	3.3	11.9	72.0
Castle Brook	6.0	17.9	66.0
Castella	1.3	19.2	64.7
Southern	6.7	25.9	58.0
Kennett	43.0	68.9	15.0
Buckeye	10.1	79.0	4.9
Redding	4.9	83.9	0.0

Redding-Chico, 76.5 Miles.

	Miles to	Total Miles Out	Return
Redding	0.0	0.0	76.5
Anderson	11.8	11.8	64.7
Cottonwood	5.7	17.5	59.0
Red Bluff	16.4	33.9	42.6
Proberta	7.4	41.3	35.2
Vina	15.1	56.4	20.1
Chico	20.1	76.5	0.0

Chico-Sacramento, 114 Miles.

	Miles to	Total Miles Out	Return
Chico	0.0	0.0	114.0
Live Oaks	37.7	37.7	76.3
Marysville	12.8	50.5	63.5
Wheatland	16.9	67.4	46.6
Sheridan	4.4	71.8	42.2
Lincoln	10.6	82.4	31.6
Roseville	10.2	92.6	21.4
Ben Ali	16.2	108.8	5.2
Sacramento	5.2	114.0	0.0

ITINERARY NO. 157.

San Francisco to Los Angeles.

Night Stops—San Francisco, Santa Cruz, Paso Robles, Santa Barbara and Los Angeles, Cal. Four Days, 487.1 Miles.

San Francisco-Santa Cruz, 90.7 Miles.

	Miles to	Total Miles Out	Return
San Francisco	0.0	0.0	90.7
Colma	8.8	8.8	81.9
South San Francisco	4.0	12.8	77.9
San Bruno	3.2	16.0	74.7
Rolcoff	1.5	17.5	73.2
Millbrae	1.1	18.6	72.1
Burlingame	2.2	20.8	69.9
San Mateo	2.2	23.0	67.7
Belmont	4.0	27.0	63.7
San Carlos	1.1	28.1	62.6
Redwood	1.5	29.6	61.1
Palo Alto	5.4	35.0	55.7
Mayfield	1.6	36.6	54.1
Santa Clara	13.5	50.1	40.6
San Jose	3.9	54.0	36.7
Buena Vista	1.9	55.9	34.8
Moulton	2.5	58.4	32.3
Campbell	1.3	59.7	31.0
Los Gatos	5.5	65.2	25.5
Alma	3.0	68.2	22.5
Soquel	18.5	86.7	4.0
Santa Cruz	4.0	90.7	0.0

Santa Cruz-Paso Robles, 149.1 Miles.

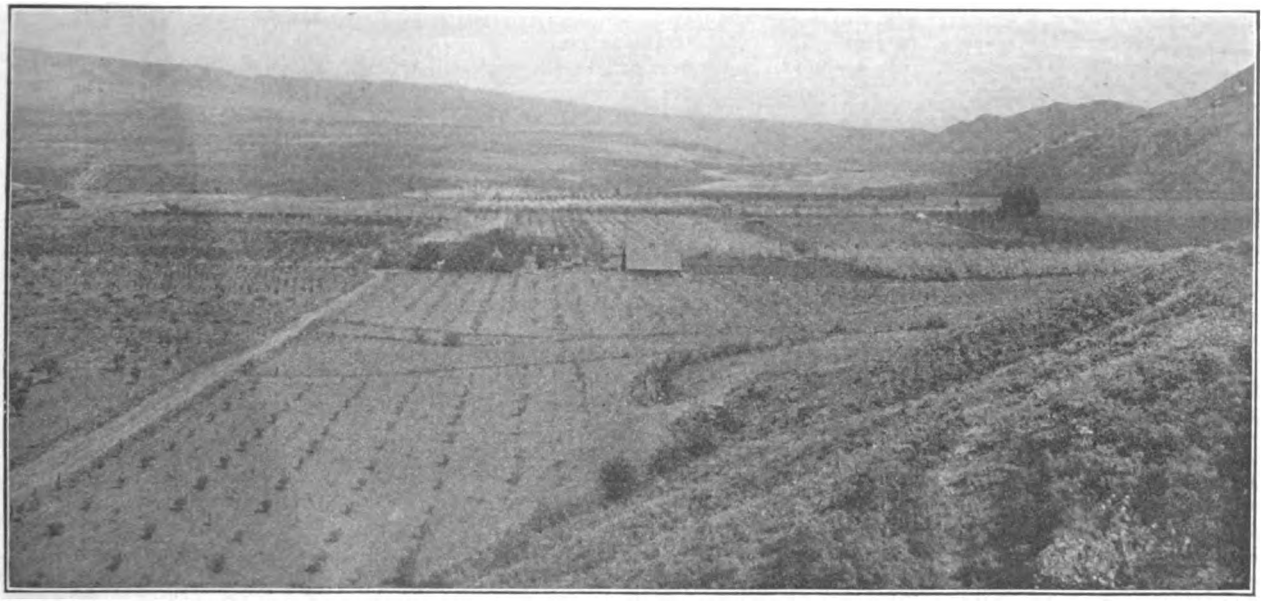
	Miles to	Total Miles Out	Return
Santa Cruz	0.0	0.0	149.1
Soquel	4.0	4.0	145.1
Aptos	3.6	7.6	141.5
Freedom	9.5	17.1	132.0
Watsonville	1.9	19.0	130.1
Moss Landing	9.6	28.6	120.5
Castroville	2.8	31.4	117.7
Salinas	8.7	40.1	109.0
Chualiar	10.9	51.0	98.1
Gonzales	5.9	56.9	92.2
Soledad	8.6	65.5	83.6
Greenfield	8.6	74.1	75.0
Jolon	21.6	95.7	53.4
Bradley	33.4	129.1	20.0
San Miguel	10.9	140.0	9.1
Paso Robles	9.1	149.1	0.0

Paso Robles-Santa Barbara, 150.5 Miles.

	Miles to	Total Miles Out	Return
Paso Robles	0.0	0.0	150.5
Templeton	5.7	5.7	144.8
Santa Margarita	14.3	20.0	130.5
San Luis Obispo	11.0	31.0	119.5
Edna	6.2	37.2	113.3
El Pismo	5.3	42.5	108.0
Arroyo Grande	3.5	46.0	104.5
Berros	4.3	50.3	100.2
Nipomo	4.7	55.0	95.5
Santa Maria	7.1	62.1	88.4
Garley	11.8	73.9	76.6
Sisquoc	1.5	75.4	75.1
Ollvera	1.3	76.7	73.8
Foxen	7.6	84.3	66.2
Los Olives	12.8	97.1	53.4
Santa Inez Mission	5.8	102.9	47.6
Los Cruces	11.0	113.9	36.6
Gaviota	3.8	117.7	32.8
Lento	3.8	121.5	29.0
Tajiguas	3.5	125.0	25.5
Orella	3.0	128.0	22.5
Capitan	1.4	129.4	21.1
Naples	5.8	135.2	15.3
Goleta	8.4	143.6	6.9
Santa Barbara	6.9	150.5	0.0

Santa Barbara-Los Angeles, 96.8 Miles.

	Miles to	Total Miles Out	Return
Santa Barbara	0.0	0.0	96.8
Summerland	6.8	6.8	90.0
Carpinteria	5.0	11.8	85.0
Ventura	13.6	25.4	71.4
Montalvo	6.0	31.4	65.4
El Rio	2.5	33.9	62.9
Camarillo	9.1	43.0	53.8
Calabasas	25.0	68.0	28.8
Santa Monica	1.5	69.5	27.3
Hollywood	19.6	89.1	7.7
Los Angeles	7.7	96.8	0.0



In the Fruit Growing Country of Washington State: A Glimpse of Wenatchee Valley—Photo Copyrighted by Kiser Photo Company.

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DIGEST OF THE MOTORING LAWS NOW IN

State	Act of	Amended	Registration	With Whom	Address	Fees	Driver	Chauffeur
Alabama	1911	....	Annual	Sec. of State	Montgomery	*$7.50-$20	..	$5
Arizona	1912	....	Annual	Sec. of State	Phoenix	*$5-$10	..	$5
Arkansas	1911	....	Annual	Sec. of State	Little Rock	$5	..	$1
California	1913	*	Annual	Sec. of State	Sacramento	*$5-$30	$1	$2
Colorado	*	*	*	*	*	*	*	*
Connecticut	1911	1913	Annual	Sec. of State	Hartford	50c hp.	$2	$2
Delaware	1909	1913	Annual	Sec. of State	Dover	$5	*$5	$5
Florida	1911	....	*Perpetual	Sec. of State	Tallahassee	$2	..	$2
Georgia	1910	....	Perpetual	Sec. of State	Atlanta	$2	..	..
Idaho	1913	....	Annual	Highway Com.	Boise	*$15-$40	..	..
Illinois	1911	*	Annual	Sec. of State	Springfield	*$4-$10	..	$5
Indiana	1913	....	Annual	Sec. of State	Indianapolis	*$5-$20	..	$2
Iowa	1911	1913	Annual	Sec. of State	Des Moines	*	..	..
Kansas	1913	....	Annual	Sec. of State	Topeka	$5	..	..
Kentucky	1910	....	Annual	Sec. of State	Frankfort	*$5-$20	..	..
Louisiana	*	*	*	*	*	*	*	*
Maine	1911	1913	Annual	Sec. of State	Augusta	*$5-$15	$2	$2
Maryland	1910	1912	Annual	Com. Mot. Veh.	Baltimore	*$5-$25	$2	$5
Massachusetts	1909	1912	Annual	Highway Com.	Boston	*$5-$25	$2	$2
Michigan	1909	*	Annual	Sec. of State	Lansing	$3	..	$2
Minnesota	1911	....	Triennial	Sec. of State	St. Paul	$1.50	..	$3
Mississippi	*	*	*	*	*	*	*	*
Missouri	1909	1913	Annual	Sec. of State	Jefferson City	*$2-$12	..	$1.50
Montana	1913	....	Perpetual	Sec. of State	Helena	$2	..	$2
Nebraska	1911	....	Annual	Sec. of State	Lincoln	$2	..	..
Nevada	1913	....	Annual	Sec. of State	Carson City	12.5c hp.	..	..
New Hampshire	1911	1913	Annual	Sec. of State	Concord	*$10-$40	$3	$5
New Jersey	1906	1913	Annual	Com. Mot. Veh.	Trenton	*$4.50-$15	*	*
New Mexico	1913	....	Annual	Sec. of State	Santa Fe	*$2-$12	$1	$1
New York	1913	....	Annual	Sec. of State	Albany	*$5-$25	$1	$1
North Carolina	1913	....	Annual	Sec. of State	Raleigh	*$5-$10	..	..
North Dakota	1911	....	Annual	Sec. of State	Bismarck	$3	..	..
Ohio	1911	....	Annual	Sec. of State	Columbus	$5	..	$2
Oklahoma	1911	....	Annual	Highway Com.	Oklahoma City	$1	..	..
Oregon	1911	....	Annual	Sec. of State	Salem	*$3-$10	..	$2
Pennsylvania	1910	*1911	Annual	Highway Dept.	Harrisburg	*$5-$15	$2	$2
Rhode Island	1909	1912	Annual	Bd. Pub. Roads.	Providence	*$5-$25	$2	$2
South Carolina	1906	....	.....	Clk. County Ct.	County seat	$1	..	..
South Dakota	1913	....	Annual	Sec. of State	Pierre	$6	..	..
Tennessee	1905	*	Perpetual	Sec. of State	Nashville	$2	..	..
Texas	....	....	Perpetual	County Clerk	County seat	50c	..	..
Utah	1909	1911	Perpetual	Sec. of State	Salt Lake City	$2	..	$2
Vermont	1908	1913	Annual	Sec. of State	Essex Junction	$2 hp.	$2	$2
Virginia	1910	....	Annual	Sec. Com'wealth	Richmond	*$5-$20	..	$2.50
Washington	1905	1913	Annual	Sec. of State	Olympia	$2	..	..
West Virginia	1911	....	Perpetual	State Auditor	Wheeling	$10	..	$2
Wisconsin	1911	*1913	Annual	Sec. of State	Madison	$5	..	..
Wyoming	1913	....	Perpetual	Sec. of State	Cheyenne	$5	..	..
District of Columbia	1906	1913	Perpetual	Automobile Bd.	Washington	$2	$2	$2

*The following additional notations should be considered in connection with the above table: **Alabama**—Fees, 20hp, $7.50; 20-30, $12.50; 30-40, $17.50; over 40, $20. **Arizona**—Fees, 40 hp, $5; over 40, $10. **California**—Only that portion of the act of 1913 which applies to registration is in effect at present; remainder, Jan. 1, 1914. Fees, 20 hp, $5; 20-30, $10; 30-40, $15; 40-50, $20; 50-60, $25; over 60, $30. **Colorado**—New law now in force, but provisions have not been received. **Delaware**—Family driving license, $8. **Florida**—Special law provides for county registration; fees, 10 hp, $5; 11-29, $10; 30-40, $20; 41-50, $30; 51-60, $50; 61-70, $70; over 70, $100. Two lamps are required from sunset to sunrise. **Idaho**—Fees, 30 hp, $15; 30-40, $20; 40-50, $25; over 50, $40. **Illinois**—Additional legislation pending. Fees, 25 hp, $4; 25-35, $6; 35-50, $8; over 50, $10. **Indiana**—Fees, 25 hp, $5; 25-40, $8; 40-50, $15; over 50, $20. **Iowa**—Fees, 20 hp, $8; over 20, 40 cents a horsepower. **Kentucky**—Fees, 25 hp, $5; 25-50, $10; over 50, $20. **Louisiana**—No state law. Cities and towns are permitted to enact individual ordinances. **Maine**—Fees, 20 hp, $5; 20-35, $10; over 35, $15. Special provision for non-residents living within 15 miles of state line. **Maryland**—Fees, 10 hp, $5; 10-20, $10; 20-30, $15; 30-40, $20; over 40, $25. Special license for two periods of seven days each for non-residents, except reciprocity by governor's proclamation with New York, Pennsylvania, Delaware, Virginia, West Virginia. **Massachusetts**—Fees, 20 hp, $5; 20-30, $10; 30-40, $15; 40-50, $20, over 50, $20. **Michigan**—New law in effect Jan. 1, 1914. **Mississippi**—Law has been declared unconstitutional by state supreme court. **Missouri**—Fees, 12 hp, $2; 12-24, $3; 24-36, $5; 36-48, $7; 48-60, $8; 60-72, $10; over 72, $12. **New Hampshire**—Fees, 15 hp, $10; 15-30, $15; 30-40, $20; 40-50, $25; 50-60, $30; over 60, $40. Special provision for non-residents living

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FORCE IN THE SEVERAL AMERICAN STATES.

Non-Residents	Lights	Front	Visible	Rear	Visible	Speed	Bus.-Dis.	Res.-Dis.	Out-side	Maximum
reciprocity	30 mins.	2	.....	1	50 ft.	reasonable and proper	..	..	..	30
6 months	1 hour	2	.....	1	.....	reasonable and proper	10	15	30	..
exempt	1 hour	2	200 ft.	1	.....	reasonable and proper	15	15	20	..
exempt temp.	30 mins.	1	200 ft.	1	250 ft.	reasonable and proper	10	15	20	..
*	*	*	*	*	*	*	*	*	*	*
exempt	30 mins.	2	200 ft.	1	.....	reasonable and proper	..	..	..	25
reciprocity	1 hour	1	200 ft.	1	.....	.....	12	12	20	..
30 days	*	*	*	*	*	reasonable and proper	..	..	..	..
30 days	1 hour	1	100 ft.	1	.....	reasonable and proper	..	..	..	..
reciprocity	1 hour	2	200 ft.	1	100 ft.	careful and prudent	..	..	..	30
60 days	1 hour	2	200 ft.	1	150 ft.	reasonable and proper	10	15	20	25
reciprocity	30 mins.	2	200 ft.	1	100 ft.	reasonable and proper	10	15	20	25
reciprocity	30 mins.	2	500 ft.	1	50 ft.	careful and prudent	..	..	..	25
30 days	30 mins.	1	.....	1	50 ft.	reasonable and proper	12	12	20	..
exempt	1 hour	2	200 ft.	1	.....	reasonable and proper	10	15	20	..
*	*	*	*	*	*	*	*	*	*	*
*30 days	30 mins.	2	.....	1	.....	reasonable, safe and proper	10	10	25	..
*	1 hour	2	200 ft.	1	.....	reasonable and proper	12	12	18	25
10 days	30 mins.	2	200 ft.	1	60 ft.	reasonable and proper	10	15	20	..
exempt	1 hour	2	200 ft.	1	.....	reasonable and proper	10	15	25	..
30 days	1 hour	2	200 ft.	1	.....	reasonable and proper	15	15	25	..
*	*	*	*	*	*	*	*	*	*	*
20 days	30 mins.	2	200 ft.	1	.....	careful and prudent	..	..	..	25
reciprocity	1 hour	2	200 ft.	1	.....	reasonable and proper	..	..	..	..
30 days	1 hour	1	.....	1	.....	reasonable and proper	12	12	25	..
30 days	1 hour	2	.....	1	.....	reasonable and proper	..	..	..	..
*10 days	30 mins.	2	200 ft.	1	50 ft.	reasonable and proper	15	15	25	..
*15 days	30 mins.	2	250 ft.	1	50 ft.	reasonable and proper	12	12	25	..
60 days	30 mins.	2	.....	1	.....	.....	..	..	..	..
reciprocity	30 mins.	2	200 ft.	1	50 ft.	careful and prudent	..	..	..	30
15 days	30 mins.	2	.....	1	50 ft.	reasonable and proper	10	15	25	..
exempt	.....	..	.....	..	.....	reasonable and proper	10	10	30	..
exempt	30 mins.	2	200 ft.	1	.....	reasonable and proper	15	20	25	..
not exempt	.....	..	.....	..	.....	.....	..	..	..	..
30 days	1 hour	2	200 ft.	1	50 ft.	reasonable and proper	..	..	..	25
10 days	1 hour	2	200 ft.	1	.....	reasonable and proper	..	..	..	24
10 days	1 hour	1	.....	1	.....	reasonable and proper	15	15	25	..
no provision	.....	..	.....	..	.....	.....	..	..	..	15
reciprocity	30 mins.	2	.....	1	.....	careful and prudent	10	10	25	..
no provision	.....	..	.....	..	.....	.....	..	..	..	20
no provision	.....	..	.....	..	.....	.....	8	8	18	..
exempt temp.	1 hour	2	.....	1	.....	reasonable and proper	10	15	20	..
reciprocity	45 mins.	2	200 ft.	1	50 ft.	.....	10	10	25	..
*	1 hour	1	100 ft.	1	.....	.....	8	8	20	..
exempt	*	1	.....	1	.....	reasonable and proper	12	12	24	..
reciprocity	1 hour	2	.....	1	.....	reasonable and proper	10	15	20	..
exempt	1 hour	1	.....	1	.....	reasonable and proper	15	15	25	..
.....	.....	..	.....	..	.....	.....	..	..	..	..
reciprocity	30 mins.	2	.....	1	.....	.....	*	*	*	15

within 15 miles of state line. **New Jersey**—Fees, 10 hp, $4.50; 11-29, $7.50; over 29, $15. Driver's and chauffeur's licenses, $2 or $4, according to the horsepower. Reciprocity governs non-resident provision. **New Mexico**—Fees, 12 hp, $2; 12-20, $4; 20-30, $6; 30-40, $8; 40-50, $10; over 50, $12. **New York**—Fees, 25 hp, $5; 25-35, $10; 35-50, $15; over 50, $25. **North Carolina**—25 hp, $5; 25-40, $7.50; over 40, $10. **Oregon**—Fees, 26 hp, $3; 26-36, $5; 36-40, $7.50; over 40, $10. **Pennsylvania**—Additional legislation pending. Fees, 20 hp, $5; 20-50, $10; over 50, $15. **Rhode Island**—Fees, 5-20 hp, $5; 20-30, $10; 30-40, $15; over 40, $25. **Tennessee**—New law now pending before legislature. **Virginia**—Fees, 20 hp, $5; 20-45, $10; over 45, $20. Non-residents are exempt for two periods of seven days each. **Washington**—Lights required during hours of darkness. **Wisconsin**—Additional legislation pending. **District of Columbia**—Ask for copy of police regulations covering speed limitations and streets on which automobiles are not permitted, as well as other special provisions.

The above table and the accompanying notations are held to present the essential features of the motoring laws in the various states as applying to tourists, although several of the states permit local ordinances and regulations. Practically all laws now provide for good and efficient brakes, suitable horn or other signalling device, and that the rear lamp shall display a red light toward the rear and a white light illuminating the number plate. Connecticut, Maryland, Massachusetts, Minnesota, New Hampshire, New Jersey, Pennsylvania, Rhode Island, Vermont and Washington forbid the use of the muffler cut-out. Tire chains are not permitted on certain surfaces, unless the roads are in a slippery condition, in Delaware, Michigan and New Jersey, while Montana expressly requires their use when the road surface is in an unsafe condition.

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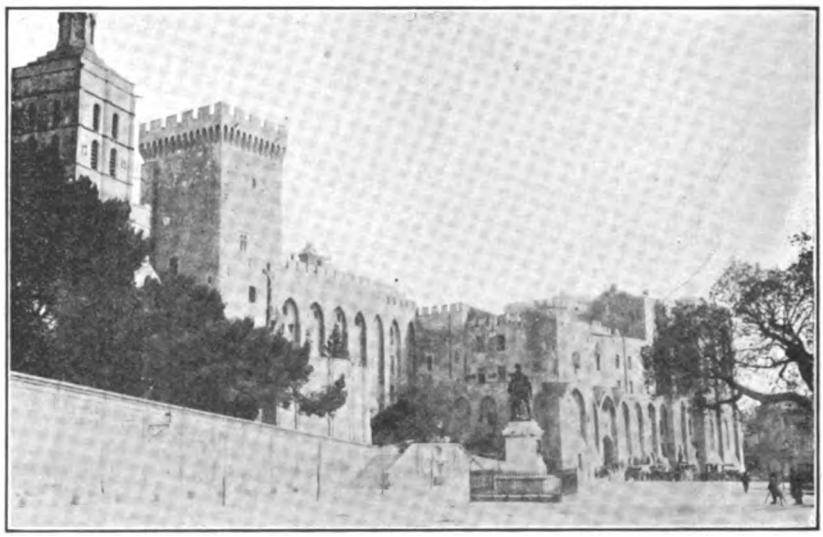
A WEEK IN THE CHATEAUX DISTRICT.

Splendid French Roads Offer Many Inducements to Study the People---Itinerary Includes a Visit to Normandy and Brittany Before Reaching Paris.

MOTORING on the Continent of Europe is one of the chief delights of the American tourist. Road conditions, particularly in France, are splendid, and, of course, the scenic beauties are best appreciated when thus approached. The grandeur of the mountains; the points of interest made famous in history, art and literature; the ruins and ancient architecture, all combine in making their appeal.

In outlining the accompanying itinerary, it is anticipated that the visitor will welcome the possibility of seeing some of France and its people before arriving at Paris, which, it is assumed, will be selected as the centre from which other tours will radiate. In the event that this supposition is not correct, the route may be reversed.

Leaving Havre the first day, the way leads over the river road to Harfieur. Those who are visiting France for the first time, may think it a little strange that the better known "Route Nationale No. 14" was not selected, but those who care for country lanes and by-ways will be delighted with the opportunity to gain more intimate knowledge of the towns and villages, as well as the people, than would be possible on the main highway. However, these roads will be found equally as good; sometimes better, as they see less traffic.



One of the Typical Historic Structures in the Chateaux District of France.

Stops undoubtedly will be made at Littlebonne to view the ruins of an old Roman theatre, which is well worth inspection. The ferry to Quillebeuf affords a delightful sail across the Seine with splendid outlooks in either direction. Immediately thereafter the tourist finds himself in the midst of the farming district of Normandy. The road to Bernay is through undulating country and fast time may be made. The night stop is at Mortagne, which is not famous, except that the church tower burned down, and they ring the bells in the streets.

The second day's journey lies across Normandy toward Brittany, and on either side, the road is bordered by hedges for miles. In many places it winds in and out among the hills, affording picturesque views nearly all of the way into Mayenne. Thence, the way will turn southward again toward Touraine, the real objective point of the tour. The night stop is at Laval.

From this town it is only a brief run to Chateau Gontier, the first in a long list of ancient structures, presenting sufficient of beauty and medieval grandeur to cause the motorist many pangs of regret upon leaving. Angers is one of the larger places in France, and is full of interest. Time should be taken to drive in the environs, including the fortress, the statues of Margaret and King Rene, and the Chateaux St. Maurice, Plessis Bourre, Serrat and Plessis Mace. The cathedral was begun during the 11th century and completed in the 13th.

The way is now along the banks of the Loire, and just before reaching Saumur, the night stop, the Chateau de Souzay is passed. This structure is particularly famous because of the death there in 1842 of Margaret of Anjou and Lancaster, heroine of the War of the Roses. Inside the city proper is the old fortress, which is being restored, and a splendid piece of modern work is the bridge across the Loire at this point. It ought also to be added that the Saumur wines are particularly good, and the cellars of the Hotel Budan are one of the important features of the place.

If time will permit the short side trip to Montreuil-Bellay should not be missed. The chateau here contains an ancient kitchen with vaulted roofs and fireplaces, and a fine stairway with handsome arches leads to other rooms, all splendidly decorated and fitted with no end of Renaissance furniture, Venetian glass and old china. The tapestries also are interesting.

Chinon probably is the oldest town to be visited. It is even claimed that it was built by Cain, and that it is the oldest city in the world. However that may be, it is certain the records of the people date back to the fourth century, and St. Mesme came to Chinon before the year 400. In 402, he consecrated the original foundation of the church there.

The town has many places of interest, but none

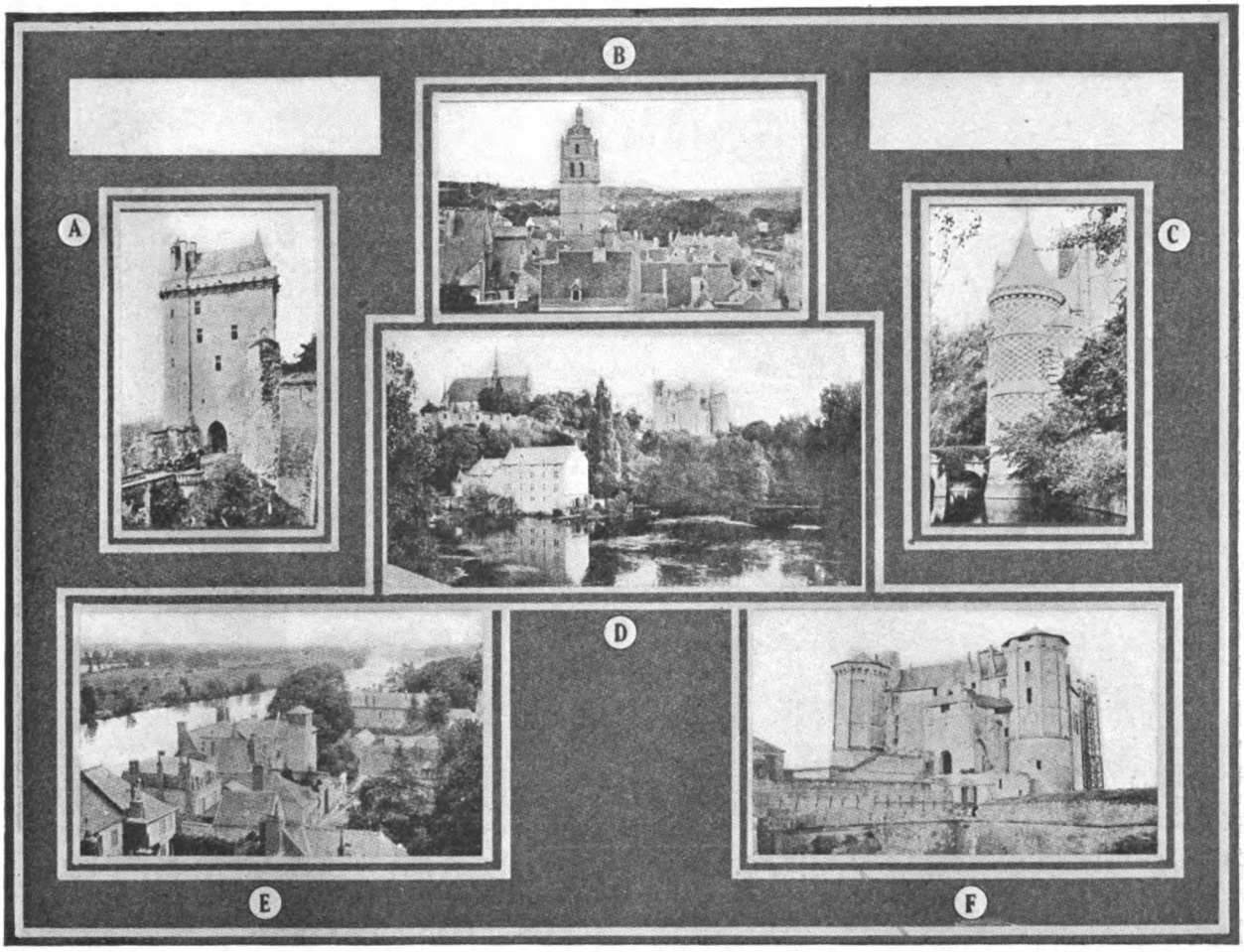
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more so than the chateau, with its chimney piece and fire place, the few stones that are left of the room in which Jeanne d'Arc had her memorable interview with Charles VII. This also is the room where, toward the end of the 12th century, King Henry of England drew his last breath. The whole place seems to be permeated with historical memories, and probably that of the Maid of Orleans is most prominent of all.

The route now enters the forest of Chinon to Azay-le-Rideau, where still another chateau is to be found, and Tours. Near the latter town is the Chateau d'Amboise, the greatest charm of which undoubtedly lies in its association with the history of its times.

At Montresor, the chateau is in the possession of a Polish count, who with his uncle, has made this a wonderful storehouse of art in connection with the Polish subjects of France. One room is devoted to what is termed the "treasure of Montresor," and is constructed very much like a bank vault, except that it has a window. Built into the walls are glass cases in which stand the solid gold plate of the Kings of Poland. The masterpiece of the lot is Sobieski's soup tureen. Outside are the beautiful gardens, with their fountain and a pond filled with lilies of every description and color.

The road turns northward at Romorantin, and



Views in Touraine: A, Pavilion de l'Horloge at Chinon; B, Loches from the Chateau; C, Castle at Reaux from the Moat; D, Montreuil-Bellay's Castle Above the Thouet; E, the Loire from the Chateau d'Amboise; F, the Fortress at Saumur.

The scene from the top is one of the finest in Touraine.

Then comes Montbazon, with its castle of the 10th century, built by Fulk the Black. The night stop is at Loches, the real feature of which is to be found in the dungeons, credited to Louis XI, and the stories that could be told concerning them are legion. Inscriptions on the walls, steps hewn in the rock to enable prisoners to gain a glimpse of light now and then and the sun dials cut in the stone to enable some hopeless one to keep a rough account of time, will be sufficiently explained by the guide.

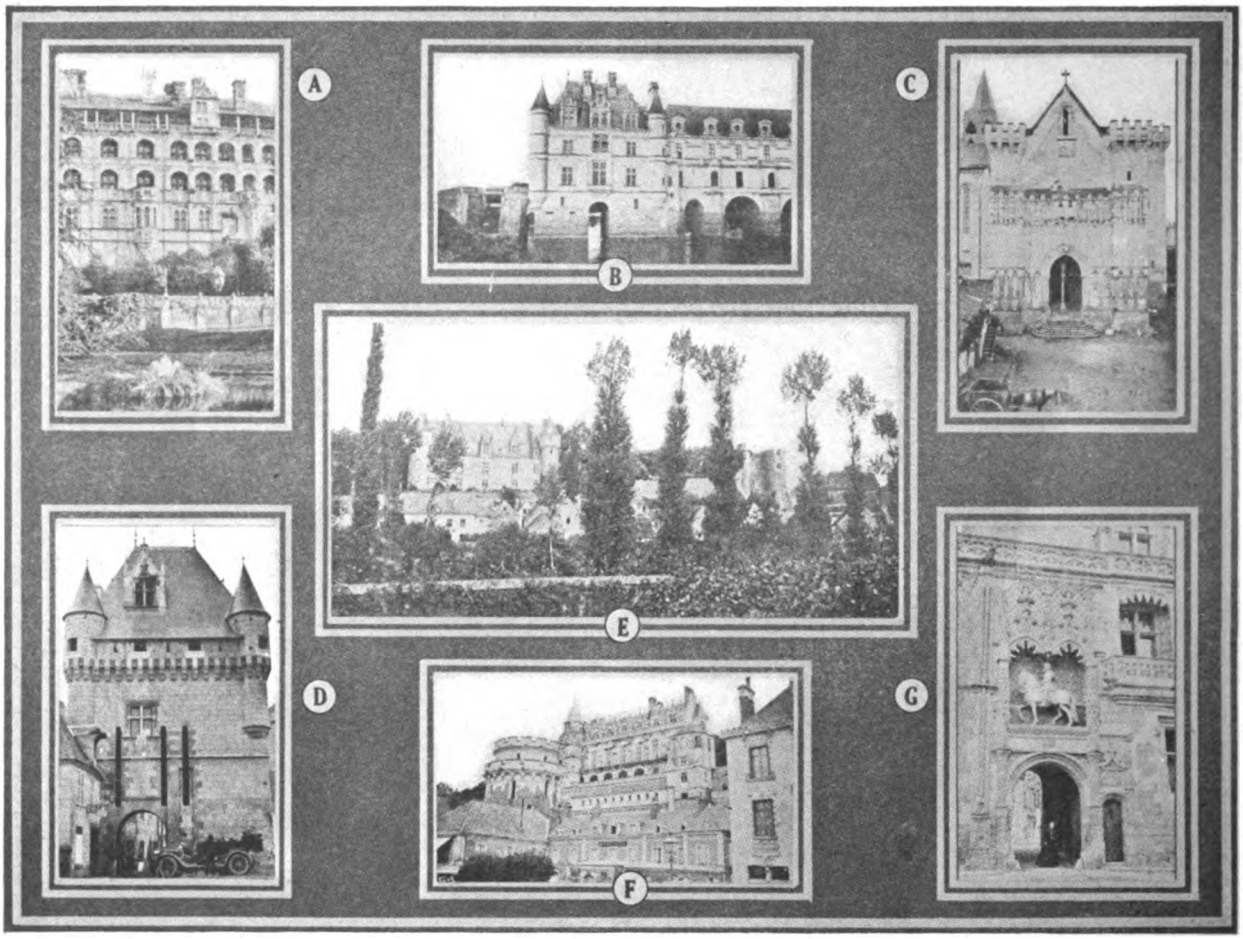
Blois is the night stop. The chateau was built by Louis XII, and some of the pictures are well worth seeing. The famous staircase, and the hidden cabinet, controlled by a concealed spring, where Catherine de Medici kept some of her poisons, are among the interesting features.

The real chateaux country is now left behind, although there remain one or two interesting examples on the way through Chateaudun and Chartres, the cathedral in the latter place being worthy of special attention. The roads are still good, and little difficulty

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will be experienced in making Paris before nightfall. Of course a stop must be made at Versailles, unless it is preferred to reserve this for a side trip later during the stay.

On the return to Havre, the road follows somewhat closely the "Route Nationale No. 14." Near Vernon is Giverny, which is still an artist colony, as it was 20 years ago when Willard Metcalf, Robert Reid and Edward Primmons studied there. Here and there, will be noted a chateau half-hidden away on some hilltop. One of these is the Chateau Gaillard, Richard Coeur de Lion's "Gay Castle." He built it, with its moat, its outer works, its 14-foot walls and most impregnable donjon tower within, in less than a year. For decades thereafter, it commanded the valley and the river against the attacks of the French, finally falling to Philip Augustus after a siege of five months. It is now a most attractive and interesting ruin.



Scenes in Chateaux Country: A, Castle at Chateaudun; B, Fairy Castle on the Cher; C, Church at Candes; D, Chateau of Montresor, Housing Gold Plate of Kings of Poland; E, Gate Tower at Loches; F, Chateau d'Amboise; G, Louis XII Castle at Blois.

FRENCH ITINERARY.

Night Stops—Havre, Mortagne, Laval, Saumur, Loches, Blois, Paris and Havre. Seven Days, 661.6 Miles.

Havre-Mortagne, 97 Miles.

	Miles to	Total Miles Out	Total Miles Return
Havre	0.0	0.0	97.0
Harfleur	4.3	4.3	92.7
St. Romain	8.1	12.4	84.6
Lillebonne	9.3	21.7	75.3
Quillebeuf	3.1	24.8	72.2
Pont-Audemar	8.7	33.5	63.5
St. Georges	8.7	42.2	54.8
Valailles	8.7	50.9	46.1
Bernay	1.9	52.8	44.2
La Barre	10.6	63.4	33.6
Glos-la-Ferriere	7.5	70.9	26.1
Laigle	6.2	77.1	19.9
D'Apres	5.0	82.1	14.9
Lignerolles	8.7	90.8	6.2
Mortagne	6.2	97.0	0.0

Mortagne-Laval, 88 Miles.

	Miles to	Total Miles Out	Total Miles Return
Mortagne	0.0	0.0	88.0
Parfondeval	3.7	3.7	84.3
St. Jouin	2.5	6.2	81.8
Pervencheres	3.1	9.3	78.7
Mamers	5.6	14.9	73.1
Gare de Vezot	3.7	18.6	69.4
St. Paterne	10.5	29.1	58.9
Alencon	3.1	32.2	55.8
La Boissiere	1.9	34.1	53.9
Pre-en-Pail	12.4	46.5	41.5
Javron	6.8	53.3	34.7
Le Ribay	5.0	58.3	29.7
Mayenne	11.2	69.5	18.5
Moulay	2.5	72.0	16.0
Martigne	5.6	77.6	10.4
Louverne	5.5	83.1	4.9
Laval	4.9	88.0	0.0

Laval-Saumur, 84.4 Miles.

	Miles to	Total Miles Out	Total Miles Return
Laval	0.0	0.0	84.4
Entrammes	5.0	5.0	79.4
Le Bourg-Neuf	13.0	18.0	66.4
Chateau Gontier	3.1	21.1	63.3

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Chemaze	4.3	25.4	59.0
Segre	8.7	34.1	50.3
Le Lion-d'Angers	8.7	42.8	41.6
La Membrolle	5.0	47.8	36.6
Angers	8.7	56.5	27.9
La Pyramide	3.7	60.2	24.2
St. Mathurin	8.7	68.9	15.5
Les Rosiers	5.6	74.5	9.9
Gennes	0.6	75.1	9.3
Saumur	9.3	84.4	0.0

Saumur-Loches, 75.2 Miles.

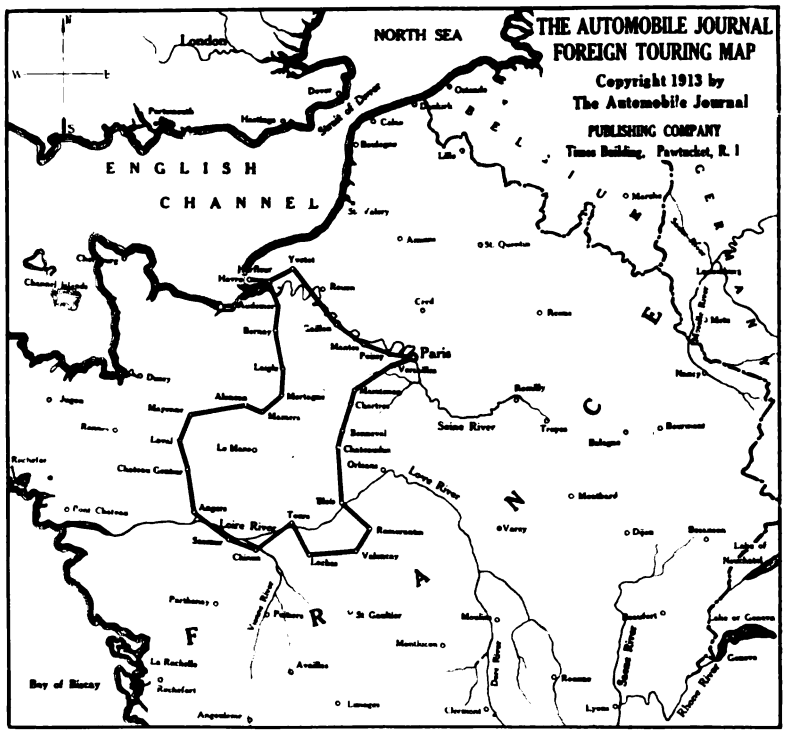
	Miles to	Total Miles Out	Return
Saumur	0.0	0.0	75.2
Villebernier	3.2	3.2	72.0
Port Boulet	9.8	13.0	62.2
Chinon	6.8	19.8	55.4
Azay-le-Rideau	13.0	32.8	42.4
Ballan	8.7	41.5	33.7
Tours	6.2	47.7	27.5
Pont du Cher	1.2	48.9	26.3
Montbazon	6.2	55.1	20.1
Esvres	2.5	57.6	17.6
Cormery	3.1	60.7	14.5
Reignac	5.0	65.7	9.5
Chambourg	6.2	71.9	3.3
Loches	3.3	75.2	0.0

Loches-Blois, 73.9 Miles.

	Miles to	Total Miles Out	Return
Loches	0.0	0.0	73.9
Beaulieu	1.2	1.2	72.7
Liget	5.0	6.2	67.7
Montresor	3.7	9.9	64.0
Nouans	4.9	14.8	59.1
Lucay-le-Male	9.0	23.8	50.1
Valencay	6.2	30.0	43.9
Selles-sur-Cher	8.7	38.7	35.2
Romorantin	9.9	48.6	25.3
Mur	7.4	56.0	17.9
Cour-Cheverny	9.0	65.9	8.0
Blois	8.0	73.9	0.0

Blois-Paris, 107.7 Miles.

	Miles to	Total Miles Out	Return
Blois	0.0	0.0	107.7
Villebarou	3.1	3.1	104.6
Pontijou	5.0	8.1	99.6
Oueques	8.7	16.8	90.9
Moisy	6.8	23.6	84.1
Bonneval	8.7	32.3	75.4
Vitray-en-Beauce	6.2	38.5	69.2
La Bourdiniere	3.1	41.6	66.1
Thivars	4.3	45.9	61.8
Louisant	3.7	49.6	58.1
Chartres	1.2	50.8	56.9
Gasville	4.3	55.1	52.6
Maintenon	9.3	64.4	43.3
Epernon	4.3	68.7	39.0
Rambouillet	8.0	76.7	31.0
Le Perray	4.3	81.0	26.7
Coignieres	5.6	86.6	21.1
St. Cyr	6.8	93.4	14.3
Versailles	3.1	96.5	11.2
Petit Bicetre	5.0	101.5	6.2
Chatillon	3.7	105.2	2.5
Paris	2.5	107.7	0.0



Triel	3.7	17.3	118.1
Meulan	5.0	22.3	113.1
Mantes	7.4	29.7	105.7
Rosny	3.7	33.4	102.0
Bonnieres	4.3	37.7	97.7
Jeufosse	4.3	42.0	93.4
Vernon	2.5	44.5	90.9
Gaillon	8.7	53.2	82.2
Louviers	8.0	61.2	74.2

Paris-Havre, 135.4 Miles.

	Miles to	Total Miles Out	Return
Paris	0.0	0.0	135.4
Rueil	6.2	6.2	129.2
Chatou	1.2	7.4	128.0
St. Germain	3.1	10.5	124.9
Poissy	3.1	13.6	121.8
Pont-de-l'Arche	7.4	68.6	66.8
Rouen	11.1	79.7	55.7
Maromme	3.7	83.4	52.0
Barentin	6.8	90.2	45.2
Croixmare	8.0	98.2	37.2
Yvetot	5.0	103.2	32.2
Valliquerville	3.1	106.3	29.1
Bolbec	10.5	116.8	18.6
St. Romain	6.2	123.0	12.4
Harfleur	8.1	131.1	4.3
Havre	4.3	135.4	0.0

Kurt Issertedt, distributor of Overland cars, made by the Willys-Overland Company, for the German Empire, on his recent visit to the Overland factory at Toledo, O., gave some interesting facts relative to the class of competition which the American machines have to confront. Mr. Isserstedt said:

European manufacturers of motor cars are spending more valuable time in trying to belittle American made automobiles than in improving their own production facilities to meet the so-called invasion in the logical way. Not only are they wasting their time in these efforts, but, I am sorry to say, they are playing the game unfairly.

One of the most difficult features of the European opposition with which we American representatives in Germany have to contend is the regular issuance of false statements by Continental motor car manufacturers concerning our cars. Once a month, or oftener, every motor car dealer and owner in the German Empire receives, through the mail, a printed circular which is devoted entirely to criticisms of the American made automobiles. To a great extent these criticisms are not only unfair, but intentionally and deliberately untrue. You Americans cannot realize to what lengths European competitors will go in order to create distrust of your cars.

I have in mind a particularly vicious attack, all the more unjust because there was absolutely no foundation of truth for it. It was an illustration in one of the circulars, showing a man bending a motor crankshaft almost double, across his knee, with apparently little effort. While it was not so labelled, the accompanying reading matter led the unthinking reader to the belief that the illustration was made from an actual occurrence; that the crankshaft was taken from a medium priced American car and was found so poor in quality and construction that a man of ordinary strength actually bent it across his knee.

The Standard Motor Company, Baltimore, Md., Maryland distributor of Cadillac cars, made by the Cadillac Motor Car Company, Detroit, is planning a unique exhibition. F. S. Blivin, president of the company, states there are 250 parts in a Cadillac machine and it is his purpose to have the company's workmen assemble a complete car in the show window, using parts taken from the repair stock.

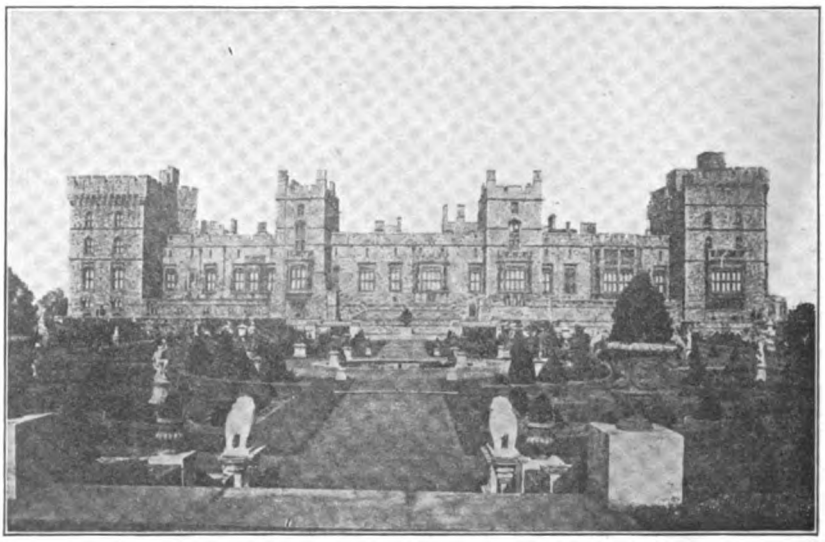
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TEN-DAY TOUR OF ENGLAND AND WALES.

After Leaving Shakespeare's Country, the Itinerary Visits Many Historic Points Before Reaching the Welsh Mountains and Returns by Way of Stonehenge.

FEW English towns are dearer to Americans than Stratford-on-Avon, the home of the immortal bard. The tour outlined herein aims to present an itinerary which will occupy at least 10 days. Shakespeare's country is visited first, after which follows a number of historic spots, and a trip to the Welsh mountains, before returning to London by way of the south country. It is advisable to set aside two full weeks for the enjoyment of the tour, inasmuch as many places are visited which hold much of interest.

Leaving London the first day, the route lies through Kew Bridge to Hampton Court, in which is located a famous palace with gardens, picture gallery, etc. At Stoke Poges is the churchyard, celebrated as the scene of Gray's Elegy. Naturally, the greatest interest attaches to the royal castle at Windsor, which is open to visitors during the absence of the court. Should King George and Queen Mary happen to be at home the tourist will have to be content with looking over the exterior of the building.



Windsor Castle, Home of the British Royal Family.

High Wycombe is an ancient little town, near which is Hughendon, formerly the seat of Lord Beaconsfield (Benjamin Disraeli), who lies buried in the churchyard here. Oxford, one of the two principal university cities of Britain, is at the same time one of the most ancient cities in England. Some of the college buildings still retain their mediaeval character. The cathedral dates back from the 12th century, and its octagon spire is probably the oldest in England, while the cathedral itself is the smallest in the country.

Woodstock is a small, ancient town, the site of Woodstock Manor, the residence of several English kings, although nothing is left of the palace built by Henry I. Blenheim Park is the magnificent seat of the Duke of Marlborough. Here Henry II wooed and won fair Rosamond, under the stately oaks. The park is 12 miles in circumference and well stocked with deer. The castle is a type of Vanbrugh's imposing, though heavy style. The palace contains many rare works of art and tapestries, and the gardens are most attractive. Both are open to visitors Tuesdays and Fridays from noon until 3. Motors are not allowed in the park.

Broadway is a quaint Cotswold village, much favored by American authors and artists. It contains many interesting Tudor and Elizabethan houses. The old Priory and gardens were later the studio of F. D. Millet, the American war correspondent and artist. The old church, dating from the 11th century, is especially interesting. Nearby is the village of Wickhamford, the church of which contains a stone tablet to the memory of Penelope, daughter of Col. Henry Washington, cousin of John Washington, who emigrated to America, and from whom was descended Gen. George Washington, first President of the United States.

The first night stop is Stratford-on-Avon, Shakespeare's town. The house in which the Bard of Avon was born in 1564 is now the property of the nation, and has many interesting relics of the poet. At the Church of the Holy Trinity are the tombs of Shakespeare, his wife, Anne Hathaway, and his daughter, Susan Hall. The Shakespeare Memorial building was erected in 1879. At Shottery, a mile from Stratford, is the cottage of Anne Hathaway, standing in practically the same condition as when Shakespeare courted his future bride. The house contains the carved bedstead, linen sheets, old settle, etc., once the property of Shakespeare's wife.

Early the second day the motorist reaches Warwick, one of the very quaint and historical old towns, the east and west gates of which are still standing. Warwick castle, the home of the Earl of Warwick, is a grand old edifice, one of the finest feudal residences in England, probably dating from the Saxons. The oldest portion existing is Caesar's tower, built soon after the Norman conquest. The interior is open to visitors from 10 in the morning until 5:30 in the afternoon.

Concerning Leamington it is written that it has the cleanest and best kept streets in the kingdom. There are many interesting drives about the place,

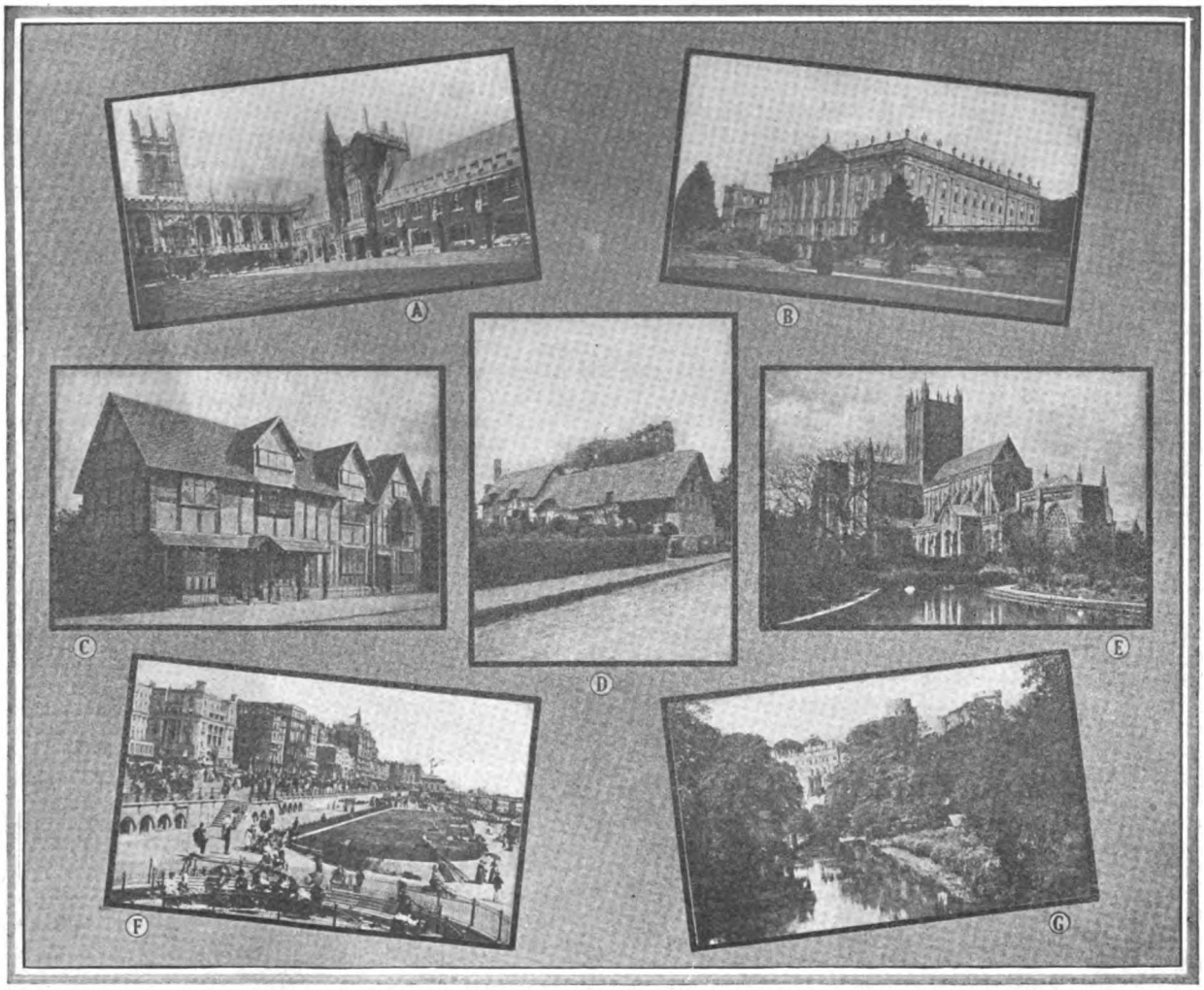
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and in fact all of this region is of great historic interest. Leamington is famed for its mineral springs, and is popular with Americans.

At Kenilworth, Kenilworth castle, founded in the 11th century, is one of the finest baronial ruins in all England, with a very stormy past. A beautiful road leads to Coventry, one of the chief cycle and motor manufacturing towns in England. This is the scene of the famous ride of Lady Godiva. St. Mary's Guildhall, which contains a statue of Lady Godiva, is a most interesting specimen of English municipal architecture of the 14th and 15th centuries.

pied, but still in fair preservation. In the 12th century this place came into the hands of the Vernon's, who held it for 400 years. It is now the property of the Duke of Rutland. At Bakewell, the ancient church contains a monument to Dorothy Vernon. Beyond Bakewell is Chatsworth, open to visitors from 11 to 4, excepting Saturdays, the grand seat of the Duke of Devonshire, built in 1687-1706. Mary, Queen of Scots, was imprisoned here.

Buxton, the second night's stop, is one of the most popular watering spots in England. It has a remarkably bracing climate, and is famous for its hot springs,



Historic English Views: A, Magdalen Cloister and Tower, Oxford College; B, Chatsworth, the Prison of Mary, Queen of Scots; C, Shakespeare's House at Stratford-on-Avon; D, Anne Hathaway's Cottage at Shottery; E, Splendid Early English Cathedral at Wells; F, Along the Esplanade at Brighton; G, Warwick Castle and Caesar's Tower from the Avon.

The cathedral at Lichfield, built in the 12th century, has an almost perfect nave. The city was the birthplace of Johnson and has many literary associations. Burton-on-Trent is famous as the ale making centre of Bass & Co., whose plant covers 200 acres. Matlock is noted for its baths, petrifying wells, caves, etc.

Haddon Hall is a splendid specimen of an old English baronial mansion, open to visitors, unoccu-

which were known to the Romans. They were visited often by Mary Stuart, while in the custody of the Earl of Shrewsbury. The dome of the Devonshire Hospital is said to be the largest in Europe, 154 feet in diameter, and emits a most curious echo.

Macclesfield is a silk manufacturing centre. Chester is said to be the most quaint town in Britain, care having been taken, even in installing modern improvements, to preserve as far as possible the old features

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of the place. The old city walls are of the 14th century, and extend in a circuit of about two miles with a footway on top.

Eaton Hall, on the River Dee, is the seat of the Duke of Westminster, and is a grand English mansion of the Gothic style, fitted up lavishly. Public admission is granted to the hall and gardens, the latter being especially beautiful. Motor cars are not allowed on the grounds.

At Wrexham, outside the church, built in 1742, is the tomb of Elihu Yale, after whom Yale University in America is named. The night stop is at Llangollen, Wales, at which the bridge over the Dee is described as one of the seven wonders of Wales. A particular point of interest is the ruins of Castell Dinas Bran, perched on an eminence 1000 feet above the river. All around Llangollen are charming walks and drives. The ruins of Valle Crucis Abbey, founded in 1200, is said to be a splendid specimen of pure Gothic architecture.

From Llangollen to Bettws-y-Coed, the route traverses some excellent scenery, which continues on the way to Llandudno, beautifully situated on a narrow peninsula facing Orme's bay and with a fine view of the Welsh mountains. One of the prettiest drives in Wales is that along the cliffs of Great Orme's Head, passing through Happy valley, a distance of six miles. Horse carriages are recommended for this trip, as a motor car is hardly a practical conveyance for the roads encountered.

Conway is surrounded by walls with 21 towers. A commanding view of Snowdon is obtained at Capel Curig. Bettws-y-Coed, the night stop, is very beautifully situated at the confluence of the Conway and Llugwy rivers. This is a highly popular resort for artists and is often called the Paradise of Wales. The Llugwy is crossed opposite the village by means of the Pont-y-Pair, a romantic structure of the 15th century.

Harlech, with its old castle and its splendid view of the sea and mountains, was the last place in North Wales to hold out against Charles I. Aberystwyth, the night stop, is a favorite watering place, from which point the tour turns inland to Rhayader on the River Wye. Abergavenny, another night stop, is termed the Gate of Wales. It is a little town occupying the site of the Roman Gobannium, and contains the ruins of a Norman castle, the grounds of which are open to the public. A rustic gallery on the walls affords a magnificent view of mountain and vale, especially of Sugar Loaf mountain.

The next day's run takes the tourist to the famous Wye valley. The river scenery on the way to Usk is particularly charming. Caerleon is the traditional residence of King Arthur. Caldicut offers a castle with wonderful masonry. In Roman times Caerwent was a city of much importance. Chepstow is picturesquely situated on the west bank of the Wye, with its ruins of the Chepstow castle, dating from the 13th century. Some parts of the town walls and an old gateway still exist.

Tintern abbey at Tintern is considered the most beautiful and romantic ruin in England. It was founded in 1131, and was the third Cistercian church in England. The structure is still preserved, with the exception of the roof and central tower. At Monmouth, the old castle, but little of which remains, was the birthplace of Henry V, the "Prince Hal" of Shakespeare.

Ross is a pretty little town on the Wye, particularly notable because of its quaint little town hall, supported by pillars of red sandstone. Gloucester is the night stop. The history of this ancient city dates back nearly 2000 years, and is famous for its resistance to King Charles in 1643. Henry VIII was crowned here. The east window in the cathedral, of the perpendicular style, is 72 by 38 feet, said to be the largest in England.

Bath, a combination of the archaeological, historic and scenic, probably ranks first among English towns. The health giving mineral springs are famous, particularly the Roman baths, said to have been founded by Emperor Claudius. The great pump room is a remarkably fine edifice. Guildhall contains many pictures of historic interest.

Wells is a small ancient city, claimed to be the most characteristic cathedral city in England. Although one of the smallest in the kingdom, the cathedral is considered the most perfect piece of Gothic art imaginable. The west front is exceedingly fine and the nave superb.

Glastonbury is noted for the Glastonbury abbey, which traces its foundation back to the sixth century. Longleat is the magnificent seat of the Marquis of Bath, considered the finest Elizabethan mansion in England. Stonehenge is a most imposing megalolithic monument, supposed to have consisted originally of two ellipses of wonderful upright stones. The origin and purposes of Stonehenge are unknown.

Salisbury, the night stop, possesses a cathedral built in the 12th century, a fine example of pure early English architecture. The spire, 404 feet high, is said to be the tallest in England. The Halle of John Halle was built in 1470.

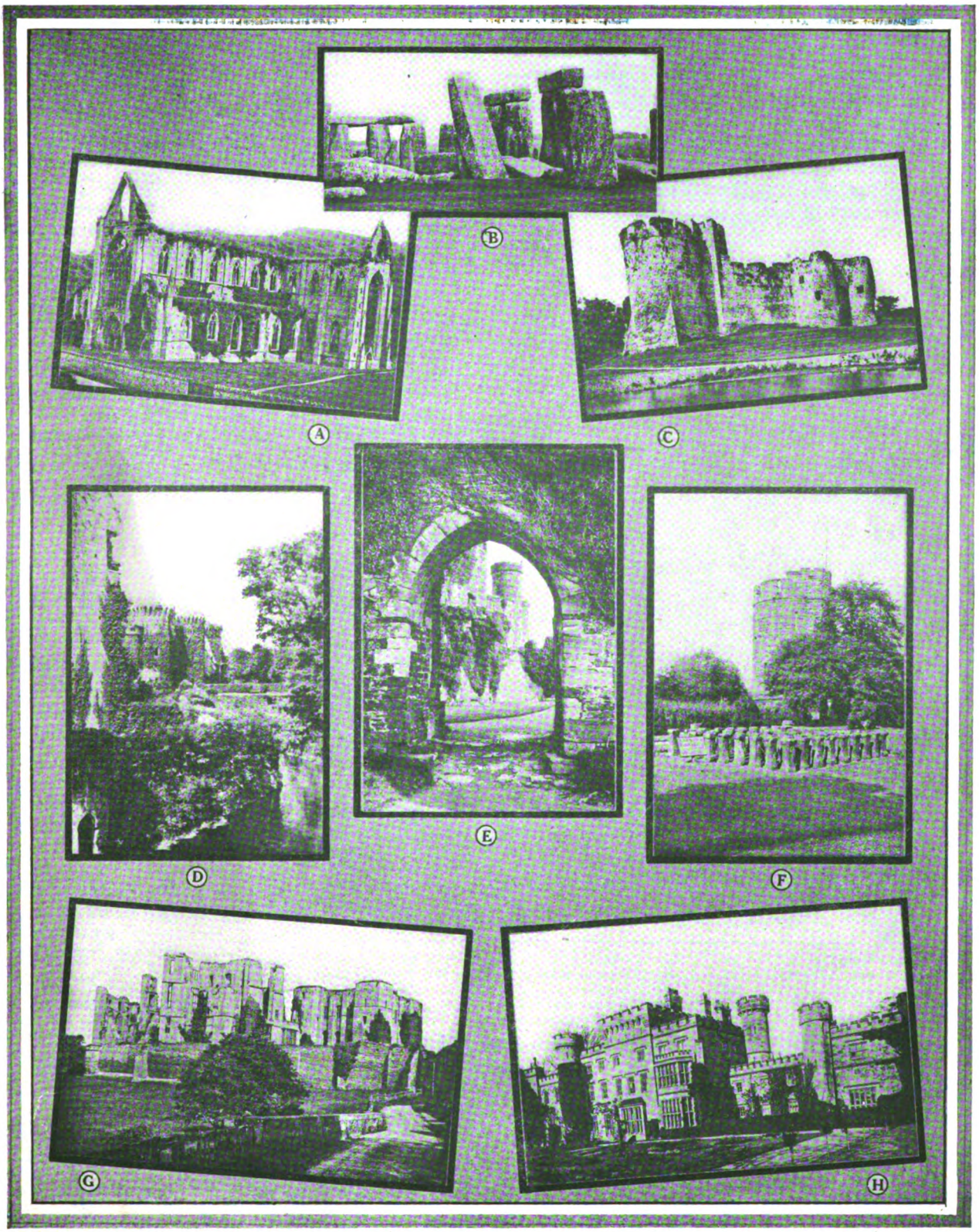
Winchester is a city of great antiquity, and the cathedral, founded in 1079, incorporates every style of English architecture from the Norman to the perpendicular. Winchester college was built in 1373. County Court was erected by William the Conquerer. In the older times Winchester was the capital of the Saxon kingdom of Wessex.

Arundel contains Arundel castle, the splendid seat of the Duke of Norfolk, open Mondays and Fridays from 12 to 4. Brighton, the night stop, is the most favorite seaside resort of the British. The picture gallery contains famous portraits and other pictures. The Royal Pavilion was built for George IV, when Prince of Wales, in 1787. The esplanade is about four miles long.

Lewes is a quaint old town with an old castle of the Norman period and many other interesting places. The return to London is by way of Eastbourne, Uckfield, East Grinstead, Purley and Croydon, over one of the most popular motor trips for English motorists.

It may be explained, in connection with the itinerary outlined on page 86, that an attempt has been made to include the best roads, although in some instances it has been necessary to leave the main highways in order to reach places of historic interest. The daily mileage might be reduced somewhat in some instances by taking the direct route between important centres, but it is assumed that the tourist will desire to view as much of the country as possible, and since all English roads are considered good, when compared with some of the ways traversed in mountain touring in this country, no trouble should be experienced in covering the route selected.

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A Few of England's Grand Old Ruins: A, Tintern Abbey; B, Mysterious Stonehenge; C, Chepstow Castle from the Moat; D, Raglan Castle Between Tintern and Monmouth; E, Conway Castle; F, Old Roman Bath at Chester; G, Kenilworth Castle; H, Hawarden Castle, Home of the Late William E. Gladstone.

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BRITISH ITINERARY.

Night Shops—London, Stratford-on-Avon, Buxton, Llangollen, Bettws-y-Coed, Aberystwyth, Abergavenny, Gloucester, Salisbury, Brighton and London. Ten Days, 1016 Miles.

London-Stratford-on-Avon, 116 Miles.

	Miles to	Total Miles Out	Return
London	0	0	116
Kew Bridge	6	6	110
Hampton Court	8	14	102
Stoke Poges	8	22	94
Windsor	3	25	91
Beaconsfield	10	35	81
High Wycombe	7	42	74
Stokenchurch	8	50	66
Wheatley	11	61	55
Woodstock	12	73	43
Enstone	7	80	36
Moreton-on-the-Marsh	12	92	24
Broadway	8	100	16
Stratford-on-Avon	16	116	0

Stratford-on-Avon — Buxton, 115 Miles.

	Miles to	Total Miles Out	Return
Stratford-on-Avon	0	0	115
Warwick	10	10	105
Leamington	2	12	103
Kenilworth	5	17	98
Coventry	5	22	93
Corley	4	26	89
Furnace End	6	32	83
Tamworth	9	41	74
Lichfield	7	48	67
Burton-on-Trent	13	61	54
Derby	12	73	42
Belper	10	83	32
Matlock	10	93	22
Rowsley	6	99	16
Haddon Hall	2	101	14
Buxton	14	115	0

Buxton-Llangollen, 93 Miles.

	Miles to	Total Miles Out	Return
Buxton	0	0	93
Cat and Fiddle	6	6	87
Macclesfield	7	13	80
Congleton	8	21	72
Holmes Chapel	7	28	65
Northwich	8	36	57
Crabtree Green	5	41	52
Tarvin	7	48	45
Chester	6	54	39
Eaton Hall	5	59	34
Rossett	11	70	23
Wrexham	11	81	12
Llangollen	12	93	0



Llangollen-Bettws-y-Coed, 98 Miles.

	Miles to	Total Miles Out	Return
Llangollen	0	0	98
Corwen	10	10	88
Druid	3	13	85
Cerrig-y-Druidion	7	20	78
Bettws-y-Coed	12	32	66
Llanrwst	5	37	61
Colwyn Bay	16	53	45
Llandudno	5	58	40
Conway	7	65	33
Aber	7	72	26
Bangor	5	77	21
Capel Curig	12	89	9
Bettws-y-Coed	9	98	0

Bettws-y-Coed-Aberystwyth, 100 Miles.

	Miles to	Total Miles Out	Return
Bettws-y-Coed	0	0	100
Ffestiniog	12	12	88
Harlech	13	25	75
Barmouth	11	36	64
Dolgelley	10	46	54
Llwyngwril	12	58	42
Aberdovey	12	70	30
Machynlleth	12	82	18
Aberystwyth	18	100	0

Aberystwyth-Abergavenny, 82 Miles.

	Miles to	Total Miles Out	Return
Aberystwyth	0	0	82
Llangwrig	14	14	68
Rhayader	20	34	48
Builth	13	47	35
Brecon	24	71	11
Abergavenny	11	82	0

Abergavenny-Gloucester, 91 Miles.

	Miles to	Total Miles Out	Return
Abergavenny	0	0	91
Usk	17	17	74
Caerlon	8	25	66
Newport	4	29	62
Penhow	7	36	55
Caldicot	5	41	50
Chepstow	7	48	43
Tintern	5	53	38
Monmouth	11	64	27
Ross	10	74	17
Gloucester	17	91	0

Gloucester-Salisbury, 131 Miles.

	Miles to	Total Miles Out	Return
Gloucester	0	0	131
Stroud	9	9	122
Dunkirk	14	23	108
Cold Ashton	10	33	98
Bath	5	38	93
Radstock	10	48	83
Wells	11	59	72
Glastonbury	5	64	67
Shepton Mallet	9	73	58
Frome	12	85	46
Longleat	16	101	30
Shrewton	15	116	15
Stonehenge	4	120	11
Salisbury	11	131	0

Salisbury-Brighton, 90 Miles.

	Miles to	Total Miles Out	Return
Salisbury	0	0	90
Romsey	14	14	76
Winchester	9	23	67
Midhurst	30	53	37
Petworth	7	60	30
Arundel	10	70	20
Brighton	20	90	0

Brighton-London, 100 Miles.

	Miles to	Total Miles Out	Return
Brighton	0	0	100
Lewes	8	8	92
Polegate	8	16	84
Eastbourne	9	25	75
Heratmonceux	15	40	60
Uckfield	14	54	46
East Grinstead	13	67	33
Caterham	12	79	21
Purley	5	84	16
Croydon	3	87	13
Streatham	4	91	9
Kennington	4	95	5
London	5	100	0

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CANADIAN CUSTOMS AND MOTORING LAWS.

RECIPROCITY provisions between the United States and Canada permit the free passage of automobiles under certain regulations. The method of procedure is the same with respect to American or Canadian tourists, except for its reversal. Assuming that the American desires to visit Canada for a period of one week or less, he will proceed as follows:

Stop at United States customs house in order to permit the officer to take note of the number and make other inquiries for the purpose of identification. If the car is to be returned through another port the necessary papers will have to be procured. Stop at the first Canadian customs house and secure a seven-day permit, which will be issued free of charge. If the laws of the province require registration, this detail must be attended to at this time.

If the car remains in Canada longer than seven days, it will be necessary, in order to avoid paying duty, to secure a customs bond, which may be procured at any Canadian customs house. The bond is made out for the double estimated duty based on an appraisal of the car by the customs officer, and must be guaranteed by two Canadian citizens approved by the local collector of customs. In addition a cash deposit of $25 is required, which will be returned at the port of leaving when the car reenters the United States. The bond is good for six months.

A summary of the motoring laws in force in the several provinces covered by this Seventh Annual Touring Number is as follows:

New Brunswick—Registration, annually with secretary of department of public works, Fredericton. Registration fee, $5, plus the following horsepower fees: Twenty, $5; 20-30, $10; 30-40, $15; 40-50, $20. Chauffeur's license, $2. Non-resident owners are exempt 21 days, but chauffeur must have license. Speed, closely built-up sections, 12 miles an hour; other sections of city or town, 15; elsewhere, 20.

Ontario—Registration, annually with provincial secretary, Toronto. Fee, $4. Operator's license, $1. Non-residents are not exempt and the car must bear Ontario number plates only. Speed, within the city limits, 15 miles an hour; outside, 20.

Quebec—Registration, perpetually with provincial treasurer, Quebec. Fees, 25 horsepower, $5; 25-35, $10; 35-50, $15; over 50, $20. Chauffeur's license, $5 annually. Non-residents are exempt if registered in any other province of Canada. Speed, reasonable and proper, closely built-up sections, nine miles an hour; elsewhere, 15. New legislation pending.

WOLVERINE AUTOMOBILE CLUB.

Prominent Detroit Organization Opens Its Magnificent New Home.

Few motoring organizations have enjoyed as much success as the Wolverine Automobile Club of Detroit, which was formed some two years ago to promote good fellowship among the enthusiasts in that city and to boom the product of the Detroit factories. An accompanying illustration presents an interior view of the handsome new home of the club in the Springfield building, 125 Woodward avenue, opposite the Hotel Pontchartrain, where it is expected to become the headquarters for tradesmen visiting the capital of the industry.



Interior of Wolverine Club, Detroit.—Photo by Spooner & Wells, Inc.

The Wolverine Automobile Club has taken a decidedly active part in awakening interest in long distance touring, having successfully managed a run around Lake Erie and a number of runs to important motoring events in Indianapolis, Chicago and other sections of the Middle West. It is rapidly becoming one of the most efficient organizations of its character in the country.

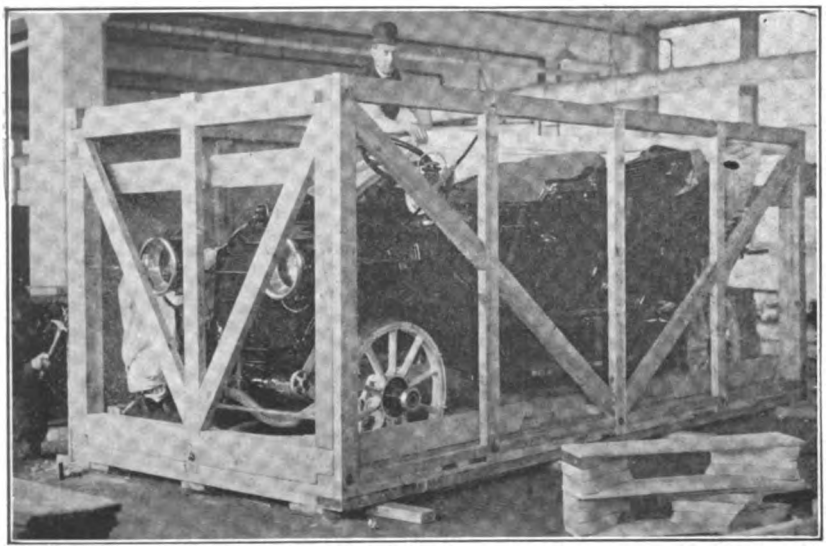
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PREPARING FOR THE FOREIGN TOUR.

Shipment of Car Has Been Simplified to the Last Degree—Tourist Has Option of Purchasing or Renting Machine Abroad—Taxicab Proposition Considered.

WHILE each American is strongly advised to "See America First," there is little disposition to question the statement that the historical and scenic influences of Europe have a special fascination for the tourist. And it is not surprising that the increased use of the motor car for long distance touring in this country should awaken interest in its possibilities abroad.

The superior roads and the other conditions surrounding motoring in Great Britain and on the Continent are such that no American need hesitate to undertake an automobile trip in any of the more important countries. It is but natural that those who already possess a car should desire to take with them the machine with the operation of which they are thoroughly familiar. However, there are many who suggest that they have found it much more economical under certain circumstances to purchase a car upon arrival and dispose of it upon their return to this country. There also is the possibility of renting a machine, or of engaging taxicabs in each of the important centres visited. An attempt will be made herein to discuss briefly each of these methods.



The Initial Step in the Crating for Foreign Shipment—Constructing Framework About the Car.

It is no longer considered feasible for the owner to do his own crating, not alone because of the difficulties presented due to the lack of information respecting the freight regulations of the various steamship lines, but because of the expense involved. Express companies and tourist agencies, catering to foreign travel, have so systematized this feature that it is extremely probable that the cost will be less than if the work were done by the owner himself. In addition, these concerns arrange all the details so that when the tourist arrives on the other side he finds his car awaiting him with all the necessary papers, triptyques and licenses, with the sole exception of the driving license for France. This must be procured by the operator in person and cannot be obtained without a special examination before the proper authority. But even in this instance full arrangements will be made for taking the necessary examination without delay.

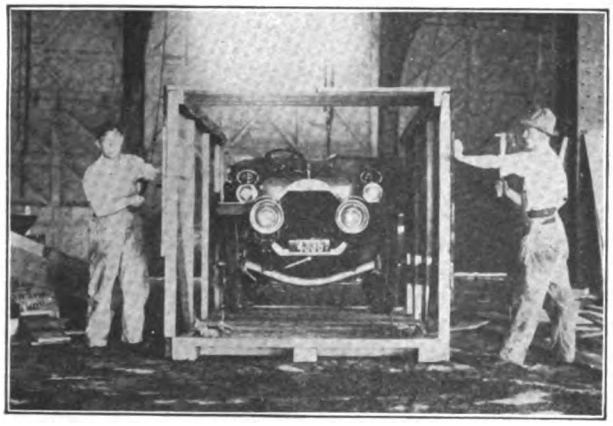
Thus is the shipment of the car simplified to the last degree. The owner is called upon to make choice of the steamship line and arrange with the forwarding company. Some two weeks before sailing he should notify the latter concerning the exact, extreme overall length, height and width of the car, the correct weight, the length of the wheelbase, the bore and stroke, and the manufacturer's number of the motor. While it is possible, under certain circumstances, to make arrangements for crating the machine on the pier, it usually is necessary to deliver it to the forwarding company at least 48 hours before the time of sailing to insure its going by the same boat. It ought also to be said that some of the faster boats do not carry automobiles, but this is a matter which can be determined when consulting the ticket agent before making decision as to the steamship line.

The question as to whether it is better to take the car abroad or purchase one on the other side depends upon the length of time that is to be spent abroad. This factor also enters into the problem when considering the advisability of

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renting a machine. An estimate of the cost of shipping a seven-passenger touring car abroad is placed at about $450 by an owner who has made frequent trips of this character during the past several years. This figure includes all details—freight, licenses, insurance, triptyques, customs bond, etc. It is possible that some of the forwarding companies will quote a price somewhat less than this, some of the items depending largely upon the size and weight of the machine. It will be understood that the purchase of a car in Europe eliminates freight, insurance en route, duty and perhaps a few other items.

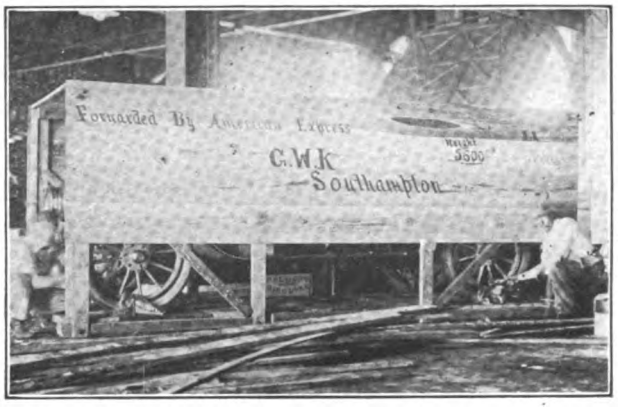
Those who decide upon renting a car are cautioned against waiting until their arrival in Europe with the hope of securing a better bargain. Many of the concerns who do a rental business are quite as adept in the art of disposing of unsalable goods as the proverbial Yankee. The contract of rental invariably includes a clause re-



Putting on the Boards at the Side After the Car Has Been Stayed in Place.

quiring the tourist to keep the car in repair. It readily will be seen that it is possible for the renting company to secure much the better part of a bargain under these circumstances.

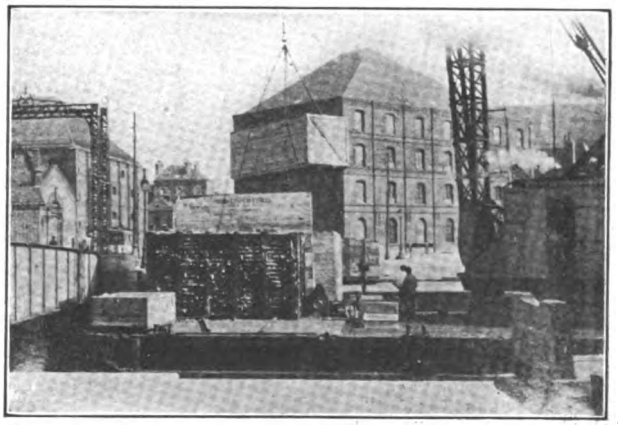
It must not be understood, however, that this result cannot be avoided. There are a number of reliable concerns in all the principal cities of Europe from whom it is possible to obtain a machine that is first class in every respect. It may be mentioned that Thos. Cook & Son, the well known tourist agency, maintains a rental garage in Paris, and the reputation of this company is sufficient guarantee of its treatment of patrons. There are others of equal prominence, which may be recommended by steamship agencies. While the rental charge may seem greater, the absence of replacements will be found to make the cost much less when dealing with firms of recognized standing.



Showing the Finish of the Enclosure, with the Rest of the Sides and Top Boarded Up, Cleated with Two by Fours and Marked for Shipment.

For those who have limited time at their disposal or those who desire a less expensive means of seeing the country by automobile, the taxicab plan is suggested. In Paris, and in fact most of the larger centres on the Continent, it is possible to rent a private taxicab, so-called, and visit all the points of interest, even at some little distance, at an expense which is surprisingly small.

It should be remembered that the taxicab charges in Europe are very much less than in this country. The private taxicabs are distinguished from those termed public by the color of the flag, which with the former is white and the latter red. The initial charge with the public cab is 75 centimes, while with the private cab it is 85 centimes. This permits a drive of 1300 meters. Thereafter the charges are the same, 10 centimes for each 300 meters. A centime is one-fifth of a cent, and a meter is 3.281 feet, so that the initial charge is 17 cents for the first .8 mile and two cents for each .18 mile thereafter. It would be possible to visit the chatteaux district from



Except for the Differing Aspect of the Docks, Cranes and Laborers, the Unshipping Process Abroad Is Exactly the Reverse—Scene in Havre Showing the Unloading of a Car.

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Paris, for instance, at a cost of some $20 for taxicab fares.

The tourist who takes his own car abroad, or purchases one upon arrival, should arrange to join at least one of the foreign automobile clubs. It will be assumed of course that he already is a member of the American Automobile Association or the Automobile Club of America, either of which organizations will be able to procure for him a triptyque, a document somewhat in the nature of a club passport, the club guaranteeing the payment of various fees and compliance with the different rules and regulations in the several countries visited. A card from either of the

LIST OF SAILING DATES DURING THE 1913 SEASON.

FROM NEW YORK.

London Direct.
(Atlantic Transport Line.)

July 12..... Minneapolis
July 19..... Minnehaha
July 26..... Minnewaska
Aug. 2..... Minnetonka
Aug. 9..... Minneapolis
Aug. 16..... Minnehaha
Aug. 23..... Minnewaska
Aug. 30..... Minnetonka
Sept. 6..... Minneapolis
Sept. 13..... Minnehaha
Sept. 20..... Minnewaska

Liverpool via Queenstown and Fishguard.
(Cunard Line.)

July 16..... Caronia
Aug. 2..... Carmania
Aug. 6..... Campania
Aug. 23..... Caronia
Aug. 27..... Campania
Sept. 6..... Carmania
Sept. 17..... Campania
Sept. 20..... Caronia

Liverpool via Queenstown.
(Cunard Line.)

July 23..... Mauretania
Aug. 13..... Lusitania
Aug. 20..... Mauretania
Sept. 3..... Lusitania
Sept. 10..... Mauretania
Sept. 24..... Lusitania
Oct. 1..... Mauretania

Liverpool via Queenstown.
(White Star Line.)

July 17..... Adriatic
July 24..... Celtic
July 31..... Cedric
Aug. 7..... Baltic
Aug. 14..... Adriatic
Aug. 21..... Celtic
Aug. 28..... Cedric
Sept. 4..... Baltic
Sept. 11..... Adriatic
Sept. 18..... Celtic

Southampton via Plymouth and Cherbourg.
(White Star Line.)

July 12..... Majestic
July 19..... Oceanic
Aug. 2..... Olympic
Aug. 9..... Majestic
Aug. 16..... Oceanic
Aug. 23..... Olympic
Aug. 30..... Majestic
Sept. 6..... Oceanic
Sept. 13..... Olympic
Sept. 20..... Majestic

Southampton via Cherbourg.
(American Line.)

July 18..... New York
July 25..... St. Paul
Aug. 1..... St. Louis
Aug. 8..... Philadelphia
Aug. 15..... New York
Aug. 22..... St. Paul
Aug. 29..... St. Louis
Sept. 5..... Philadelphia
Sept. 12..... New York
Sept. 19..... St. Paul

Antwerp via Dover.
(Red Star Line.)

July 12 .....Zeeland
July 19..... Vaderland
July 26..... Lapland
Aug. 2..... Finland
Aug. 9..... Zeeland
Aug. 16..... Kroonland
Aug. 23..... Vaderland
Aug. 30..... Finland
Sept. 6..... Lapland
Sept. 17..... Kroonland

Havre Direct.
(French Line.)

July 17..... La Lorraine
July 19..... Niagara
July 24..... France
July 31..... La Savoie
Aug. 2..... Chicago
Aug. 7..... La Lorraine
Aug. 14..... La Provence
Aug. 16..... Rochambeau
Aug. 21..... France
Aug. 28..... La Savoie
Aug. 30..... Virginie
Aug. 30..... Chicago
Sept. 4..... La Provence
Sept. 6..... La Touraine
Sept. 11..... France
Sept. 13..... Niagara
Sept. 18..... La Savoie
Sept. 20..... Rochambeau
Sept. 24..... Floride
Sept. 25..... La Provence
Sept. 27..... Chicago

Glasgow via Londonderry.
(Anchor Line.)

July 19..... Columbia
July 26..... Cameronia
Aug. 2..... California
Aug. 9..... Caledonia
Aug. 16..... Columbia
Aug. 23..... Cameronia
Aug. 30..... California
Sept. 6..... Caledonia
Sept. 13..... Columbia
Sept. 20..... Cameronia
Sept. 27..... California

Hamburg via Plymouth and Cherbourg.
(Hamburg-American Line.)

July 12..... Pretoria
July 16...President Grant
July 19..... Imperator
July 23..... Amerika
July 24..President Lincoln
July 31..... Pennsylvania
Aug. 2..Kaiserin Auguste Victoria
Aug. 9..... Patricia
Aug. 9..... Imperator
Aug. 21..... Amerika
Aug. 23..... Pretoria
Aug. 27...President Grant
Aug. 30..... Imperator
Sept. 3..Kaiserin Auguste Victoria
Sept. 4..President Lincoln
Sept. 11..... Pennsylvania
Sept. 12.... Victoria Luise
Sept. 20..... Imperator
Sept. 20..... Patricia
Sept. 24..... Amerika

Bremen via Plymouth and Cherbourg.
(North German Lloyd Line.)

July
15..Kaiser Wilhelm der Grosse
22.....Kaiser Wilhelm II
24..... Barbarossa
29.....Kronprinz Wilhelm
31.Prinz Friedrich Wilhelm
August
5..Kronprinzessin Cecilie
7..... Berlin
9.....George Washington
12..Kaiser Wilhelm der Grosse
19....Friedrich der Grosse
26.....Kaiser Wilhelm II
28..... Bremen
30.Prinz Friedrich Wilhelm
September
2.....Kronprinz Wilhelm
6.....George Washington
9...Kronprinzessin Cecilie
16..Kaiser Wilhelm der Grosse
23.....Kaiser Wilhelm II
25....Friedrich der Grosse
30.....Kronprinz Wilhelm

Naples via Marseilles.
(Fabre Line.)

July 19..... Madonna
July 25..... Germania
Aug. 2..... Santa Anna
Aug. 8..... Venezia
Aug. 15..... Roma
Aug. 23..... Canada
Sept. 2..... Madonna
Sept. 9..... Germania
Sept. 16..... Santa Anna
Sept. 23..... Venezia
Sept. 30..... Roma

Rotterdam via Boulogne-sur-Mer.
(Holland-American Line.)

July 15...New Amsterdam
July 22..... Noordam
July 29..... Ryndam
Aug. 12..... Rotterdam
Aug. 19..... Potsdam
Aug. 26...New Amsterdam
Sept. 2..... Noordam
Sept. 9..... Ryndam
Sept. 16..... Rotterdam
Sept. 23..... Potsdam
Sept. 30...New Amsterdam

Copenhagen via Christiania.
(Scandinavian-American Line.)

July 17..... Hellig Olav
July 31..... Oscar II
Aug. 14..... United States
Aug. 28..... Hellig Olav
Sept. 4..... C. F. Tietgen
Sept. 11..... Oscar II
Sept. 25..... United States

FROM BOSTON.

Liverpool Direct.
(Leyland Line.)

July 12..... Bohemian
July 19..... Winifredian
July 26..... Devonian
Aug. 9..... Canadian
Aug. 16..... Bohemian
Aug. 23..... Winifredian
Aug. 30..... Devonian
Sept. 6..... Canadian
Sept. 20..... Bohemian

Liverpool via Queenstown.
(White Star Line.)

July 15..... Cymbric
July 19..... Canopic
July 29..... Arabic
Aug. 12..... Cymbric
Aug. 26..... Arabic
Sept. 9..... Cymbric
Sept. 20..... Canopic

Liverpool via Queenstown.
(Cunard Line.)

July 22..... Laconia
Aug. 5..... Franconia
Aug. 19..... Laconia
Sept. 2..... Franconia
Sept. 16..... Laconia
Sept. 30..... Franconia

FROM PHILADELPHIA.

Liverpool via Queenstown.
(American Line.)

July 19..... Haverford
July 26..... Dominion
Aug. 9..... Merion
Aug. 23..... Haverford
Aug. 30..... Dominion
Sept. 13..... Merion

Antwerp Direct.
(Red Star Line.)

July 18..... Manitou
Aug. 1..... Marquette
Aug. 15..... Menominee
Aug. 29..... Manitou
Sept. 12..... Marquette

FROM PROVIDENCE.

Naples via Marseilles.
(Fabre Line.)

July 26..... Germania
Aug. 9..... Venezia
Aug. 16..... Roma
Sept. 3..... Madonna
Sept. 10..... Germania

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American organizations usually is accepted as sufficient credentials to warrant election to membership in a foreign body. The Touring Club de France is the strongest and the one most used by tourists. Membership therein costs six francs ($1.20).

As its name indicates the triptyque is in three parts or sheets, the first of which is attached by the customs official at the point of entry, the second by the customs on the final exit, and the third, duly signed and stamped by the customs officers for entry and exit, is retained by the tourist. A separate triptyque is issued and used for each country entered. After the country has been crossed, the third sheet, signed and sealed, is returned by the tourist to the club, which then refunds the original deposit less a small fee which is retained for services rendered. As stated previously the forwarding company will arrange for the triptyques if the tourist belongs to either of the American organizations named.

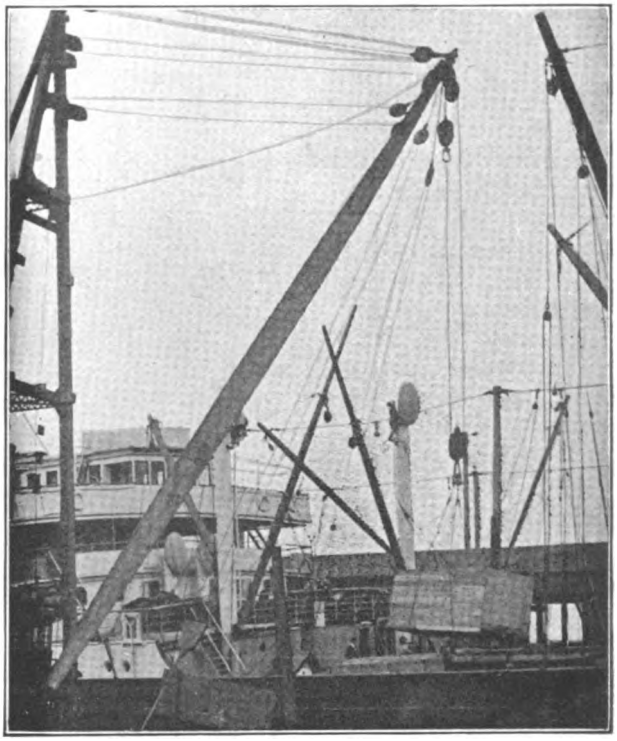
There also is the international pass, which is recognized by the nations entering into the international agreement to pass automobile tourists for 10 days in any one country without complying with annoying customs delays at the frontier. America is not a party to this agreement, but it is understood that American tourists may secure the benefits of the international pass after establishing a temporary address in any of the countries which are a party thereto and securing membership in the foreign club.

One other point in connection with crossing the various frontiers should be mentioned. By securing a passavant at the time of leaving a country, it is possible to return at any time within a year without paying duty on the car or any of its accessories. The passavant contains a full description of the machine and everything on it and costs five francs ($1). It is desirable to secure this document, even though the tourist is supplied with a triptyque or international pass, as the customs laws of some of the foreign countries require duty even on goods made therein.

The American driver will not need a special operator's license in most of the countries visited, but every operator of a car in France must secure a special license. It is necessary to supply five small photographs of the chauffeur and three of the owner. The former should be about 1.25 by 1.625 inches and the latter two by three inches. These are attached to the various licenses for identification purposes. A plate also must be carried on the car giving the owner's name and address, both permanent and temporary.

While the forwarding company will look out for the insurance, if requested, it cannot be made too emphatic that insurance is extremely necessary, particularly in France. Another point to be remembered is that in case of accident the driver should remain upon the scene until the arrival of the police. The laws of France permit the collection of full damages in case the motorist leaves before the police have made investigation, no matter whether he was the aggressor or not.

Several minor details of the laws in the various countries differ from those in America, but full information can be secured of the forwarding company or from the foreign automobile organizations. It is well to add that after a stay of three months in France, the foreign resident becomes subject to a personal property tax on the car, which must be paid before leaving the country, else the car and owner will be held up at the border.



Handling the Crate from a Lighter, Showing the Height and Power of the Shear Legs.

For the convenience of those who desire to tour abroad, a table is presented herewith giving all the most important sailing dates for the season of 1913. These are subject to change without notice. The Automobile Journal is indebted to the Raymond & Whitcomb Company, New York City; Thos. Cook & Son, Boston, and the Church Ticket Agency, Providence, R. I., for the information therein.

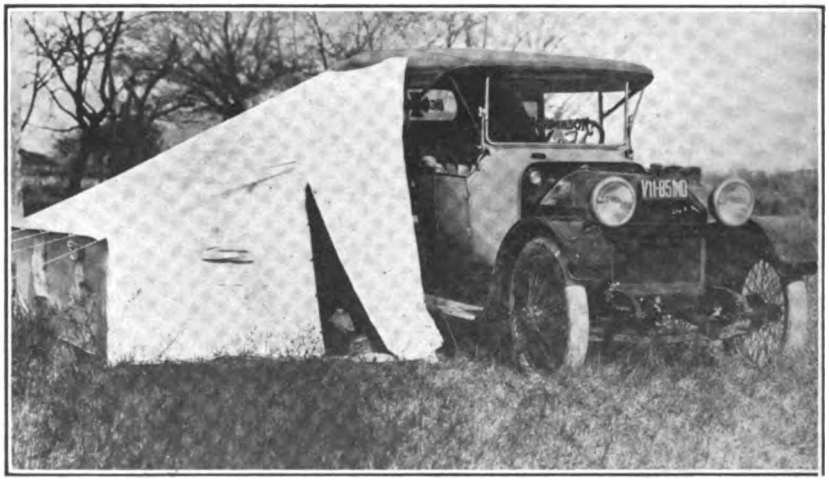
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SHORT TOURS AND CAMPING TRIPS.

How the United States Government Is Assisting Motorists to "See America First"---Suggestions with Reference to the Tent and Other Necessary Paraphernalia.

SO MUCH attention has been paid to long distance touring that the possibilities of shorter trips along the highways and byways of the country by motor car are sometimes overlooked. "Seeing America First" is too often taken to mean that the tourist shall visit distant points, and while a transcontinental journey or a trip to the mountains is desirable from every viewpoint, it is quite as essential to become familiar with the beauties of nature nearer home. The intimate knowledge thus obtained affords real pleasure, which is still further enhanced by the fact that the tourist is enabled to enjoy repeated vacations of longer or shorter duration throughout the season, another factor of decided moment.

Before the advent of the motor car many business men were accustomed to find their recreation in hunting or fishing trips. There is no reason why the two should not be combined. All that is essential is a camping outfit which shall be capable of being transported readily by automobile. Thus equipped the motorist may leave home at any time he wishes and return at will, the itinerary and schedule arranging themselves to accommodate circumstances. Stops may be made wherever fancy dictates, and may be extended as long as desired. The same thing applies with those who may not be fond of hunting or fishing, but to whom camp life makes an especial appeal.



The Compac Tent Installed with Henderson Car, the Particular Feature Being the Absence of Poles.

In this connection it may be pointed out that the United States Geological Survey, Department of the Interior, Washington, D. C., is issuing some particularly attractive maps which can be used to decided advantage in tours of this character. Since its organization, some years ago, this bureau has been engaged in making a topographic survey of the United States. The work is still far from being completed, but the maps now available cover a large portion of the country. These are sold at 10 cents each, or six cents in orders for 50 or more.

The key map covers an entire section, New England for example, from which it is possible to select the individual maps desired. These are arranged to show all main highways, intersecting roads, steam and electric railroads, etc. All ponds, brooks, rivers and bridges are indicated, as well as practically all dwellings and other important buildings in the country districts. A particularly desirable feature is the contour line, by means of which it is possible to determine whether the highway traverses hills, steep grades or gentle slopes. A few minutes' study of the maps should be sufficient to enable the motorist to become somewhat well acquainted before leaving home with the nature of the country through which he wishes to tour.

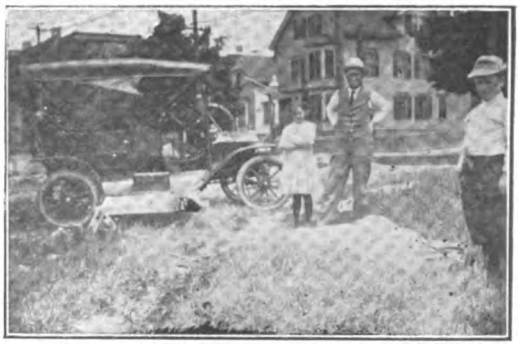
There is but one criticism to offer, this being based upon the fact that some of the sections were surveyed a number of years ago, and a growth of the country has made necessary the construction of new highways in places. As a result the maps are not strictly accurate in this regard, but if the tourist remembers that they are drawn exactly to scale he should have little difficulty in locating the road he desires, although it may appear that other highways exist than those presented. This fault is being remedied as fast as possible, supplemental surveys being made at frequent intervals whenever opportunity affords.

While it is possible to use any style of tent

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Tent Raised and Children Seated on the Couch or Bed.



Tent Folded Ready for Packing, Also Showing the Couch.

that will permit of being packed in small space so as to be stowed away conveniently upon the car. there are several makes in the market which have been designed especially for just such tours as are indicated. One of these is illustrated herewith, the particular feature being the absence of poles. The tent itself is made in one piece, ventilation being accomplished by six windows covered with a gauze netting and protected against rain by canvas flaps. It is opened from both ends by doors that are fastened with button snaps, and a partition is provided so that the interior may be divided into two private rooms with separate entrances.



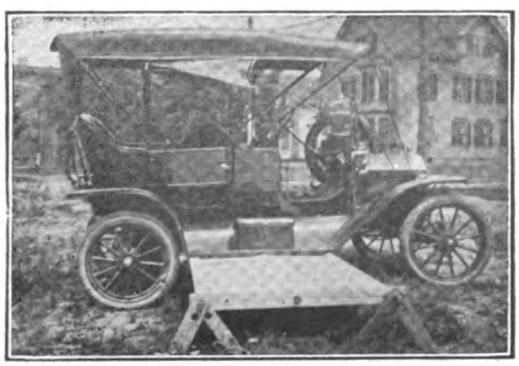
Special Tent Utilized with Ford Car on Recent Transcontinental Tour.

Other illustrations present in detail the equipment utilized by William L. Finley, Janesville, Wis., on a recent tour from that city to Boston and return. The car was a Ford and it will be noted that the tent and couch were so arranged that it was possible to fold them into small space for carrying on the car, the former in a bag at the rear and the latter in another bag on the running board.

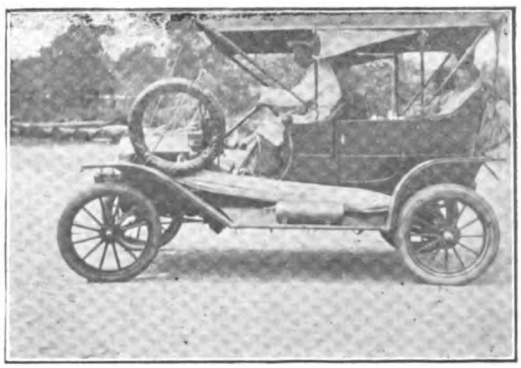
Concerning the other equipment for a camping trip there practically is no limitation except with reference to the amount the tourist desires to expend. It might be contended that provisions could be carried in any convenient package and the occupants of the car could manage without extra garments. On the other hand, the market is well supplied with accessories which tend to equip the camping tourist for any emergency. Some of these are presented in accompanying sketches.

The list of trunks includes those which may be carried on the running board or at the rear, and those which serve a double purpose in that they may also be utilized as footrests. It will be noted that some of these make provision for women's hats, and this feature is also to be found in cases made to fit inside the tire trunk. The so-called wardrobe trunks afford opportunity for carrying two or three suit cases, and are arranged so as to operate much in the nature of a chest of drawers.

In providing for the "table," the choice is even

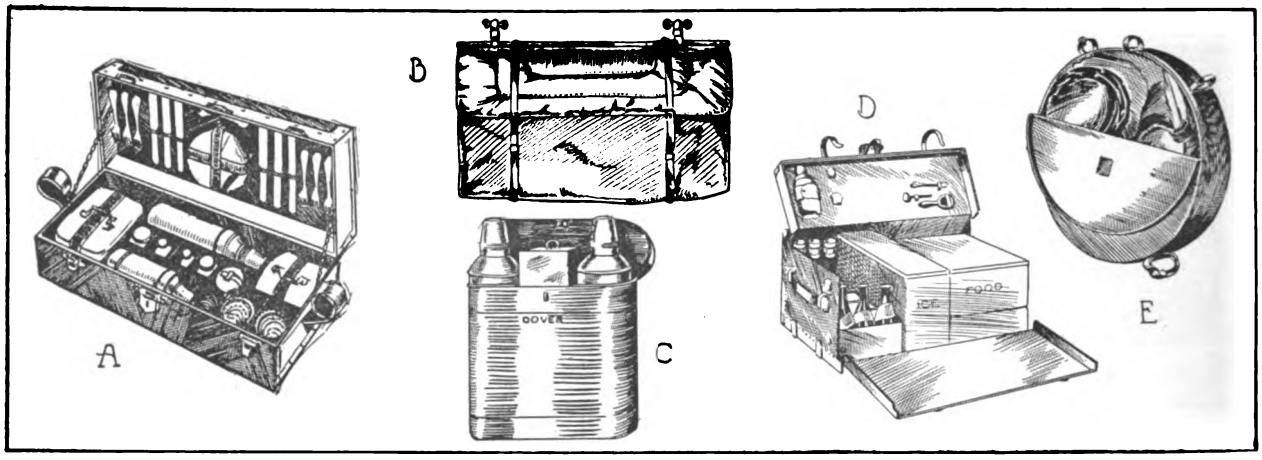


Nearer View of the Couch, Presenting Supports at the Foot.



Tent in Bag at Rear and Couch on the Running Board.

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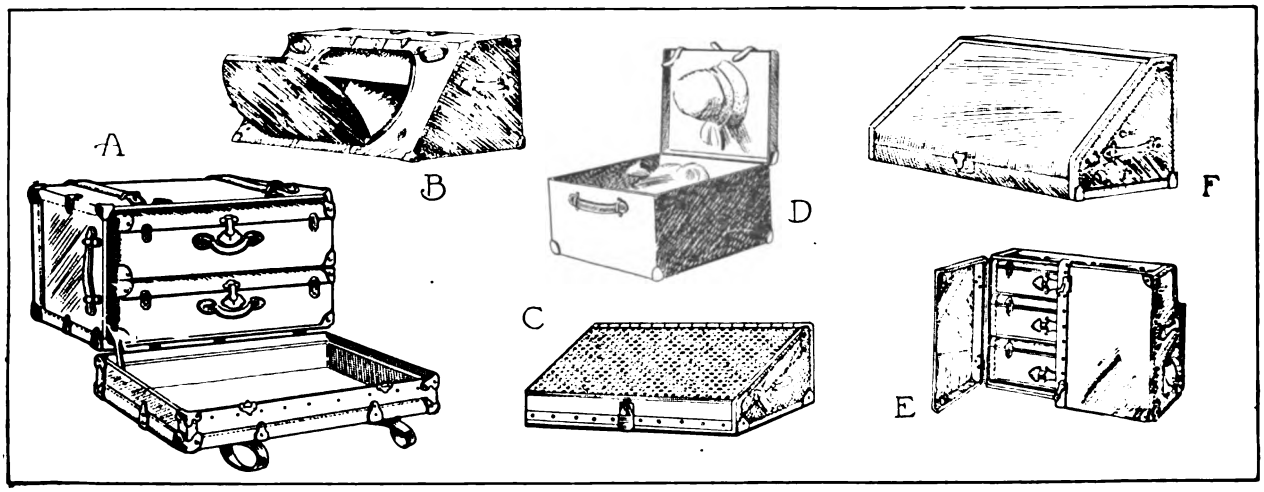
Accessories That Appeal to Motor Camping Parties: A, Luncheon Outfit in Suit Case Form; B, Pocket for Attachment to Interior of Car; C, Thermos Case; D, Portable Ice Chest; E, Utilizing Tire Trunk for Hats.

wider, including everything from the handy little hamper to the most elaborately fitted lunch carrier designed as a suit case, equipped with knives, forks, spoons, salt and pepper shakers, napkins, tablecloth, etc., a generous space for food and four short legs readily converting it into an outdoor table. Some are made of wicker work and others of kiln dried bass wood covered with heavy enameled duck.

The utility of the Thermos bottle, for carrying both hot and cold liquids, is well known. The handy case shown herewith is made by the Dover Stamping & Manufacturing Company, Cambridge, Mass., and provides for two of these vacuum bottles as well as a sandwich box. W. W. Winship, 71 Summer street, Boston, Mass., who makes a specialty of trunks and touring cases of all kinds, produces a similar carrier which is designed as a pocket to be attached to the interior of the car. Larger pockets, of leather or imitation leather, similar to that illustrated, are made for attachment to the back of the front seat, and are exceedingly handy for carrying extra clothing, etc.

Other illustrations serve to indicate the wide variety of carriers available. It is even possible to purchase a portable refrigerator in which there is a special compartment for ice, which should prove particularly attractive to the camping tourist. Many of these outfits are equally applicable to the long distance tour.

It is appropriate that the Turks, who sit much, have learned to build the most comfortable seat cushions. The Peerless Motor Car Company, Cleveland, O., maker of Peerless cars, has experimented with the Turkish cushion designs and this year Turkish upholstery will be used very extensively in Peerless machines, believing it to be best adapted for automobile use.



Trunks Are Made in Shapes and Sizes to Meet Individual Requirements: A and E, Accommodating Two and Three Suit Cases, Respectively; B, C and F, Combining Footrest Features; D, Another Suggestion for Carrying Hats.

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OVERHAULING THE CAR FOR THE TOUR.

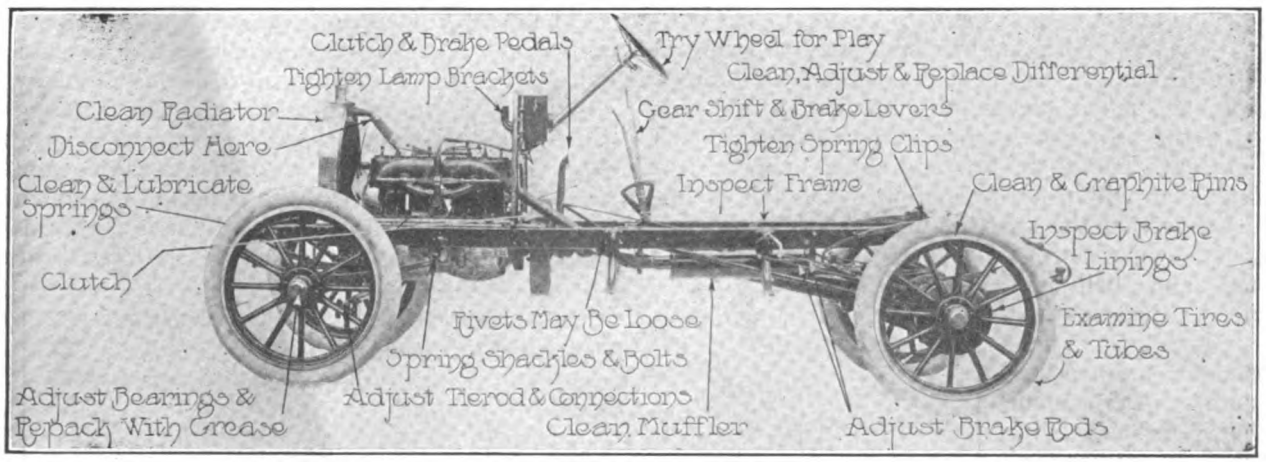
Components Requiring Attention and Suggestions for Completing the Work---Brakes and Steering Mechanism Should Be Placed in Perfect Condition.

AS THE successful completion of a tour depends largely upon the vehicle, the owner should take every precaution to insure proper operation of each and every component. Nothing detracts so much from the pleasures of automobiling as to experience trouble on the road. Frequently the tourist meets with mishaps through lack of attention to small details previous to the trip, and invariably the trouble develops in the most undesirable locality and where the services of the expert repairman are not obtained easily. It is obvious that with the itinerary limited to a certain number of days any serious delay because of mechanical difficulties will mean a rearrangement of the schedule and possibly the elimination of some of the most attractive portions.

Motorists about to make their first tour, or those whose trips have been confined to good roads, fail to take into consideration the fact that in operating over hilly and strange roads the car is subjected to stresses not encountered where the driver is familiar with each hole and gully. Places of particular interest will tempt the tourist to leave the beaten paths and the highways may require considerable use of the low gear and the frequent application of the brakes. The same argument applies to other components of the chassis.

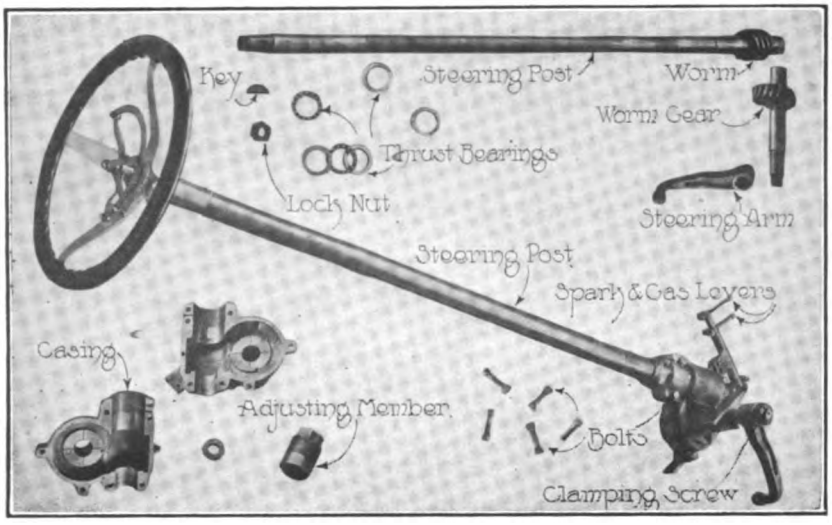
Many owners limit their tours, or in other words, plan a trip through territory where the roads are known to be good and free from steep grades, because of a lack of confidence in the capacity of their machine. This is a mistake, as a moderate priced car in good condition is as capable of giving satisfactory service as a high powered machine. This is substantiated by tours successfully completed throughout the country by light and moderately priced automobiles. It should be borne in mind that the fundamental principle of touring is to see the country, not how much of it can be covered in a given time.

The labor and expense involved in preparing the machine for the tour will depend on its age and condition. A new car may not need any attention other than grinding in the valves, removing carbon and a general inspection for loose nuts and bolts, etc. On the other hand, an old machine may require a complete overhaul and the replacement of worn parts. It should be remembered that the automobile which appears satisfactory to the owner may develop weaknesses when subjected to the severe service demanded of it in the mountains, etc. The inspection of all components should be very thorough and avoidance of makeshift repairs is recommended, for although such may have withstood ordinary service it is poor economy to patch up a part which undoubtedly will give trouble later. This applies particularly to the brakes and steering mechanism and the motorist cannot be too careful in overhauling and replacing any worn com-



Showing the Components Requiring Attention in the Overhaul of the Chassis in Preparing It for the Tour.

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Illustrating a Typical Steering Gear and Its Parts—Lost Motion Is Eliminated by Meshing Unworn Part of Worm Gear with Worm.

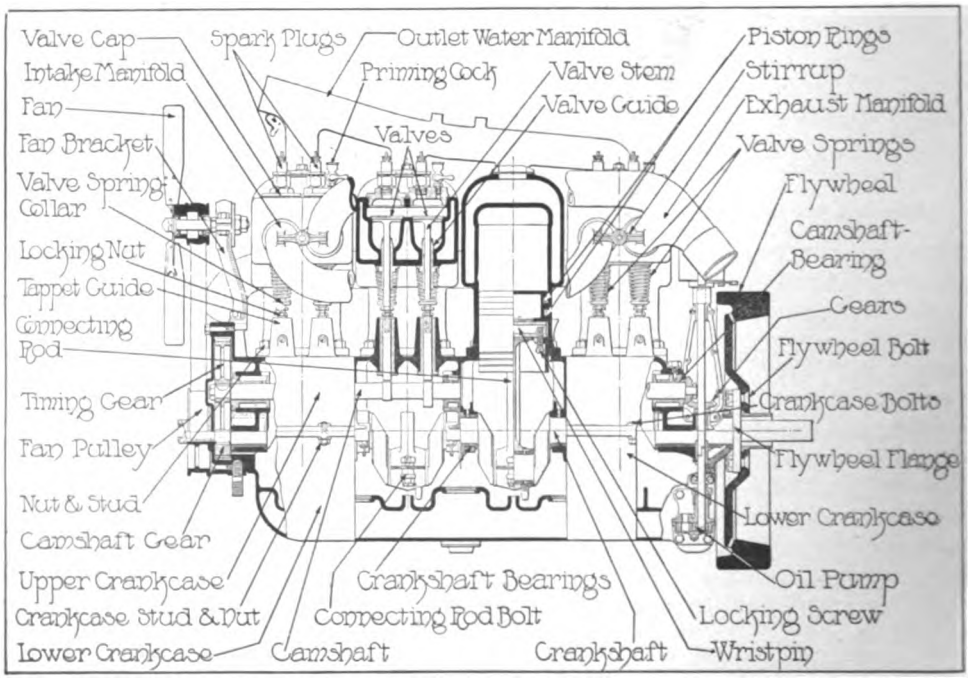
ponents, as conditions may be encountered which will severely test the material and construction.

The motor should be placed in first class condition as its maximum efficiency may be required in negotiating long and steep grades which might not be climbed successfully on the second gear with the power plant not in proper shape. As continued use of the low and sometimes the second gear will test the cooling system, it is imperative that the radiator be thoroughly cleaned and the smallest of leaks repaired. Similarly, the fan and belt will need adjustment.

The bearings should be inspected and any loose members adjusted, taking care to replace all cotter pins. If the car has seen considerable service since its last overhaul it is a good plan to check up the timing of the valves after grinding them in and removing the carbon deposits. If the ignition system comprises a timer or a distributor, examine these members carefully and replace worn components with new or fit a new member. The magneto should be cleaned and oiled in accordance with the instructions of the maker, and as many manufacturers provide service stations the placing of the instrument in first class condition will not involve any great expense or loss of time. Clean the carburetor and fuel supply system, inspecting at the same time the float. The subjects of carburetion and ignition are discussed elsewhere in this issue, and suggestions are also made for correcting faults.

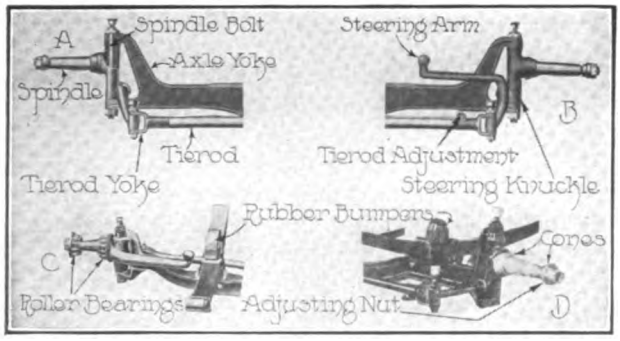
The type of clutch utilized will determine to a large extent the work of overhaul, as that employed with planetary transmission will require but little attention unless badly worn. The adjusting of the high speed member, low and reverse, is made easily where bands are employed.

The lining of the cone clutch should be examined and if it has been slipping and does not yield to the usual treatments it is best to fit a new leather. The multiple disc will require cleaning, which is accomplished easily by draining out the old oil and refilling with kerosene, engaging and disengaging the clutch several times, after which it should be refilled with the lubricant recommended by the maker. It is possible that the



Part Sectional View of Conventional Type of Motor with Each Component Lettered to Simplify the Work of the Overhaul.

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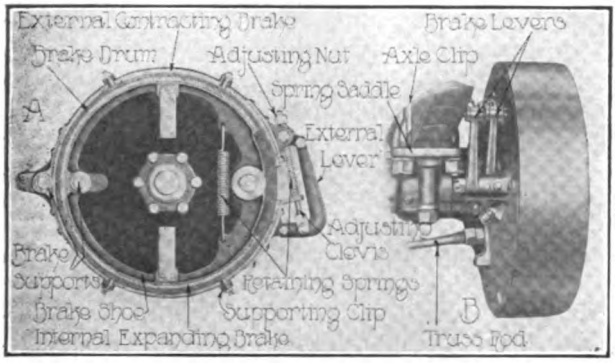
Front Axle Assembly and Parts Subject to Wear: A, Steering Knuckle Cut Away to Show Bolt; B, Adjusting Devices for Aligning Wheels; C, Conventional Types of Roller Bearings; D, Cones Utilized with Ball Bearing Wheels.

discs will require some slight adjustment.

Broadly speaking, there is not much to be done to the transmission if the gears and bearings are in good condition, other than remove the old lubricant and refill with new. If any of the gears are worn badly and do not mesh easily the trouble should be remedied. While on the transmission the shifting forks ought to be examined and adjusted if necessary, and the lever and quadrant gone over carefully to insure that the components are tight and do not stick or bind in their operation.

Universal joints are important and when these operate in grease packed in a boot, the latter should be taken off and cleaned. It will afford an opportunity to test the members for lost motion and the correction of same before renewing the grease and replacing the boot. The differential and drive shaft may not require any attention other than cleaning and the renewal of the lubricant, but it is possible that the position of the driving and driven gear may need correction and that the thrust bearings should be readjusted.

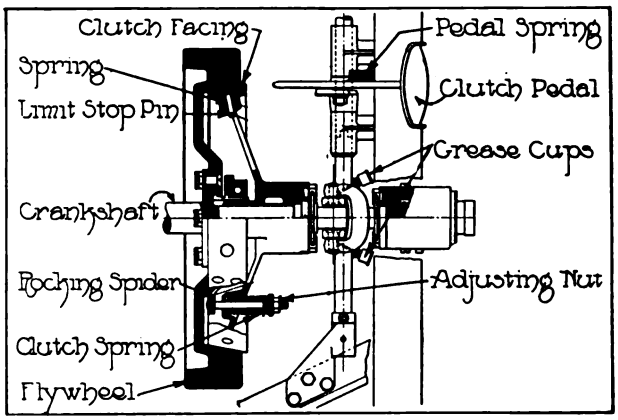
It is important that the rear wheels, axles and their bearings be in good condition as they are



The Brakes and Operating Mechanism Should Be Placed in First Class Condition.

subjected to severe stresses. As it will be necessary to remove the wheels to inspect the condition of the brake linings, it will provide an opportunity to examine the bearings, keyways, locking mechanism, etc. Ball bearings should be packed with a non-acid grease and care should be exercised in the adjustment so that the bearings do not bind. Loose wheel or axle bearings may be responsible for faulty operation of brakes or undue friction of these members.

Coming next to the subject of brakes too much emphasis cannot be laid upon the importance of having these members and their actuating mechanism in the very best of condition as their reliability will be severely tested on the tour. If the linings are worn, renew them. Clean and lubricate all parts subject to friction and test the rods and equalizers for binding. While on the subject of brakes it is well to point out that the springs may have lost their tension and may



Illustrating the Leather Faced Cone Clutch and Components Which May Require Attention.

cause the new lining to drag, burning the material, as well as decreasing the power of the car.

Torsion, radius and torque members are important factors in the drive of a machine and one cannot be too careful in giving these components the attention they deserve. If the rear axle be provided with a truss or strut rod, test these members for looseness and if play exists remove same. They should be set up snug, not too tight, the locking members being set up hard and cotter pinned. Before leaving the rear system search for loose rivets in the housing and make sure that all bolts and nuts are tight.

Springs, shackles, bolts and retainers should be gone over carefully and worn parts replaced with new. If the springs are dry or rusty, pry the leaves apart, remove the dirt and lubricate with graphite and oil. As many cars are equipped with shock absorbers these should be given the attention recommended by the maker. The

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frame, cross members, aprons, fenders and their irons should be included in the inspection and the bolts securing these units tightened.

The most important component of the chassis is the steering mechanism, and the examination should be very thorough. Too much emphasis cannot be laid upon the necessity of disassembling the parts, inspecting each carefully and replacing any worn with new. The reach rod and its connections should be gone over, tested for play, and if not provided with means for adjustment, worn components should be rebushed or replaced with new. Tierod connections may be worn, creating considerable lost motion, which may also exist in spindles and pins. The bearings of the front wheel are next examined, readjusted and the lubricant renewed. In overhauling the steering gear the tube and base supporting the column should not be overlooked. All grease cups and the passages communicating to the bearings, etc., should be cleaned and the cups refilled.

No mention is made of the tires, tubes, etc., as the subject is dealt with elsewhere in this issue. The lamps and their brackets will require inspection, and cleaning if of the oil or acetylene type. It is needless to state that the gas tank should be exchanged for a new one if nearly exhausted. It will be an excellent idea to examine the top, curtains and windshield and to make any needed repairs.

As the majority of the cars are now fitted with electric lighting and motor starting systems, it is suggested that the battery be examined and the electrolyte tested in accordance with the instructions of the maker. As many motorists make it a practise to carry spare bulbs, the subject of lighting may be dismissed. Lack of space prevents the discussion of subjects pertinent to the preparation of the car for the tour, but it should not be taken for granted that because a machine has been overhauled it will not require attention on the trip. It is an excellent plan to go over the machine at the completion or beginning of each day's run, tightening any nut or bolt that may be loose and to examine the connections of the steering linkage. These precautions will prevent annoying delays and probable expense, adding considerably to the pleasures of the journey.

Among the recent automobile deliveries in Washington, D. C., were two Studebaker machines, both of 35 horsepower, one being a limousine to Senator Joseph W. Dixon of Montana, and the other a touring car to Representative C. B. Miller of Minnesota.

TO LECTURE ON ADVERTISING.

Harry Tipper of the Texas Company to Conduct Course at New York University.

His many friends in the industry will be glad to learn that Harry Tipper, advertising manager of the Texas Company, New York City, maker of Texaco lubricants, is to conduct a course on "Advertising" at the school of commerce, accounts and finance, New York University. Mr. Tipper is well qualified for this work, having a wide knowledge of his subject. Previous to his present connection he was president of the Technical Publicity Association and he is a member of the National Advertising Managers, Associated Ad-Clubs and the Advertising Men's League of New York. Mr. Tipper's course will present the fundamental principles of the science of advertising, and show its relation to business as a whole and to the several departments of the business. There will be about 30 class sessions of approximately two hours each, taking up the following topics:

Advertising and its relation to business—Advertising as a direct selling force; advertising as a distribution factor; the functions of the advertising department; the functions, growth, etc., of advertising agents; the place of the publisher; the relation of manufacturer's advertising department, agency and publisher to each other, and the economic consideration of advertising.

The medium in relation to the audience—Newspapers, field, service, local prestige, value, etc.; other news mediums, weekly papers, farm papers, etc.; magazines, a medium of entertaining, educational character; trade and class journals; direct mail; outdoor advertising; booklets and printed matter, and special advertising.

What to say to the audience—The general principles and the arguments to be used, the class of audience to be reached, etc.; the preparation of booklets, circulars and folders; the arrangement, dummies, etc., and samples, window displays and demonstrations, preparation and use.

The planning of an advertising campaign—The preliminary investigation, consideration of the extent, method and character of distribution, consumption, districts to be covered, character of article, etc.; the relation of all these factors to the choice of mediums and method; the arrangement of mediums; the product and the planning of copy in its relation to the campaign; the arrangement of the work and its relation to the campaign and the administration.

The Haynes Automobile Company, Kokomo, Ind., maker of Haynes cars, has let the largest contract for automobile bodies in the history of the company, being divided between the Glascock Bros. Manufacturing Company, Muncie, Ind.; Union City Body Works, Union City, Ind., and Portland Body Works of Portland, Ind. Other firms represented in the bids were: Laporte Carriage Company, Laporte, Ind.; Racine Manufacturing Company, Racine, Wis.; Central Manufacturing Company, Connersville, Ind.; Detroit Body Company, Detroit, Mich.; Carriage-Woodstock Company, Owensboro, Ky., and Capitol Body Company, Indianapolis, Ind.

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TOURING GARMENTS FOR MOTORING WOMEN.

Influence of the Automobile Is Strongly Reflected in the Season's Offerings---Designers Have Prepared Wide Selection of Practical Models.

SINCE the automobile has taken such a prominent place in the social and business life of the world, the attention of the designer has been directed more and more toward the production of garments that are suitable for the woman motorist. The situation began to make itself felt in a decided manner a year ago, and with the opening of the present season it was soon evident that even with coats designed primarily for street wear there was to be a very definite suggestion of the car. This results in an extremely wide selection of charming and practical offerings from which the woman tourist may make choice.

It is not to be denied that for those who have no reason to consider difference in cost the exclusive creations by women's tailers and modistes will make the strongest appeal, and with such garments individuality is the prevailing note, but there are many who must regard expense where there are few who do not. And while it is desirable to possess a coat which lends a certain prestige to the wearer, there is no questioning the statement that the exclusive design may not be any more practicable or serviceable than one which can be secured ready made in any of the leading local shops.



Front and Back Views of Imported Model in Basket Weave Material with Boucle Effect.

The real secret of good dressing lies in selecting a becoming garment and in always having the proper clothes for the occasion. Now that motoring has become so intimately connected with a woman's everyday life, the latter portion of this problem is by no means so difficult as formerly. Obviously, there are certain coats and hats which are not to be considered as practical for motoring wear, particularly for touring, but it is a much easier matter to find suitable apparel when the line of demarcation between street and automobile is more carefully drawn.

The so-called Bulgarian models are held to be well adapted to motoring, although possibly the colors are not quite so pronounced as for street wear. Short coats are worn very extensively, but for long tours it is suggested that the longer models are somewhat more practical. However, it is by no means necessary to confine the decision to these two, coats of almost any length being shown.

The long coats that are used for motoring have some belt or suggestion of a belt. The cut-in effects are employed very largely and it is noticeable that the bottom of the skirt is made to conform to the lines of the straight models now so much in favor. The line that extends front and back from the collar into the high waist line gives the raglan sleeve expression, without its being really a raglan sleeve. This seam has a double row of stitching to outline it, and a belt effect all the way around, and is stitched in rows, the back and front having a smart touch of embroidery trimming. With some the buttons and buttonholes are small and the buttons are set close together. With many the front is straight in line.

The so-called travelling coat is made full length and may have the sleeves set in raglan style, over the kimono shoulder. The sleeves are long and have large cuffs, which look as if they might be turned up or down. Many are made to correspond with the collar. The fronts are cut straight down, as a general thing, although others are made to fasten at one side with loops of the material. Ball buttons are preferred in this in-

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At Left, New Sport Coat in 40-Inch Length; at Right, English Auto-Coat, an Imported Design.

stance. The collars are made so that they can lie flat or be turned up around the neck. A noticeable point in these travelling coats is the oddness of the cut. It may be cut across the hip line and have big pockets set on a line and a yoke across the back. The main idea in this instance is to suggest fullness and comfort. The fullness, however, is caught in with straps having two buttons, one on each side, to fasten. Some of these long coats are double-breasted. Long revers prevail and the "made" buttonhole is holding its own, both for utility and trimming.

Then there are the coat wraps, all of which evince the kimono shoulder and sleeve with the fullness in the centre back held in at the hip line with a band of self, or a draping of the material, or the material may be draped in and held with a button. All of the newest ideas embodied in coats or wraps of this order have trimming of some kind, velvet being used in many instances.

Coats also are shown in the shorter lengths with braid trimming around the waist line, giving the expression of a high waist line. Large buttons and buttonholes are used. The collars are low and some are square across the back with a notched expression in front, and the revers are not large. This type of coat is semi-fitting in the back and straight in front; that is, the waist line is straight and at the hip line it is made quite tight. The collar is the principal feature of this type, and one might say that it is so cut that it can be worn as a most attractive high collar, though it looks equally well when low. Buttons also are a feature with this coat.

Various types of sport coats are shown in numerous materials. These are made with box pleats extending all the way to the bottom. A belt is set on at the hip line through narrow loops of the material, and there are five buttons and made buttonholes. There is a notched collar and revers, and the sleeves are straight. Other sport coats are made with the fullness caught in with a deep belt and are stitched top and bottom. No pockets appear in this particular type of garment. Still another model is shown with four pockets, two breast and two side, while a belt encircles the waist above the hip line.

Many tones are used in the materials, especially in the mixtures. Among the materials mentioned are mohair, polo cloth, zibeline, rajah linen, cloth of gold, suede, tweed, eponge, boucle, etc.

A number of the season's models are shown herewith, the illustrations being from photographs secured through the courtesy of Cherry & Webb, Providence, R. I. The first of these, presented both in front and back views, is an imported design, made of basket weave material with the boucle effect. It has the convertible collar, which may be worn buttoned closely about the neck as shown, or open at the throat. It also has the raglan shoulder effect, giving ample room over suits and dresses. The shoulders are lined to the hip line with Skinner satin. The trimming



At Left, Black and White Striped Zibeline Model; at Right, Black and White Checked Mohair.

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includes large handsome bone buttons, and a band under the sleeves extends down across the back. The model also presents the extra wide cuffs. The hat with this model is of French gray felt, with grosgrain trimming and ribbon binding on the band and side.

Another imported model is the English autocoat, made of tweed, this being presented in the 48-inch length. Among the features noted are the extreme fullness around the skirt, in which it differs somewhat from the other designs shown. It has the loose raglan sleeves and large pockets, making for decided comfort. The buttons are of crushed leather, the whole being made in one piece. The hat in this instance is of Austrian velour, trimmed with ribbon.

One of the new sport coats is shown in the 40-inch length, this being furnished either in boucle, chinchilla, eponge or the ever popular black and white checked goods. The large patch pockets are trimmed with the same ivory white buttons as are used at the front, but the belt is held in place at the back with buttons of the same material as the coat itself. While it is possible to wear the collar open at the throat, it is designed to be worn as shown, and is faced with ratine. The sleeves and yoke are lined with peau de cygne. With this model is shown a large panama hat with wide brim, trimmed with ostrich pompon and a band of ribbon matching the shade of the coat.

A shorter coat still is the Newport model, shown in the 36-inch length. This comes in cut velour and chinchilla, and has the new long roll lapel, cut in to button high at the neck when desired. The buttons are large and of the same material as the coat. Two breast pockets, deep cuffs and a loose box back are among the distinguishing features. The lining is of peau de cygne, the same color as the coat. With this model it is suggested that the plain panama hat is quite becoming.

For a long tour it is anticipated that nothing will make quite the same appeal as a linen coat with motoring cap of the same material. The model shown is of linen crash, but it may be stated that this style also comes in the mohairs. The buttons in this instance are of brass, and practically the only relief from the severity of the design is to be found in the belted back and in the mannish sleeves, although this latter might be held to add to rather than detract from the simple lines of the model. The cap is tied at the throat with ribbons of the same material.

Another model illustrated is of black and white striped zibeline, trimmed with cerise velvet collar and cuffs, these being faced with white broadcloth. It is designed to be worn either open or closed at the throat. Still another row of the small round white buttons is to be found at the back. The coat has the popular deep set-in sleeves, and is lined throughout with cerise peau de cygne. The hat is an imported English model, of rajah silk, with stitched brim and band and carrying a fancy feather at the side.

The last model shown is of black and white mohair, trimmed with large fancy bone buttons and velvet collar piped with broadcloth. The side belts define the waist line, while the design is worked out to give a double-breasted effect. As will be noted, it is possible to button the collar closely about the neck when desired. The hat is a panama, poke shaped, trimmed with cherries and ribbon.



At Left, Linen Duster and Motoring Cap; at Right, the 36-Inch Newport Model.

The Goodyear Tire & Rubber Company, Akron, O., announces its new Goodyear tire branch and truck service station will be opened at the corner of Jackson avenue and Honeywell streets, Long Island City, N. Y., in about six weeks. It is to be four stories high, 275 feet long and 50 wide. There is to be a showroom, warehouse and a wheel shop, the last named affording opportunity for tire applying and wheel work at all hours. The warehouse will be large enough to carry all the tires necessary to keep this territory well supplied.

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CARBURETION TROUBLES AND THEIR REMEDY.

Presenting Standard Types of Vaporizers and Directions for Cleaning and Adjusting--Effect of High Altitudes and Hints for Obtaining Efficiency.

EVERY motorist who drives his own car should have at least a working knowledge of the carburetor fitted to his motor. These instruments are not complicated and it is an easy matter to become familiar with those components that may require attention during the tour. It is possible that dirty fuel will clog the spraying nozzle or filters, and that in operating in high altitudes the mixture will need to be changed. It is a well known fact that when driving in the mountains considerable trouble is experienced in carburetion due to the reduced atmospheric pressure. This is overcome by changing the adjustments and if the owner be familiar with the type of vaporizer fitted to his car, it will be a simple matter to correct faults due to changes of this character. Views of standard makes of carburetors are presented herein with their components lettered, which will prove of service in making adjustments or cleaning.

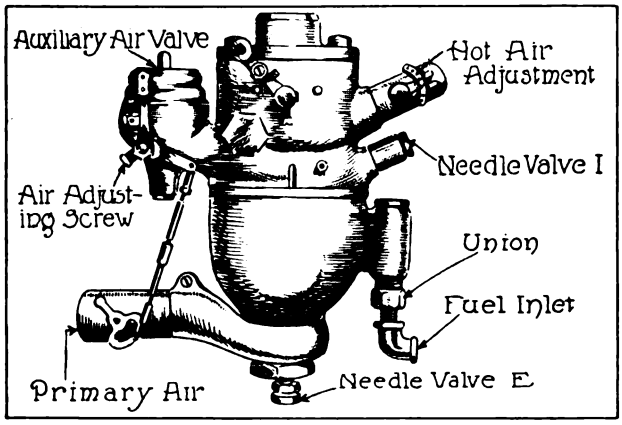


Fig. 1—Illustrating Components Employed in Making the Low and High Speed Adjustments of Model O Schebler Carburetor.

Stromberg.

Stromberg carburetors are produced in five types, A, B, C, D and G, respectively, A and B having single jets, while the others have both a primary and an auxiliary nozzle. The Stromberg is not a difficult carburetor to set, as there are but two adjustments to be made, a low and a high speed, these components being shown at A and B respectively in the sectional view of the type A vaporizer at Fig. 4. As the adjustment of other types is similar a description of A will serve all practical purposes.

As it is possible that climatic changes may compel a slight alteration of the original setting, it is well to have a knowledge of the work involved. It should be remembered that the low and high speed members are adjusted separately. The proper low speed mixture is obtained by turning the nut A up or down until the low speed spring f seats the valve e lightly. By this is meant that the tension is sufficient to retain the valve on its seat. It is important that the high speed spring e should have about .06125 inch play. By rotating the nut A up or down, and by turning it one notch at a time, the desired, even idle, operation of the motor is secured. This is obtained with the spark retarded and throttle but slightly open. After the motor has become warm, retard the throttle and note if it runs as slowly as desired. If not, move out the screw acting as a stop for the lever. To increase the speed move in the screw.

To adjust the high speed, advance the spark and open the throttle, and if the motor backfires or shows an indication of a weak mixture, turn up the nut B a notch at a time. If too rich, rotate the nut in the opposite direction. It is important that the high speed spring g should have at least .03125 inch play when the motor is idling. The season adjustment is shown at t and this should be open in warm weather.

The height of the float and proper size nozzle is provided at the factory and should not require any attention. If it becomes necessary to displace the nozzle it is accessible by taking off the nut u, after which the nozzle c can be removed with a screw driver. The float chamber may be drained by opening the petcock p. Should this fail to remove obstructions in the fuel line above the inlet pipe, take off the nut c c and clean the filter n.

Too much air is usually denoted by the motor being hard to start and by its speeding up upon closing the air valve; by the engine being slow to respond when opening the throttle, and by back firing. A lack of fuel presents similar symptoms. Too much fuel and not enough air is known by the motor speeding up when the air valve is opened slightly; by missing when the car is being operated slowly on the level and by failing to pick up when the clutch is disengaged. The last named condition indicates a very rich mixture.

Schebler.

Although Schebler carburetors are made in several types, models F, L and O may be said to be the most popular. Models O and L are shown at Figs. 1 and 2 respectively with their components lettered. Models F and L have single jets, although provision is made for adjustment of the high, intermediate and low speeds, and both are fitted with the lift type of needle, this member providing more fuel and proportionately to the speed of the motor.

To set the model L carburetor the low speed needle valve, Fig. 2, is screwed in until it seats firmly. Next unscrew it about a turn and a half, and prime or flood the carburetor. Open the throttle slightly less than two-

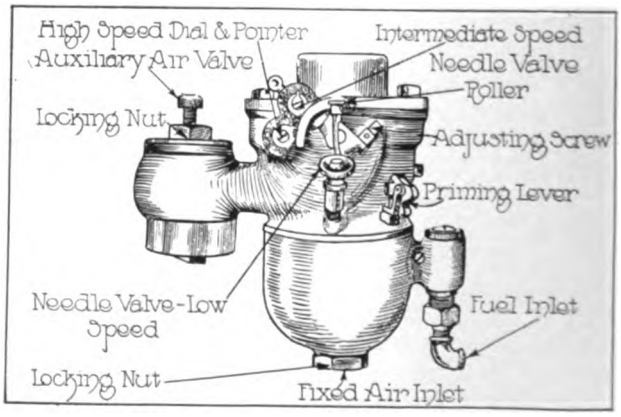


Fig. 2—The Intermediate and High Speeds Are Obtained with the Schebler L Type of Carburetor by Moving Arms on Dials.

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thirds way, and with the spark retarded start the motor. Change position of low speed needle until the engine runs smoothly. If it operates too fast, move out the adjusting screw, which restricts the opening of the butterfly valve. If the motor stalls, move the screw in.

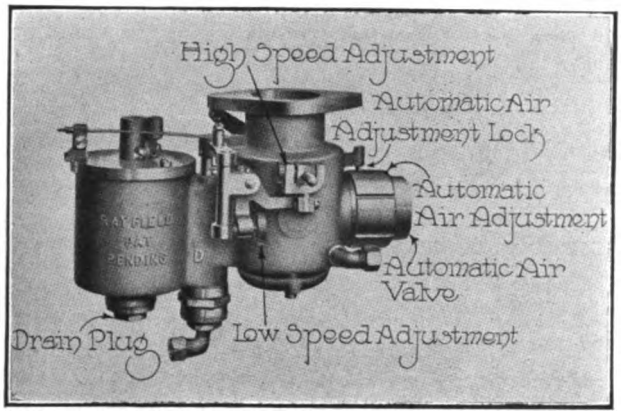


Fig. 3—The Rayfield Carburetor Has Two Fuel Adjustments in Addition to an Automatic Air Valve Member.

The low speed member must not be disturbed in making the adjustment of the intermediate or high speeds. These are obtained by moving the arms or pointers on the dials, of which there are two. The intermediate is adjusted first and has three numbers, 1, 2, 3. Move the arm or pointer from the figure 1 toward the figure 3, about half-way between these members. Next advance the spark and open the throttle so that the roller moving on the track like member beneath the dials is in line with the intermediate speed dial. It is important that the auxiliary air valve seat lightly.

If the motor backfires with the spark and throttle lever in this positon, increase the amount of fuel by moving the arm toward the figure 3, or if the mixture be too rich, back toward the figure 1. A little experimentation will secure the proper position. Noting the color of the exhaust and its odor also will be of value. The high speed is secured by utilizing the other dial and pointer, and with the throttle wide open. The maker of the Schebler recommends cutting down the supply of fuel until the motor shows signs of backfiring, then increasing the amount until the engine runs evenly and smoothly. Turn the low speed member a notch at a time and note the results. In adjusting the arms, do not move these more than half way at a time between the graduated divisions or marks. Slight variations may be necessary in setting the speeds as, frequently, apparently proper operation with the motor idle will not obtain the desired results under load.

Model F.

The model F is similar to L, differing in that but one dial is provided. The low speed is set in the same manner, but with the intermediate the spark is advanced about one-quarter and with the throttle one-third open. In this position cutting down the fuel by screwing in the needle or slow speed member should not result in speeding up the motor. This indicates that the point of the needle is too large. The engine should run smoothly and will if the needle is of the proper size. As previously pointed out, the proper needle is inserted at the factory and the above suggestion is made for the benefit of those who fit new carburetors. The adjustment for high speed is secured by advancing the spark one-quarter and with the throttle open to its maximum. The arm or pointer should stand at the figure 1 on the dial. If the motor backfires, it indicates that more fuel is required and this is obtained by moving the arm toward the figure 3. If the backfiring continues and with the arm at 2, increase the tension of the spring of the auxiliary air valve; that is, cut down the air supply.

Model O.

The model O Schebler is provided with two jets, these being shown at Fig. 1 by the letters I and E respectively. In adjusting this type the auxiliary air valve is seated lightly and the needle members I and E screwed in until seated firmly. Do not use pressure. Next turn valve E to the left about three turns, open throttle about one-third and start the motor. After the engine is warm, turn valve E to the right until the motor operates smoothly and slowly with the throttle nearly closed. Open the throttle slowly until about one-third open and if the motor backfires screw in the adjusting screw until the motor runs evenly. Next open the throttle wide, and if the motor backfires at speed, turn needle member I to the left until the missing ceases. The second jet is not utilized until the car attains a speed of from 18 to 25 miles an hour, or a motor speed of from 700 to 1000 revolutions a minute. The needle or jet I is not difficult to adjust and when set for high speed exposes from one to four threads of the knurl.

To clean the Schebler models described the nut retaining the bowl or float chamber is removed, although sediment in the spraying nozzles can sometimes be displaced by cranking with the primary air passages closed. This exerts considerable suction, which will invariably remove small particles.

Rayfield.

The adjustment of Rayfield carburetors, models D and H, is similar. At Fig. 3 is illustrated an exterior view of the water jacketed type with the components utilized in adjusting clearly lettered. The low speed is set first by turning the low speed screw to the left until the arm member above it and slightly to the right just breaks contact with the cam above that. Next turn low speed screw 1.5 turns to the right, open the throttle about one-quarter, prime the carburetor and start the motor. Close the throttle until the motor runs slowly without stopping, then turn the low speed screw to the left, cutting down the fuel, and do this one notch at a time until the engine idles smoothly. The desired speed may be obtained by the adjustment of the screw in the top arm to the left, using a screw driver.

Open the throttle slowly until wide open. If the motor backfires turn the high speed adjusting screw to the right, a half turn at a time, until each cylinder fires evenly. Should the motor not backfire, turn the high speed screw to the left until it does, then to the right until it runs smoothly. This insures economy of fuel and efficiency as well.

One is apt in setting the Rayfield for the first time to obtain too lean a mixture, which makes it sensitive to climatic changes. The low speed should not be touched in setting the high, but should the motor backfire with the throttle about one-quarter open, the automatic air adjustment should be turned to the right a turn or two, increasing the tension of the spring and decreasing the

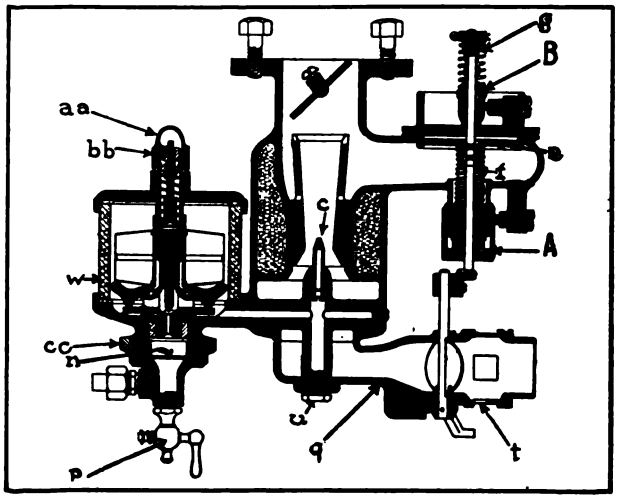


Fig. 4—Adjustment of the Stromberg Carburetor Is by Nuts A and B, the Former Being Used for the Low and the Latter for the High.

amount of air slightly. For very high altitudes the maker recommends setting the air valve so that it seats a trifle lighter and cutting down slightly on the low and high speed fuel adjustments. It should be remembered that the automatic air valve must be seated when the motor

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is idling. It is further suggested that starting is made easier when the throttle is about one-quarter open. The float chamber is drained by removing the plug member.

Planhard.

The simplicity of the Planhard carburetor will appeal to motorists who take care of their cars, as not only is

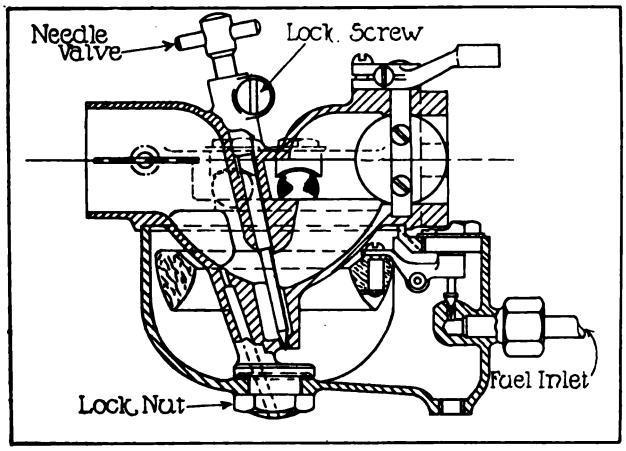


Fig. 5—The Kingston Has But One Adjustment, That of the Fuel.

the vaporizer easily adjusted, but it may be disassembled and assembled without interfering with its efficiency. Fig. 6 illustrates the components of the Planhard and it will be noted that there is but one part requiring attention in setting the vaporizer—the needle valve member. Its position is retained by a lock screw, by unloosening which the needle may be raised or lowered, increasing or decreasing the fuel supply. All air taken into the carburetor is compensated for automatically, a number of balls being raised from their seats, these being lifted progressively. It will also be noted that the construction of the float chamber is such that it is difficult for sediment in the fuel to reach the spraying nozzle and that the displacing of the lock nut enables rapid and easy cleaning of the carburetor. The maker holds that the Planhard will adjust itself to the varying climatic changes.

Kingston.

A sectional view of the Kingston carburetor is shown at Fig. 5 and there is but one part to be adjusted, the needle valve. This is locked by a screw which should be loosened when any change in the adjustment is attempted. To set the carburetor, unloosen the lock screw and turn the needle valve to the right until entirely closed, then in the opposite direction a full turn. With the motor operating, retard the spark during the following operations: First, turn the needle valve slowly to the right until the motor backfires through the carburetor, noting the position of the needle valve. Second, turn the needle valve slowly to the left until the motor attains its maximum speed, after which tighten the locking screw. It is held that the auxiliary air controlled by the floating ball valves will take care of the mixture for speeds above or below this point. The carburetor is disassembled for cleaning purposes by displacing the lock nut shown.

Effect of High Altitudes.

Mention has been made of the effect of climatic changes upon the mixture and the need of slightly altering the adjustments, the method depending on the type of carburetor, etc. In high altitudes the reduced atmospheric pressure, 5000 feet and over above sea level for example, is such that the proper proportion of air is not provided. There are two methods of compensating for the lack of air, one by increasing slightly the member admitting air, and the other by cutting down the supply of fuel. The loss of power noted when travelling in the mountains is due to the reduced atmospheric pressure, which impairs the efficiency of the engine. Consequently the combustion may be said not to be as rapid or as complete as under normal conditions.

The maker of the modern carburetor has provided for this contingency by fitting his product with devices for controlling the air or mixture, and in some instances both, from the seat. This is a decided advantage over the earlier forms of carburetors as the effect of altering the mixture may be determined with the motor under load and without stopping to lift the hood.

Heating and Flooding.

While there are a number of conditions which are responsible for boiling of the water in the radiator and heating of the motor, these symptoms may be noted in high altitudes and be due entirely to the mixture. Either too weak or too rich a mixture will cause heating, and is largely responsible for boiling of the water.

The most general cause of flooding is dirt lodging under the fuel valve. This member controls the flow of the gasoline passing into the float chamber and operates automatically in that it maintains the level of the liquid. When the height of the fuel attains a predetermined level, the valve closes. When flooding is due to sediment it can often be cured by priming or flushing and draining the contents of the float chamber.

Backfiring.

Attention has been called to backfiring in the adjustment of several types of carburetors and in each instance it has been stated to be due to too much air or not enough fuel. The direct cause of backfiring through the carburetor is the ignition of the mixture in the intake pipe, the gases being fired by a flame remaining in the cylinder after the inlet valve opens. Too late a spark and open throttle will sometimes cause backfiring. Dirt or sediment clogging the spraying nozzle will create similar symptoms, preventing starting of the motor, or if the engine does respond, operating irregularly and finally stopping. The dirt can usually be removed by opening the needle valve a turn or two while the motor is running. It is also an excellent idea to open the petcock and remove a cupful or so of fuel. Sometimes when the engine fails to respond because of dirt in the spraying nozzle, priming the cylinders will be found beneficial as the initial explosions will exert the desired suction on the spraying nozzle. The float chamber should be drained afterward and only when the motor is inoperative.

Straining the Fuel.

Too much emphasis cannot be laid upon the importance of thoroughly straining the fuel. Do not allow any garage attendant in replenishing the supply to use a funnel that is not equipped with a suitable strainer. The best is a chamois, as some wire strainers have too coarse a mesh or screen and allow small particles of dirt to be carried with the liquid. It is much better to take a little more time to see that the gasoline is filtered properly than to be delayed on the road cleaning a carburetor. It is also an excellent practise to open the filter occasionally, as well as the petcock of the carburetor. These simple precautions should be observed.

As carburetor troubles and ignition disorders are closely allied it is important that one should satisfy

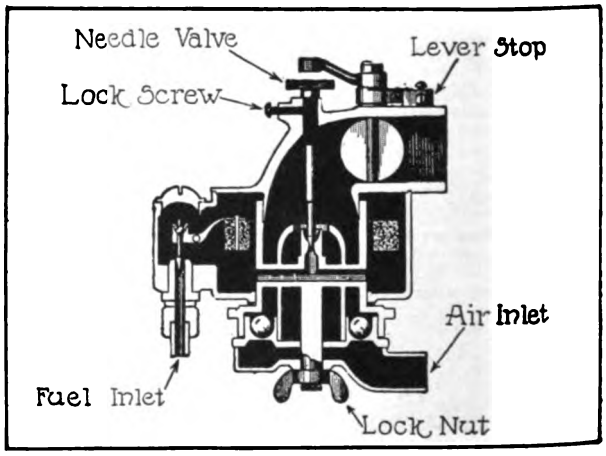


Fig. 6—Sectional View of Planhard, Noticeable for Simplicity of Adjustment and Ease of Disassembly for Cleaning, Etc.

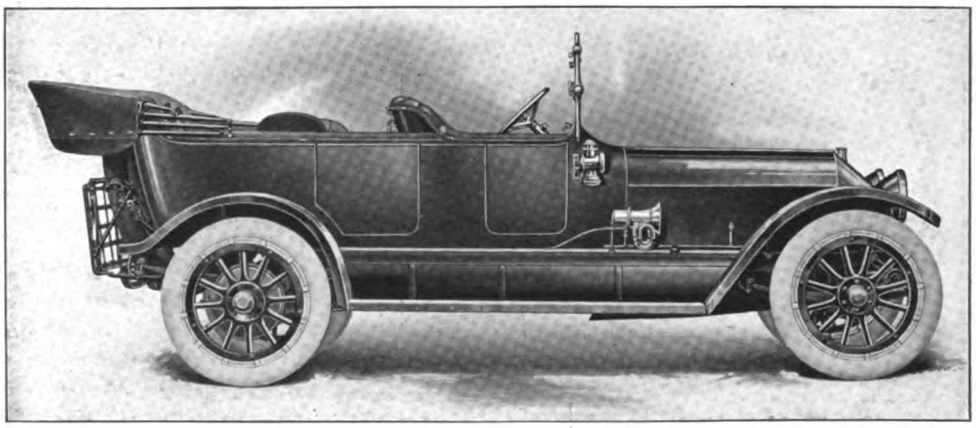
himself that the difficulty is due to the vaporizer before altering its adjustments. As some garage attendants frequently assume that the carburetor is to blame without first locating the source of trouble, the motorist is advised to be convinced before allowing what might prove an unnecessary bill of expense to be incurred.

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KNOX ANNOUNCES NEW TYPE OF BODY.

THE Knox Automobile Company, Springfield, Mass., one of the oldest manufacturers of motor cars, announces that its line for 1914 will include, in addition to the body types already offered for the present season, the Prince Henry or stream line design, shown in an accompanying illustration. It will be constructed in four, six and seven-passenger capacities for the Knox Little Six chassis, which will be continued, it having been demonstrated to the satisfaction of the company that it meets every requirement of service. The efforts of the concern in recent years has been concentrated upon the refinement of chassis details, a study of improved body designs, and a careful process of selection and elimination to secure the equipment necessary to the comfort and convenience of the purchaser. The bodies fitted to the 1913 chassis will be retained, these including a six and seven-passenger torpedo, two, three and four-passenger raceabout, seven-passenger limousine and seven-passenger landaulet. A wide variety of finish also is offered.

The six-cylinder motor of the Little Six is cast in pairs with detachable cylinder heads and with valves in the head. The bore is 4.375 inches and the stroke 5.5, developing approximately 46 horsepower according to the S. A. E. formula, The transmission is the Knox selective type, three speeds forward and reverse, having imported annular ball bearings and all gears and shafts of a high grade alloy steel. The clutch is the Knox three-plate with cork inserts and the drive is by a straight line shaft. Two separate and distinct ignition systems are provided by a Bosch magneto and a distributor with battery. The well known Knox oiling system is continued. The Knox full floating rear axle is fitted to all models and both sets of brakes, which act directly on the rear wheels, are liberal in size. The upholstery of the new body is in keeping with the high grade maintained by the company. The fuel capacity is 24 gallons, wheelbase 134 inches, tire sizes 38 by five, with demountable rims. Electric starting and lighting will be standard equipment on all 1914 models.



New Prince Henry or Stream Line Type of Body Which Will Be Fitted to 1914 Knox Little Six Chassis in Four, Five and Seven-Passenger Capacities.

RACE FOR ANCIENT CARS.

California Owner of 1904 Marion Would Compete with Contemporaneous Products.

E. L. Symonds of the Symonds Motor Car Company, Los Angeles, Cal., has issued a sweeping challenge to race a 1904 air-cooled, double-chain drive Marion, made by the Marion Motor Car Company, Indianapolis, Ind., against any machine in Los Angeles built during that season or prior to that time. Mr. Symonds says the race is open to all and that the distance may be anything up to 100 miles for any purse the other contestants may desire. Provided that it is at least nine years old, no car will be barred because of age, color or previous condition of servitude.

While Mr. Symonds is reticent concerning the speed of his ancient car, experts who have examined it are confident that with proper tuning it will do at least 30 miles an hour and possibly five miles an hour better than this. The machine formerly belonged to C. P. Dodge of Los Angeles, and he estimates that he has driven it upward of 200,000 miles.

In the event that Mr. Symonds' challenge is accepted it is anticipated that the contest will be followed with decided interest.

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CORRESPONDENCE WITH THE READER.

Adjusting Pressure Feed.

(1608)—Am experiencing trouble with the fuel system of my machine which is of the pressure type. I am unable to get the gauge to register over 1.5 pounds and unless the motor is driven at a good rate of speed the pressure falls considerably. I have been all over the connections and tested for leaks, but none appears to exist. The result is that I have trouble when climbing hills, etc., owing to not enough gas in the float chamber of the carburetor. Any suggestions will be appreciated.

READER.

Independence, Kan., June 25.

As make of car was not mentioned other than general suggestions cannot be made. There are two methods of obtaining pressure, one by utilizing the energy of the exhaust gases, and the other by a positively driven pump. With the former system, a pipe is led from the exhaust line, usually the manifold, to the fuel tank. A check valve is also employed to allow the gases to pass to but not from the container. Frequently these check valves become carbonized, and not seating properly, allow part of the pressure to escape.

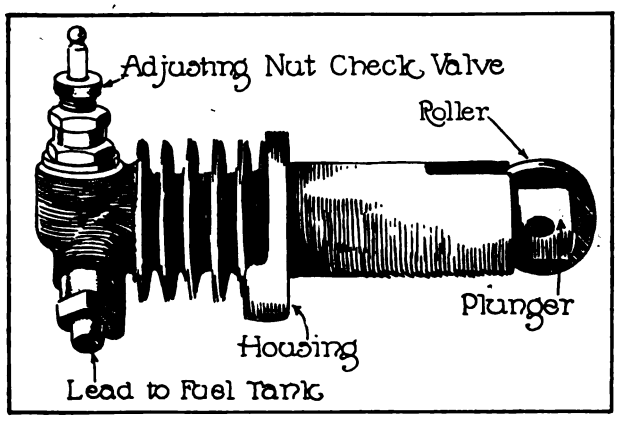


Fig. 1—Showing the Components and Adjusting Device of Pump Utilized in Pressure Feed Fuel Systems.

This is more particularly noticeable at low motor speeds.

At Fig. 1 is illustrated the air pressure pump utilized on the Cole car, and this form presents advantages in that the pressure supplied is proportional to the speed of the engine. The plunger is actuated by a cam much in the same manner as that operating a valve. Provision is made for increasing or decreasing the amount of pressure carried in the tank by a check valve, which is screwed in or out as the case may require. From 1.5 to three pounds should serve.

Chauffeur's License.

(1609)—Could you tell me where I could get a chauffeur's license? Also, if the one license is good for more than one state, as I live in New Jersey? SUBSCRIBER.

Suffern, N. Y., June 28.

A resident of New Jersey should make application to the commissioner of motor vehicles at Trenton for a chauffeur's license.

There is no license that is good in all states, but according to the provisions of the various laws, a New Jersey chauffeur's license is good for touring purposes, subject to the limitations for non-residents, in the following states: Alabama, California, Connecticut, Delaware, Georgia, Idaho, Illinois, Indiana, Iowa, Kansas, Kentucky, Maine, Maryland, Michigan, Minnesota, Mississippi, Missouri, Montana, Nebraska, Nevada, New Hampshire, New York, North Carolina, North Dakota, Ohio, Oklahoma, Oregon, Rhode Island, South Carolina, South Dakota, Tennessee, Texas, Vermont, Virginia, Washington, Wisconsin and Wyoming.

Polish Formula.

(1610)—In a recent issue of The Automobile Journal I saw a formula for a brass and metal polish. Could you inform me which book it was in? C. W. S.

Newport, R. I., June 29.

The formula referred to appeared in the May 10th issue of The Automobile Journal.

Timing Magneto.

(1611)—Will you kindly inform me how a magneto should be timed on a pleasure, a commercial and a racing car, and when the spark should be retarded and advanced, also what advantage do you obtain? L. S.

Bridgeport, Conn., June 25.

The timing of a magneto would depend to a certain extent upon the design of the motor, bore and stroke, etc. With some types of engines the lead is greater than with others. The Bosch Magneto Company, 225 West 46th street, New York City, publishes a chart showing the proper lead with varying types of motors and this chart was reproduced in the Dec. 25th issue of The Automobile Journal.

As a general rule the magneto is installed so that the contact points of the breaker box open at a certain point, corresponding to a predetermined angularity of the crank throw from vertical, the relation of the piston to the rotation of the crankshaft depending upon the stroke and the length of the connecting rod. The last named factor may be eliminated except in the case of extreme variations. It is a simple matter to learn the piston travel in inches by inserting a wire through an open petcock. Regarding the timing of magnetos on racing cars, they are so set as to provide an early break of the contact points, the advance depending upon the design and speed of the motor.

The advantage of advancing or retarding the

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spark, either of which is obtained by moving the breaker box, lies in that the contact points are made to separate when the armature is in that position when the greatest efficiency is derived, or in other words, when the greatest number of lines of force is cut. In practise the spark lever is advanced as much as possible without the motor knocking. The subject of timing a magneto is discussed elsewhere in this issue and the points referred to explained.

Timing Valves.

(1612)—In reading The Automobile Journal of April 10th I noticed an article on timing motors when the flywheel could not be used in the work. I am not much acquainted with the timing of valves, but thought it a little strange, which accounts for my writing you. You say that the intake opens .015625 part of an inch late, and the exhaust closes .03125 on the same stroke, which according to my figuring makes both valves open at the same time for a distance of .015625 part of an inch. Kindly publish answer in your next issue. Not being a subscriber to your book you will find enclosed $1, for which you will please enter my name as a subscriber. Also find money enclosed for three of your automobile mechanical books, namely: Engine, carburetion and ignition.

W. W.

Rochelle, Ill., June 27.

The timing plan referred to dealt with the motor of a 1912 Herreshoff car and by again reading the paragraph relating to the timing of the intake valve it will be noted that it states "that the timing of the intake valve is as follows: Inlet opens .015625 inch late; that is, the piston descends that amount on the intake stroke before the valve lifts. The intake valve closes 3.40625 inches late, the piston starting up on the compression stroke before closing. The exhaust valves close .03125 inch after the top dead centre and open 3.28125 inches from dead centre on the downward stroke." The operation of the valves is fully discussed in the motor book, and the opening and closing points illustrated, which will make clear the points referred to.

Auxiliary Mixing Devices.

(1613)—I note that of late a large number of mixing devices for placing in the manifold have made their appearance and that the producers make strong claims for them. As I am interested in any accessory that will improve the running of my motor and cut down the gasoline bills, I would be pleased to have you inform me if these mixers really do what they claim they will.

A PRACTICAL MOTORIST.

Providence, R. I., July 1.

Although the writer has not had any extended experience with the various designs marketed, he installed a certain type in the intake manifold of a car and carefully observed the results. The motor was an old one and there is more or less auxiliary air being drawn in because of worn valve stems, this resulting in a rich mixture on intermediate and high speeds. The mixer was fitted without changing the mixture and improved the operation of the car decidedly, in that the motor was more flexible at high ratios than formerly. Regarding the fuel consumption, careful measurement of the gasoline and over the same route several times developed the fact that considerable more mileage was obtained than formerly. Since then the writer has been able to cut down the gas without decreasing the efficiency of the mixture.

1908 Eisemann Magneto.

(1614)—Can you give me any information about the setting of the points of a 1908 Eisemann magneto? I purchased a car recently having a magneto of this type and wish to reset the points which are pitted and burned, as the gap is evidently too big.

W. M. S.

Boston, July 1.

To adjust the points of the instrument referred to, take off the make and break plate C and pass the brass plug A shown at Fig. 2 through the centre hole C 7 from the back. Loosen the lock nut C 2 of the platinum screw C 3, holding the nut with the wrench provided for this work

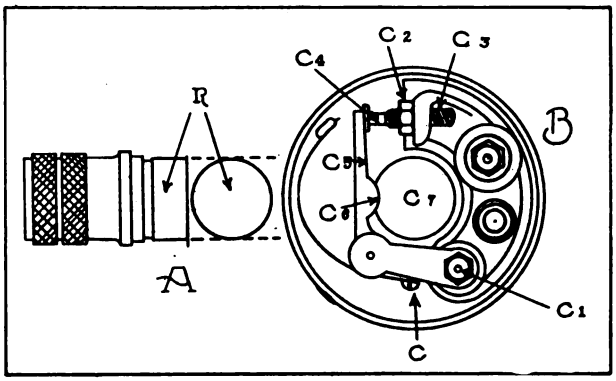


Fig. 2—Adjusting Contact Points of 1908 Eisemann Magneto: A, Plug Employed for Obtaining Break; B, Components of Breaker Box.

while the screw is moved in or out as may be needed in the setting. The proper distance is obtained by using a gauge which accompanies the instrument, and the brass plug referred to was also distributed with the magneto. The lock nut should be secured after the proper gap is obtained, and the make and break plate replaced.

It should be borne in mind that the diameter of that portion R of the plug which is placed through the hole C 7 in the plate is exactly the diameter of the cam at the lift points, so that when the plug is inserted in the plate it raises the platinum point C 4 that exact distance which it is raised when the lift point of the cam is in contact with the member C 6 of the platinum arm C 5. If the plug and gauge did not accompany the machine it may be possible to secure one from the Eisemann Magneto Company, 227 West 57th street, New York City.

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EFFECT OF INTERSTATE TOURING.

A careful reading of this Seventh Annual Touring Number of The Automobile Journal cannot help but reveal the effect of interstate touring upon good roads and uniform motoring legislation. There is little difficulty in indicating the economic benefits of improved highways, but there has been a tendency upon the part of legislators to overlook the advantages accruing from uniform motoring laws. However, there is much reason for believing that this situation is gradually undergoing a decided change for the better.

Attention is directed, in this connection, to the digest of American laws, in which it is noted, when comparison has been made with that presented a year ago, that not only have new laws been enacted in a large number of states, but practically every commonwealth now has its motoring law. And while there still remains a deplorable lack of uniformity in many respects, the situation is decidedly improved over that which prevailed formerly.

Insofar as tourists are concerned, very few states fail to grant what amounts to a reciprocity provision, under which non-residents are exempt from the payment of registration fees, and it is in this respect that the greatest difference is to be found. The efforts of the American Automobile Association are reflected in the speed regulations, practically all of which now recognize the "reasonable and proper" provision, but in many instances this is so qualified that tourists, especially, must become informed as to the rate of speed which is regarded as "prima facie" evidence of a speed that is greater than that which is reasonable and proper.

The benefits of good roads are nowhere better understood than in the Far West, where every effort has been made to attract motoring tourists. It has been exemplified to the satisfaction of the business men, as represented by the local chamber of commerce or board of trade, that such motorists in the aggregate leave an immense amount of money in the states which they visit. This fact also has been brought home to some of the states in other sections, notably New Jersey. When it is appreciated in all sections, the movement set on foot this season by New York, New Jersey, Delaware and some of the other Atlantic seaboard states, looking toward a conference of state officials in an effort to formulate uniform motoring laws which shall be all that the name implies, will bear fruit and interstate touring, as well as all interstate use of motor vehicles, will no longer be hampered by the necessity for undertaking a course in interstate law every time it is desired to cross the border.

If the diversified interests of the various countries of continental Europe could be so combined as to make for easy intercommunication by automobile tourists, there does not seem to be any reason why the 48 separate identities of the commonwealths comprising the United States should be so interwoven with the doctrine of state rights that Americans are deterred from "Seeing America First." And there remains the factor of interstate commerce, in which the automobile, both pleasure and commercial, is destined to play such an important part.

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CLEANING AND ADJUSTING THE MAGNETO.

Describing the Construction and Operation of Components, Including Make and Break Mechanism and Distributor---Locating and Correcting Troubles---Wiring Diagrams.

(By C. P. Shattuck.)

EVERY motorist who drives his own car should have a practical or working knowledge of the ignition system with which his motor is equipped in order that he may overcome minor troubles at least. Although the magneto gives maximum service with minimum attention, conditions may arise, either through neglect or accident, which will call for cleaning or adjustment. If not familiar with the components of the system, one will be obliged to depend upon some passing tourist for assistance. It is recommended that the ignition system be gone over carefully and thoroughly before beginning the tour and if one is not familiar with cleaning and adjusting magnetos, the work should be done at the nearest service station of the maker or by an ignition expert. It is suggested that the owner watch the operation as a practical demonstration, which, supplemented by the suggestions contained herein, should enable him to overcome ignition troubles.

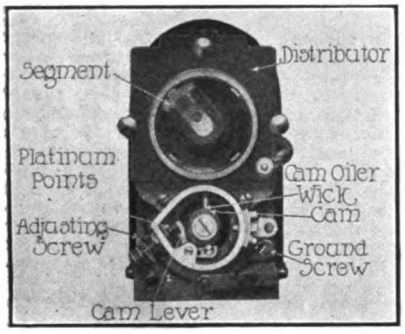


Fig. 1—Illustrating Breaker Box, Its Adjusting Mechanism and Distributor of Remy Magneto.

In the inspection and overhaul of the power plant the primary and secondary wires, terminals, etc., should be examined for chafed or worn insulation and if saturated with oil, it is best to replace the leads with new. The secondary wires need careful attention and if they have been exposed to heat or oils, deterioration of the insulation is apt to exist even if it appears to be in good condition. Many alleged magneto troubles are due to faulty insulation. The maker of the modern car has given this subject serious attention and the high-tension cables are well protected. On the other hand, early types of motors are not thus equipped, the wires being so installed that the insulation loses its efficiency. A judicious use of tape on cables near metal, or touching it, will insure the magneto delivering its maximum output to the plugs.

Operation of Magnetos.

While no attempt will be made to discuss each individual type of magneto utilized for ignition purposes, a description of the operation and function of those components which may be cleaned or adjusted by the motorist will be of value. Magnetos produce electricity by mechanical action through energy supplied by the motor. They may be divided into two classes, high and low-tension instruments, and these may be sub-divided into three types, namely: Double or compound armature (true high-tension), single and inductor (low-tension). With true high-tension magnetos the production of the primary current and its transformation into high-tension, is performed by the instrument itself. The system provides for only one outside primary wire, that leading to the switch and ground, in addition to the cables connecting with the plugs. The low-tension instrument is productive of a current of low voltage which is stepped-up or transformed by an induction coil, this being a separate unit. With this system, the primary current is led from the magneto to the coil, built up, then carried back to the instrument and distributed to the plugs in proper order by the distributor. The majority of the low-tension magnetos provide a dual system in that current from dry cells or a storage battery, the primary circuit, is broken by the interrupter of the magneto, built up by the coil, and distributed by the instrument. There are two types of dual systems, one in which the circuit breaker and distributor of the magneto are employed for both the battery and magneto currents, and the other in which a separate breaker mechanism is used for the battery current. It is important that the motorist become familiar with his equipment as the knowledge will greatly facilitate the correction of troubles.

Operation of Interrupters.

The drive of a magneto is important, it varying according to the number of cylinders. With two and four-cylinder, four-cycle engines the magneto is driven at crankshaft speed; with three-cylinder, three-quarter; and six-cylinder, 1.5 times crankshaft speed. Two-cycle

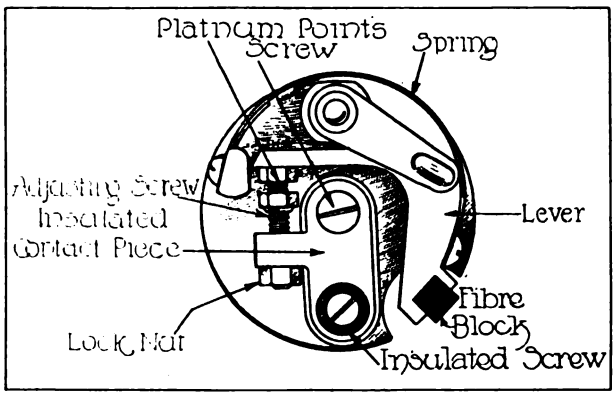


Fig. 2—Showing the Components of Bosch Breaker Box—The Points Are Adjusted by Screw Member on Insulated Contact Piece.

engines, with the exception of two-cylinder units, are driven at double the speed of that of the four-cycle. The drive must be positive for any slipping of the connection between the magneto and driving member will throw the instrument out of time. This should be re-

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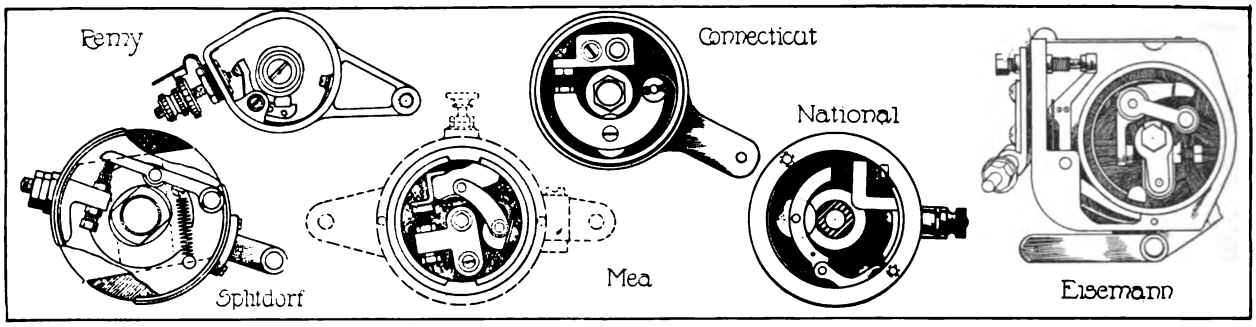


Fig. 3—Illustrating Components of Breaker Boxes of Conventional Types of Magnetos, Also Showing Operation of Contact Points.

membered in replacing a magneto which has been removed for repairs, etc.

There are two components of the magneto which the owner may clean and adjust, and aside from oiling in accordance with the instructions of the maker, no attempt should be made to take the instrument to pieces to see how it operates. The principle of the breaker box or interrupter mechanism, so-called because it interrupts the primary circuit and practically establishes the time of the spark, is similar in all types. They differ in that some have stationary mechanism; that is, the interrupter lever, contact points, etc., do not move, the break being brought about by a cam fixed to and rotating with the armature shaft. The other type utilizes segments attached to the breaker box and these actuate a lever revolving in common with other parts of the mechanism.

Components of Breaker Box.

One of the last named type is illustrated at Fig. 2, the design being a Bosch. It comprises an insulated contact piece carrying an adjustable screw, a pivotally mounted lever having an arm with a screw and a spring. These components are mounted on a metal disc which is keyed or attached to the armature shaft, revolving with it. It will be noted that the lever carries a fibre block which projects beyond the periphery of the disc. It will also be seen that the spring has a tendency to keep the platinum point on the lever arm in contact with the platinum point on the insulated contact piece.

When the armature shaft rotates the fibre block comes in contact with a segment in the housing, which is stationary normally, moving the block inward or depressing it. This causes the upper platinum point to break contact with the lower or fixed member, and to interrupt the primary current at the proper and predetermined instant.

Examples of the cam type are noted in the Remy, Splitdorf, Connecticut, etc., illustrated at Fig. 3. These show four-cylinder magnetos, and that the cam fitted to the armature shaft has two points, which come in contact with a pivotally mounted lever carrying a contact point, moving it away from a fixed point. Connection between these platinum points is established and broken twice during each revolution of the armature shaft, producing two breaks and consequently two sparks. With two complete revolutions, four breaks are made and four sparks derived.

As the high-tension current is induced at the instant of the break, and the interruption must take place when the armature is in a certain position to obtain the greatest efficiency or intensity of spark, it will be seen that it is important that the time of separation established by the maker must be maintained. Too early or too late a break results in inefficiency.

Provision is made for the adjustment of the platinum contact points. Referring once more to Fig. 2, it will be seen that the fixed member on the contact piece is secured by a lock nut. By unloosening this the screw may be moved in proper relation to the movable point. The Splitdorf, Mea, Eisemann and National are adjusted similarly.

The Remy differs from those mentioned in that the distance between the points may be varied from the outside of the breaker box and with the motor operating. The mechanism is shown at Figs. 1 and 3, and it will be seen that it is a simple matter to move the adjustable screw in or out.

Cleaning Contact Points.

It is important that the platinum contact points be true and be kept clean. They require attention only after considerable use and in some instances have been known to remain in good condition after several thousand miles of service. Lack of space prevents giving definite instruction for removing and cleaning points of all types of magnetos, but when the platinum is pitted it should be smoothed with a jeweller's file, taking care not to remove too much of the metal and to have the points true.

The majority of manufacturers provide a gauge and wrench for setting the points, the former being utilized to obtain the correct space, and the latter to fit the lock nuts and hex heads of the screws. If the owner does not possess the tool it is recommended that one be secured, as setting the points by guess work will not give satisfactory results.

The correct gap or separation should be adjusted with the fibre block resting on a segment, with the Bosch type for example, and with cams vertical with the cam type, as illustrated in the Remy at Fig. 1. This causes separation of the points, permitting use of the gauge. By utilizing the gauge accompanying the magneto it is a simple matter to reset the fixed screw. The distance recommended by the makers of different magnetos is as follows: Bosch, .4 millimeters (a millimeter is .03937

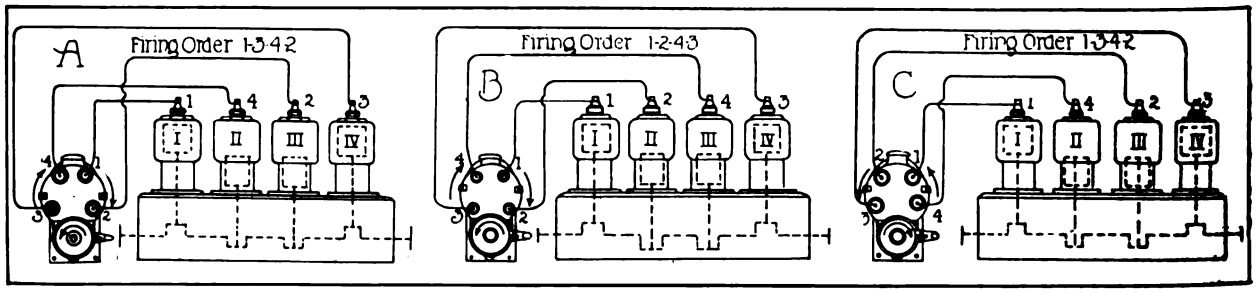


Fig 4—Wiring Diagrams of Four-Cylinder Magnetos: A, Motor Firing 1, 3, 4, 2, and Magneto Revolving Clockwise; B, Same with Cylinders Firing 1, 2, 4, 3; C, Firing Order Is 1, 3, 4, 2, with Magneto Rotating Anti-Clockwise.

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inch); Splitdorf, .03125 inch; Remy, .025 to .030 inch; Mea, .015625 inch; National, .03125 inch; Eisemann, .015625 inch; Connecticut, to gauge; Pittsfield, .015625 inch. It is important that the lock nut be set up tightly after adjusting. Lubricant should not be used in the breaker

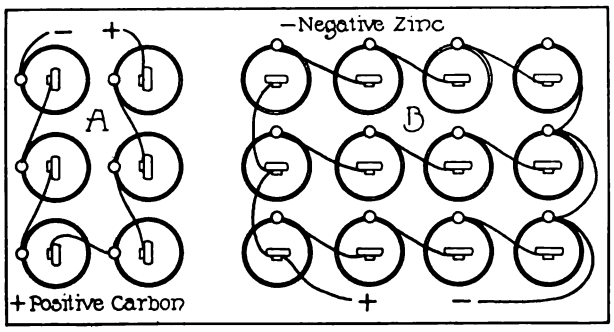


Fig. 5—Wiring Dry Cells: A, Six Cells in Series; B, 12 Cells in Multiple Series to Augment Amperage.

boxes of magnetos in which fibre is employed, such as the Bosch for example. In the Remy the cam is lubricated by an oiler wick, while the maker of the Splitdorf recommends the application of a little oil, applied with a toothpick, to the little roller on the breaker bar.

Distribution of Secondary Current.

It has been explained that the high-tension or transformed primary current is led to the proper spark plug by the distributor. This includes a rotating arm, which, with four-cylinder types of magnetos, makes one complete revolution to two of the armature shaft, and in an opposite direction. The distributor is easily accessible by removing the cover, and that of the Remy is shown at Fig. 1. As the arm comes opposite one of the four segments, the high-tension current flows through it to the wire and the spark plug.

A knowledge of the direction of rotation of the armature shaft is important in the event the instrument is removed or the cables displaced from the distributor. Let it be assumed that the secondary wires have been removed and the motor cranked in the meantime. The first step is to ascertain the firing order of the cylinders and the direction of rotation of the armature shaft. Suppose the motor fires 1, 3, 4, 2, and that the magneto runs clockwise, looking at the driving end. Under such conditions, as illustrated at Fig. 4 A, the distributor arm would be rotating anti-clockwise when considered from the driving end, but clockwise when viewed as shown in the drawing and as indicated by the arrows.

It would be necessary to bring the piston of the first cylinder to the position shown in the sketch, which is at the completion of the compression stroke. As the magneto was not removed the distributor arm should be in contact or opposite the segment marked 1. The connection between it and the spark plug of the first cylinder is made by the cable. The next cylinder to fire is the third, but the next contact to be made by the arm is the second segment, consequently the wire is attached to 2 of the distributor and connected with the plug of the third cylinder. The fourth cylinder explodes third, and the second last. At C is shown the wiring plan of a motor firing in a similar manner, but with the armature rotating anti-clockwise. The wiring of a motor firing 1, 2, 4, 3 is illustrated at B. As the secondary leads are numbered according to their proper location in the distributor housing, and the cylinders numbered in order, one should not experience any difficulty in replacing wires and timing. Some makes have a timing pin. Oils or greases must not be used in the distributor nor dirt or dust allowed to accumulate. The only attention these members require is an occasional cleaning with a soft brush. The cover should be replaced carefully and all binding nuts, etc., tightened.

High-Tension Magnetos.

One of the advantages claimed for the true high-tension magneto is the simplicity of the exterior primary wiring. But one primary wire leads from the breaker box to the switch, thence to the metal or ground, being employed to divert the primary current from the secondary winding and to stop the motor. If the motor fails to stop when the switch lever is moved to its proper position it may be due to a faulty connection. The ignition may be cut off by making a connection between the terminal on the breaker box and any metal of the motor, using metal for the connection. If the engine fails to start or stops abruptly on the magneto, disconnect the wire leading from this terminal to the switch and crank the motor. A chafed primary wire in contact with the metal of the car will produce a short circuit, and removing the lead will show if one exists.

Missing at low speeds denotes that the spark plug gaps are too wide, secondary wire disconnected or short circuited, dirty interrupter points, fouled plugs, etc., while an occasional miss may be traced to a defective spark plug or cable, or loose switch parts. Similar conditions may also prevail at all speeds.

Low-Tension Magnetos.

The circuit breaker and distributor of the low-tension magneto are cleaned and adjusted in the same manner as with the other instruments. When the system is a dual one, and batteries are utilized for starting and for an auxiliary source of supply, failure of the motor to start on these members may be due to a number of causes. The first step is to ascertain if the batteries are wired properly; that is, the binding nuts of the cells set up snugly and no broken wires exist. It is equally important to know that the cells have not run down through service or short circuiting. If the batteries test to the standard, examine the wires leading from them to the coil, magneto, etc.

Inspect the brush making contact on the cam or similar member conveying the battery current to the breaker box of the magneto. Some times in replacing the dust cover the brush does not make proper contact. If the brush is in order, have someone crank the motor and note if the platinum points separate and if the distance is correct. Another source of the trouble may be dirt in the distributor housing. Examine the brush in the distributor cover and note if it makes proper contact with the distributor. Go over all wires between the magneto and coil and make sure that none is grounded or no terminals are loose. These tests are suggested in the event the motor fails to start on either the batteries or the magneto, and when the fault is not due to carburetion or engine troubles.

Locating Troubles.

Locating a missing cylinder is a simple matter and is best performed with the engine operating. Take a screw driver with a wooden handle and short circuit a plug at a time by connecting the metal terminal of the cable with the metal of the engine by means of the blade of the tool. Be careful not to touch any metal with the fingers or a shock will be experienced. By having the cut-out open, one can distinguish by ear whether the cylinder being tested is at fault. The secondary current of each cable can be tested in a similar manner, by holding the point of the screw driver blade about .25 inch away from the cylinder. The spark will jump the gap.

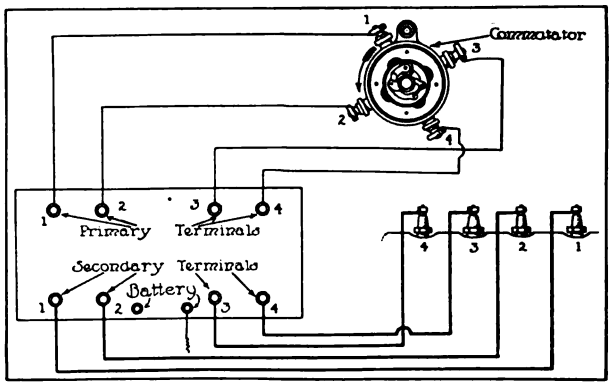


Fig. 6—Wiring Plan of Induction Coil and Commutator with Four-Cylinder Motor Firing 1, 2, 4, 3.

Otherwise, the cable is defective or is not properly fitted in the distributor housing.

It is difficult to give any set rule as to the gap of the plugs. Some makers of magnetos advise a gap of .03125 inch, while others recommend .015625, while one

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maker suggests anything between these points. It is best to adhere closely to the instructions of the maker and as all manufacturers issue comprehensive data free, the writer suggests that those not possessing an instruction book write for one and carry it on the car during the tour. The oiling instructions should be followed carefully.

The practise of many car manufacturers to fit the magneto with a cover is an excellent one and the utilization of these protectors eliminates opportunity of water and dirt reaching the working parts of the instrument. As the machine will be washed in strange garages during the tour the workman may flood the magneto with water, creating trouble, although some types of instruments are so constructed as to be dust and water proof.

While the magneto has supplanted the battery and coil system of ignition to a great extent, there are a number of machines utilizing the older form of ignition. At Fig. 6 is presented the wiring plan of a four-cylinder motor firing 1, 2, 4, 3, and with the commutat r rotating anti-clockwise. The wiring plan of both the primary and secondary wires is shown and will be of service to those not familiar with this form of ignition.

Fig. 5 illustrates how dry cells are wired in series and multiple series, the sketch at A showing six cells in series which increases the voltage, but not the amperage, while that at B provides for greater amperage. In the event the magneto becomes disabled, by utilizing two sets of six cells and wiring them as shown at B, considerable service will be obtained—sufficient to operate the motor on the battery type of timer or distributor until the magneto is returned from the factory or service station. Care must be taken to use only the number of cells recommended by the maker of the magneto, as the voltage required varies.

CLEANING PARTS WITH SODA.

Pierce-Arrow Motor Car Company Utilizes Hot Solution Instead of Gasoline.

The expense involved in the use of gasoline for cleaning parts in the assembly and other rooms of a factory and service station is considerable and is augmented in these days of the high cost of fuel. The Pierce-Arrow Motor Car Company, Buffalo, N. Y., has eliminated gasoline and its attendant dangers by the utilization of hot soda water, which is not only cheaper, but is held to be more efficient as a cleanser. The system comprises a soda and a hot water tank which are heated by steam, although it is pointed out that the invention could be supplied with the necessary heat by gas, the only alteration required being that of raising the tanks slightly.

According to J. Willard Lord of the service department of the company, the soda tank is supplied with about 25 pounds of soda weekly, the amount depending upon the nature of the parts to be cleaned. If the work for several days happens to be of a very oily nature it is found that a certain amount of oil and scum will form on the top of the solution, indicating that it is weak. This condition is easily remedied by the addition of a few pounds of new soda. The tanks are cleaned once a week and the heating coil in the base of the container requires attention semi-monthly.

The hot soda tanks are employed throughout the assembly department and digression is made only in the case of the final test gang in the motor assembly room. These men take apart and clean the motors after being received from the block testing department. In this work the parts are first washed in gasoline, because of the very heavy deposits of oil, then by the hot soda process, and dried with compressed air.

INTERESTING WORLD TOUR.

Two Young Men Leave Indianapolis in Henderson Car for Year Abroad.

Edwin P. Kohl, who has just graduated from the University of Wisconsin, left Indianapolis, Ind., July 1, in a Henderson car, made by the Henderson Motor Car Company, that city, for a tour around the world. He expects to arrive at San Francisco July 1, 1915, during the Panama Pacific exposition. He will be accompanied by a Harvard graduate, who is an expert photographer and is an experienced automobile driver.

They will not follow the beaten paths, but intend to visit nearly every civilized country on the globe. Following are some of the places included in the itinerary: New York City, sail to Liverpool, touring England, Scotland and Wales, France, Spain, Italy, Switzerland, Germany, Belgium, the Netherlands, Russia, including St. Petersburg, Samara, Moscow and Warsaw; Austria, including Vienna. The Balkan States will be crossed to Constantinople, following the Mediterranean and the Suez Canal to Cairo and Alexandria in Egypt. The Holy Land will be visited and then the route will be laid across Arabia, Persia and India to Calcutta, across the mountains into China and sail from Shanghai to Japan. The Philippines and Australia will then be visited, following which shipment will be taken to Buenos Aires, Argentina. The drive will then be along the east coast to Panama and northward to San Francisco along the west shore of Mexico.

Ten Buick cars, made by the Buick Motor Company, Flint, Mich., recently left Lincoln, Neb., each having seven gallons of gasoline in its tank. They went to Omaha, Neb., going through the cyclone district, which made the total distance 70 miles flat. Upon arrival at Omaha, 4.5 gallons of every seven were drained from the tanks, showing an average of 28 miles a gallon. As the trip was made over rain soaked roads, this record is considered excellent. The journey occupied 3:45:00, inclusive of all stops.

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TO REOPEN RECENT PATENT DECISION.

Detroit Manufacturers Anxious to Determine Their Position with Reference to Price to Consumer—Interesting Discussion of the Problem.

THE automobile industry is by no means satisfied that the recent decision of the United States supreme court, with reference to the effect of the patent law upon the fixing of retail prices, is final. It is reported from Detroit that the motor car manufacturers in that city have retained Attorney Alfred Lucking in an effort to reopen the matter.

It will be remembered that something over a year ago this court handed down a decision in the so-called Mimeograph case, Henry against Dick, in which a mimeograph was sold at cost with the restriction that the paper and ink should be bought from the company selling the machine. At that time the court held in favor of the patentee on the ground that the owner of the patent had not relinquished his interest in the machine, inasmuch as it was sought to obtain a profit from the sale of paper and ink.

In the recent decision, the case being that of the Miles Medical Company against Clark and others, it was held that "to vend is to part with a thing for a consideration," and that the owner of the patent had disposed of his interest in the patented article when it passed into the possession of the first purchaser—the jobber, for instance.

The layman finds difficulty in following the sharp distinctions made by legal interpretations. The automobile industry has been at some loss to understand the effect of the latter decision of the supreme court. Some manufacturers have maintained that it would not affect the establishment of fixed prices where cars were sold through agents, while others are of the opinion that in order to maintain prices it would be necessary to establish numerous factory branches. Apparently, there is a desire to learn exactly where the industry stands in this matter, and it is anticipated that a test case will be taken to the supreme court in order to obtain this information, although it is possible that the same result can be accomplished by reopening the Miles-Clark case.

Perhaps one of the most interesting and instructive articles covering the phase raised by the recent decision of the supreme court, is that by Harry D. Nims, a member of the bar of New York City, in The Outlook for June 21, under the title, "Price Protection and the Consumer." Mr. Nims says in part:

A. T. Stewart achieved a world wide reputation some years ago because he installed in his store what was known as a one-price system, and ended, in his business, for good and all the question of "dicker" between his clerks and his customers. His goods bore their price, and the customers could take them or leave them at that price. * * *

Price-cutting presupposes a known price and value which prevails generally in the community. The cut price appeals only to persons who recognize it as lower than a well known higher price which they have customarily paid for the article in question. It represents a revolt against the attempt of the manufacturer to sell his goods on a one-price-to-all basis. In reality, therefore, the price-cutter is a reversion to the time antedating Mr. Stewart's famous reform.

Mr. Stewart evidently believed that, while there were many business transactions in which bargaining was necessary and useful, in his business relations with the public over the counter of his store bargaining had no place; and the public has agreed with him ever since that time. * * *

The most important consideration, so far as the public is concerned, is, of course, that the play of the laws of competition shall not be suppressed or curtailed; that the consumer should be afforded an opportunity to choose from and inspect as large a number of the articles as possible which are on sale to meet the purpose for which he is buying. If this be true, this end will by no means be met by merely affording an opportunity to retailers to sell the goods on their shelves at any price they see fit. In addition, there must be preserved, by some method, an opportunity by which goods can be sold in many places—be easily inspected by the buying public.

There is one form of restraint of trade which is not always taken into account in a discussion of this question; namely, that which results from the elimination of the small dealer—the local store—by reason of the methods of the mail order house and department stores, which, by their constant so-called "sales," so depreciate the value and injure the reputation of standard goods as to render business unprofitable for the small dealer.

This change in the conditions under which goods are sold has not in any degree abrogated the economic laws of competition. But it has changed the conditions under which they exercise their beneficent influence upon trade. The operation of these laws in the small communities of 50 years ago was evident to the most casual observer. Today, so ramified and intricate are the methods by which business is done, and so silent are its processes, and so extensive its operation, that even those who are best posted upon these conditions hesitate to define exactly the economic laws which underlie present day trading.

These being the conditions of the market, the manufacturer of branded goods has, generally speaking, for some years past sold his goods to the retailer and the jobber in such a way as to insure that the price at which his goods shall be bought by the public shall be uniform everywhere throughout the country. By advertising he has created a demand for his goods, and his idea has been to sell them on the same basis as if every user of them came to his own counter at his factory and bought directly of him. Despite the apparent good reason for this, from a buyer's point of view, as well as from that of the manufacturers, the courts, generally speaking, have considered that the means so far used to accomplish this result have been against public policy, and therefore illegal.

Had every manufacturer maintained a store, and sold all his goods at retail, it is difficult to see how the manufacturer's "one-price-to-all" policy could be less commendable or less generally beneficial than is the Stewart plan for a retail merchant. Evidently the public would benefit were such a plan possible; and is it solely because such a distributive method is impossible for the manufacturer that this problem has arisen? The average manufacturer must, in the nature of things, sell to jobbers if he is to be able to offer his goods widely to the public,

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keep his price down to a reasonable figure, and avoid bad retail accounts in districts too remote for him to know or learn the standing of the retailers. Where jobbers' services are unnecessary he must still sell outright to the retailer, because he usually has not the capital necessary to own his goods both while in process of manufacture and while on the retailer's shelves awaiting purchase by the public. In other words, he must, in order to distribute his goods widely, usually sell them outright to jobber or retailer, who, in turn, will sell to the consumer.

These sales to jobber and to retailer result in injecting into the situation several legal rights and principles on which the price-cutter bases his legal rights, and which form also the basis of the charge that the manufacturer, in protecting prices, is restraining trade.

The most important of these rules is that, whenever a person has sold absolutely and without condition a piece of personal property belonging to him, he has no further dominion or control over that property. This is a general rule. It is possible, however, under certain circumstances, to attach to the sale of personal property a condition; as, for instance, an artist selling his painting or a sculptor his statue might stipulate in the sale that the buyer should not resell it for less than a stipulated sum. Such a stipulation would probably be legal.

But when we attempt to apply this doctrine to the distribution of goods, we meet with another rule of law, namely, that all contracts which have the effect of unreasonably restraining trade or suppressing competition are void. The supreme court has apparently held that it is unlawful for a manufacturer to affix to every sale of his goods a stipulation of this sort, because the result of his so doing is a restraint of trade—a suppression of competition. Undoubtedly such agreements restricted competition as it existed 50 years ago, but there is grave doubt in many minds if such an agreement has this effect upon the competition of today.

* * * As we have seen, were all the producers of all the articles used in a community located in the community, and did all of them sell directly to the consumer, competition would be defined easily. Each one would be free to fix his price at will. If A and B made watches of equal value, and A charged $10 for his while B charged $5, no one would attempt to prevent A from fixing that price for his own goods. Competition between the two watches would soon compel either the lowering of A's price or his retirement from business. A Sherman law might well be passed in such a city to prevent A and B, and all watchmakers in the community, from combining and agreeing to sell all watches of that grade at $10. That done, the interest of the public would be safeguarded by the economic law of competition—the freedom of the public to decide which article was cheapest.

But as conditions are at present are we not losing sight of the real issue, when once the Sherman law insures us against such combinations, in attempting further to say, as our courts are now doing, that because A must employ a jobber and a retailer to distribute his goods, the jobber and retailer shall be free to sell A's wares at any price they will? Are we not forgetting that, after all, true competition is not between retailers and jobbers of these rival articles, but between the rival articles themselves?

It is of interest to note, as is brought out in Mr. Sims' article, that this view already is held in several states, notably California, New Jersey and South Dakota, which have enacted laws permitting, in the absence of combinations among dealers, the manufacturer to fix his price and prevent the price-cutter from destroying it, or forbidding retailers, for the purpose of destroying competition, to charge a greater price in one community than in another, considering any differences in freight charges from the place of manufacture to the dealer's store.

Denmark has passed a law provided for the fining of persons who "sell or offer for sale goods in original wrappers from producers or jobbers, upon which their fixed prices for the retail trade have been indicated at a lower price" (except in case of sales of damaged goods, sales by reason of removal or retiring from business, etc.), unless permission of the maker or jobber is first obtained. German courts have recently held that the sale of goods by price-cutting methods is a violation of the German law against unfair competition, for the reason that such acts damage the maker's property by creating the belief that its goods can be bought at different prices at retail. Decisions of a similar tenor have been handed down in Belgium.

CROW COMPANY EXPANDING.

New Machine Shop Ready for Occupancy and More Land Is Acquired.

A new machine shop affording 5000 square feet of floor space has been built adjoining the south side of the Crow Motor Car Company's plant at Elkhart, Ind. The ever increasing demand from all parts of the country for Crow Elk-Hart motor cars has made it necessary to expand the factory and to install new machinery. The new structure was built to give plenty of light and will be utilized as a machine room. The floor is of concrete, to give a solid foundation for the heavy milling machines, lathes, drills, etc.

A large tract of vacant land west of the plant has also been acquired. At present this property is being used for switching purposes, but will accommodate other factory buildings when the volume of business indicates that additional floor space is needed. Adequate fire protection has been provided, the factory being equipped with an automatic sprinkling system. The latter comprises 10,000 feet of pipe with more than 1000 release heads. Heavy pressure is furnished at all times as the system is connected with both the city water supply and with a tank of 33,400 gallons capacity, which rests upon a brick tower and rises 60 feet above the ground.

A new, large elevator has been installed to hoist the heavy six-cylinder machines from one floor to another, the old elevator being used for the smaller models, thus effecting a great saving of time. The 1913 season has thus far been a notable one in the manufacturing career of the Crow Motor Car Company. The sales of the product have not only increased in all parts of the country, but in the foreign fields as well. At present there is a day and night shift employed in the factory and the work progresses with very little intermission.

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SELLING ADDITIONAL STOCK.

Expected That It Will All Be Taken by Present Henderson Stockholders.

At a recent meeting of the stockholders of the Henderson Motor Car Company, Indianapolis, Ind., maker of Henderson cars, it was voted to sell the remaining unissued shares of common stock, amounting to $100,000. It is anticipated that all of the new issue will be taken by the present stockholders in the Henderson company.

"The Hendersons of Indianapolis" as the Henderson brothers are generally known in the industry, are by no means new in the motor car business, although they have been operating a factory under their own name for a little more than a year. The first Henderson car made its appearance during the second annual 500-mile race on the Indianapolis motor speedway, Memorial Day, 1912. The features of this initial product included the use of wire wheels, left hand drive, seat control and cowl dash and gasoline tank. The 1914 models, announced recently, go a step further, including a kerosene carburetor as optional equipment.

SECURES MORE LAND.

Stearns Company Doubles Capital and Will Increase Production Facilities.

In order to increase production facilities necessitated by a rapidly expanding business, the F. B. Stearns Company, Cleveland, O., maker of Stearns-Knight cars, has doubled its capital stock, bringing the total to $400,000. Following the filing at Columbus, O., of the papers incident to an increase in capitalization, it was announced that the company has purchased nearly 400 feet of land adjoining its plant on Euclid avenue.

Control of this land was acquired some time ago by a group of men identified with the Stearns company and they for the time vested it in a real estate company. It is understood that an agreement was reached whereby the automobile company made a conditional exchange of its stock for securities of the realty concern. The land lies west of the Stearns company's plant.

BUYS ANOTHER PLANT.

Saurer Motor Company Acquires Additional Property in Plainfield, N. J.

Indicative of the expansion of the automobile truck business is the purchase by the Saurer Motor Company, Charles P. Coleman, president, a subsidiary of the International Motor Company, of the plant of the Manganese Steel Safe Company, on West Front street, Plainfield, N. J., near the Clinton avenue station of the Central Railroad of New Jersey.

The Saurer Motor Company was incorporated several months ago with capital of $1,600,000. It is reported that it has expended $250,000 in extensions of its plant and a considerable additional sum will be spent on the property just acquired.

JOINS APPERSON COMPANY.

W. D. Edenburn Leaves Henderson Concern on Eve of the Transcontinental Tour.

W. D. Edenburn, a former Indianapolis newspaper man, who has been connected with the automobile industry for some time, has resigned as manager of the newspaper department of the Henderson Motor Car Company, Indianapolis, Ind., maker of Henderson cars, to join the organization of the Apperson Bros. Automobile Company, Kokomo, Ind., maker of Apperson machines. His resignation is effective immediately and he is representing the Apperson company on the Indiana-Pacific Coast tour, which started from Indianapolis, July 1.



W. D. Edenburn, with Apperson Bros. Automobile Company.

Mr. Edenburn has been one of the most active men in the promotion of the third annual tour of the Indiana Automobile Manufacturers' Association. He is chairman of the special features committee of the tour and assistant chairman of the event. W. McK. White, advertising manager of the Marion Motor Car Company, maker of Marion cars, is chairman of the tour committee, and the management of the run while en route will devolve largely upon Mr. Edenburn and Mr. White.

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NEW 6-48 ADDED TO KISSELKAR LINE.

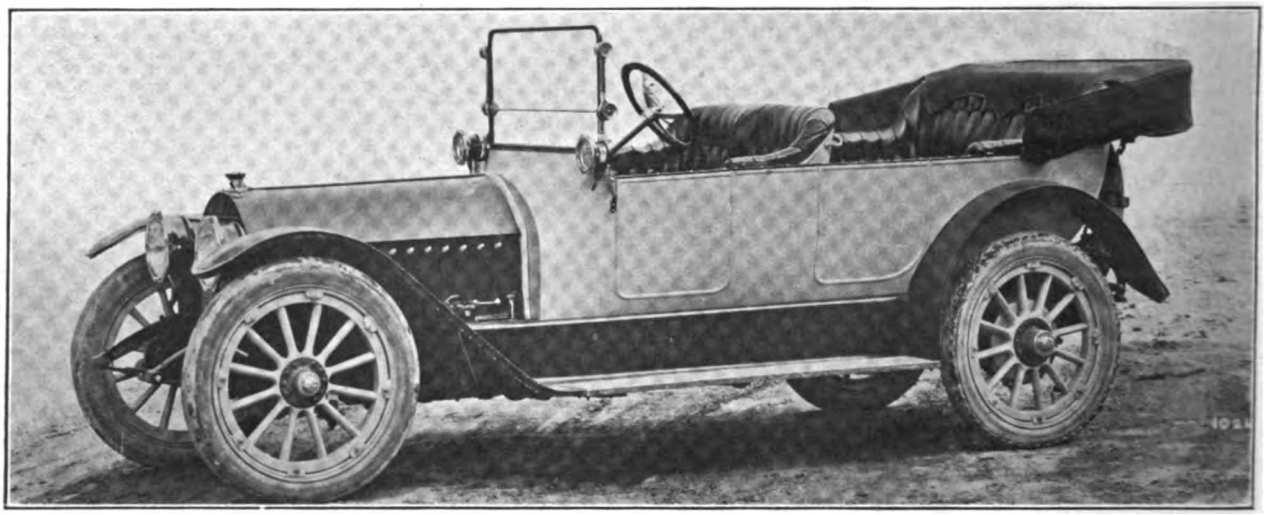
ANNOUNCEMENT was made recently of the acquisition of a new plant at Milwaukee, Wis., by the Kissel Motor Car Company of Hartford, Wis., maker of the well known KisselKar line of pleasure and commercial vehicles. Indicative of the progressive policy of the company is the appearance of a distinctly new chassis which will be constructed at the new factory and which will be known as the 6-48, instead of being designated as a particular model, the company having abandoned the yearly model system.

Although the latest creation embodies those mechanical features which have proven the durability of the Kissel product, there are several particulars in which the new design differs from previous chassis. The most striking change is the substitution of left hand drive and centre control for the right. Another is the casting of the motor en bloc instead of in pairs as with the older six. The third feature is the tendency toward a long stroke, the new motor having a 3.75-inch bore and 5.2-inch stroke which shows an increased bore to stroke ratio when it is considered that the 6-60 motor is 4.5 by 5.25. Another noteworthy change is in the design of the frame, which has a double drop, affording opportunity to utilize a straight sill for the body throughout the greater part of its length, as well as making for greater stability through a low centre of gravity.

The new KisselKar is of such size as to meet the approval of those who desire the comfort, conveniences and capacity of a large machine with a minimum cost of maintenance. It may be termed an intermediate size, but its details indicate that it possesses those advantages afforded by the high powered car. The appointments throughout are very complete and unusual attention has been paid to working out those details which contribute to the comfort of motoring. Three body styles are fitted to the new chassis, these including a five-passenger touring, a limousine and a fore door limousine. The bodies are very attractive, having clean lines, which are enhanced by the utilization of round pressed steel fenders of foreign design. The equipment is very complete, including electric lighting and motor starting.

The motor is a new design, although certain well known features of KisselKar construction have been retained. As previously stated the six cylinders are cast en bloc and the bore and stroke of 3.75 by 5.5 inches developes 33.75 horsepower according to the S. A. E. formula. The company's rating is 48, which appears to be conservative when the piston displacement is taken into consideration. The power plant is very compact and the exterior components are neatly finished, presenting an attractive motor when the hood is lifted. It is of the L head type with valves located on the left and their mechanism is enclosed by easily removed plates.

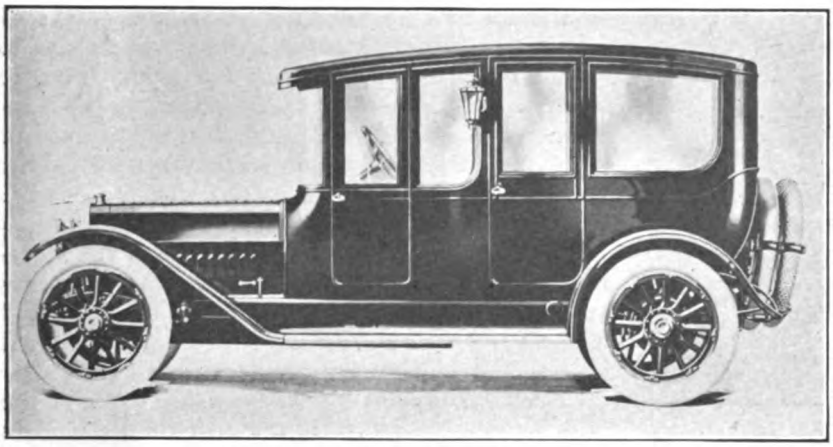
Carburetion is by the latest type automatic float feed Stromberg, water jacketed for cold weather and having the Stromberg device for restricting the air when starting the engine. The usual steering post control is included, making



KisselKar 6-48, the Initial Product of the New Kissel Plant at Milwaukee, Wis.—An Attractive Design and Noticeable for Its Clean Lines.

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for convenience in regulating the mixture. Owing to the double drop of the frame, the carburetor is mounted slightly higher than in conventional



Fore Door Enclosed Limousine, One of Several Types of Bodies Fitted to the New Chassis.

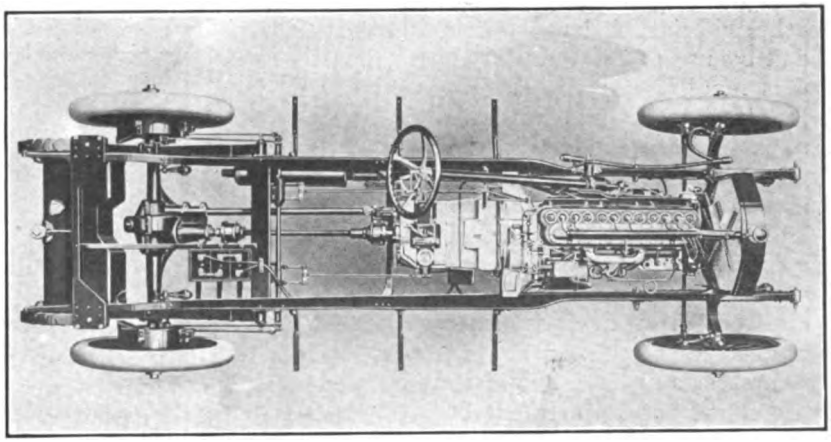
practise, and the construction permits of a shorter intake manifold. The latter is well designed, being free from curves, and should make for efficient carburetion.

Ignition is provided by the latest type Mea, a water proof instrument, which is mounted in front and slightly to the right. Both the magneto and water pump are driven by a transverse shaft and these members are very accessible. The diameter of the exhaust manifold and the straight line pipe to the muffler located amidships of the chassis is such that back pressure is reduced to a minimum.

Cooling is by a square tube radiator so mounted that road shocks are eliminated. Cooling is further aided by a belt driven fan with means provided for preserving the proper tension. The outlet water manifold is a single casting retained by studs and it is an easy matter to displace it in the event the water jackets require cleaning. The motor starter, an Esterline, is mounted at the right of the rear cylinder, energy being supplied to the motor through a gear meshing with teeth on the flywheel. Many refinements are noticeable in the power plant, these including the carrying of the high-tension wires in a neat tube and the mounting of the electric horn under the hood.

Lubrication is by the conventional splash and force feed. A noteworthy feature is the provision made to guard against smoking. The lower edge of the bottom piston ring groove is bevelled off and holes are drilled at right angles through the piston. Any surplus oil accumulating on the cylinder walls is scraped off by the bottom ring, carried through the openings in the piston, thence to the crankcase, obviating the possibility of passing by the rings into the combustion chamber and creating smoking. Oil ducts in the crankshaft distribute lubricant to all bearings. Force feed lubrication is obtained by the gear pump, the lubricant being stored in a self-contained reservoir in the lower part of the crankcase. Its capacity is two gallons.

The motor, clutch and transmission are a unit, and the accessibility of the former KisselKar amidships location is retained. The motor and clutch are together and are suspended by a special construction with one bearing in front, one in the rear and one on either side. The gearset also has a three point support, one being a trunnion on a cross member at the rear of the transmission, the others being the arm supporting members of the motor. This is obtained by means of a housing which encloses the clutch and the universal joint between it and the gearbox, and which is integral with the flywheel housing. The method of suspension should relieve components



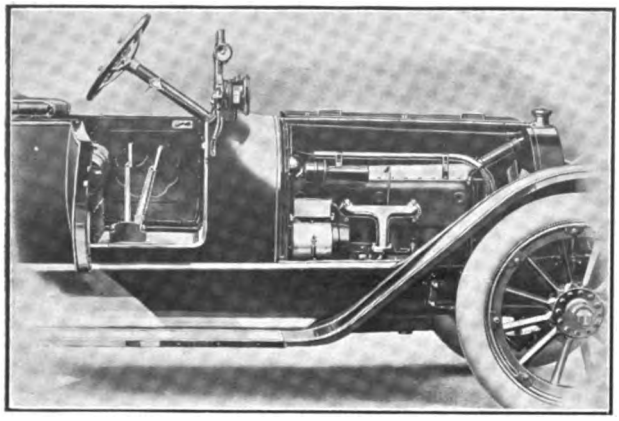
Top View of New KisselKar Chassis, Showing the Block Motor, Double Kick-Up Frame and Accessibility of Components.

of all undesirable stresses due to rough roads.

The transmission is of the selective sliding gear type, providing four forward speeds and a re-

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verse, with direct on the third. The gears are of chrome vanadium steel and the shafts are mounted on F. & S. annular ball bearings. The clutch,



Simplicity and Accessibility Are Features of the Motor Which Is a Unit with the Clutch and Transmission and Is Carried on a Three Point Suspension.

flywheel and transmission are very accessible through large inspection plates. The clutch is large, of the leather faced cone type, with adjustable spring inserts, making for gradual but positive engagement. It may be disassembled without removing the motor or gearset.

Energy is transmitted from the gearset to the axles through an unenclosed shaft with a universal joint at either end. An ample sized torsion rod from the axle to the cross member at the rear of the transmission takes the drive and cares for torsional effect. It is rigid at its rear end and trunnioned at the front, running parallel with the drive shaft.

The rear axle is of the floating type and the housing is tapered slightly from the differential to the wheels. A large factor of safety is provided by use of reinforcing webs. The differential is readily accessible through a large inspection plate or housing and the entire rear construction is such that adjustments may be made easily. The housing is further supported by an adjustable strut rod.

The brakes are unusually large, two sets being provided. The service members are actuated by pedal and are of the external contracting type, while the emergency set is operated by the conventional lever. The brake drums are 24 inches in diameter and have five-inch faces. Equalizers are utilized and adjustment of the brakes is accomplished easily.

Semi-elliptic springs are employed both front and rear, these members being of chrome vanadium steel. The front springs are 38 inches long and 2.5 wide, while the rear members are 52 by 2.5. Each leaf is carefully ground and provision is made for lubrication of the parts subject to friction.

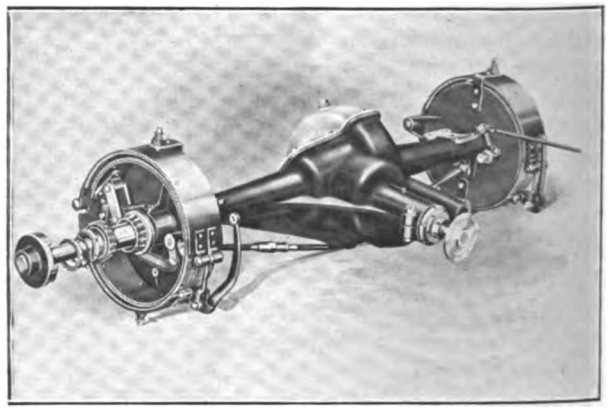
The frame is of pressed steel, narrowed in front to provide a short turning radius, and has a double kick-up, making for a low centre of gravity as well as stability. The wheels are 36 inches in diameter and both front and rear are fitted with 36 by 4.5-inch tires mounted on Continental demountable rims. The front axle is of the conventional I beam section type and the tierod is located in the rear. The wheelbase is 132 inches and the tread standard.

The driver is located at the left and the steering column is set at a comfortable angle, being surmounted by a large wheel with a corrugated rim. The spark and throttle levers are mounted on a sector. The usual accelerator is included.

Fuel is supplied by the pressure system, the tank being suspended at the rear of the chassis and having a capacity of 24 gallons. The proper pressure is maintained by a piston pump actuated by a cam on the camshaft of the motor. The cowl dash is well proportioned and back of this is the mahogany dash on which is mounted the electric meters and other control units.

Special attention has been paid to the upholstery, which includes a special mixture of hair 11 inches deep, covered with a high grade black leather. The tonneau of the touring body is very roomy and ample leg room is provided in the front. Access to the tonneau is by 21-inch doors, a dimension making for convenience.

The equipment leaves nothing to be desired. including as it does a Golde patented mohair top, which may be operated by one person; envelope, windshield, speedometer, shock absorbers, double tire irons, robe and foot rails, horn,



Illustrating Sturdy and Well Designed Rear Axle and Ample Sized Brakes.

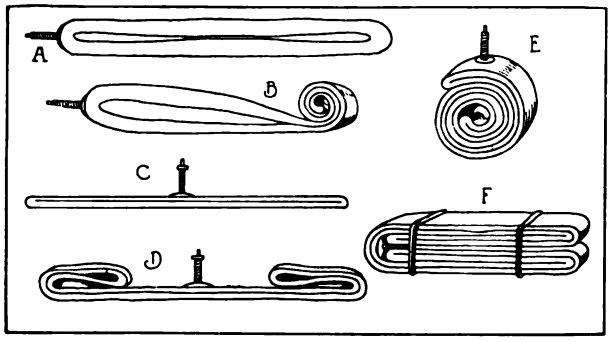
jack, pump, tire repair outfit, complete set of tools, etc. Nickel and black enamel finish prevails throughout.

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TIRE EQUIPMENT IS IMPORTANT.

Value of a Thorough Inspection of Shoes, Tubes and Rims---Accessories Making for Convenience and Economy---Hints on Maintenance.

IN THE preparation of the car for the tour the tire equipment should not be overlooked, and this applies to both the new and old machine. The



Illustrating the Essential Steps in Folding Inner Tubes Before Placing in the Tube Bag.

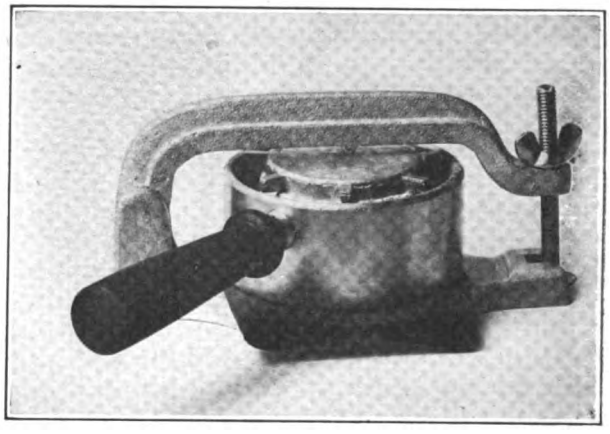
experienced tourist is not satisfied with purchasing and carrying spare casings and tubes, which the new motorist is apt to deem a sufficient precaution against trouble, but subjects the shoes in service to a thorough examination. This precaution is to be recommended as frequently an apparently good shoe may have broken fabric which cannot be determined from the exterior appearance of the casing. Reinforcing the damaged section not only prevents the blow-out, but is good tire insurance.

While it is admitted that it is a disagreeable task to remove and replace four tires, and that a large number of motorists delay this work until compelled to make a change, the results obtained from a thorough inspection of the casings will amply repay one for the labor involved. It also affords an excellent opportunity to inspect and clean the rims as well as to note if the retaining rings, locking nuts, etc., are in good condition.

Dealing first with the shoes on the car: They should be removed from the rims, carefully wiped out and the envelope opened to note if the fabric is sound. By bending the bead of each side outward it may be determined if there are any loose places in the fabric. If a place is found where the casing is very pliable and soft it is apt to denote that the fabric has begun to separate, and the shoe should be taken to the tire expert for his opinion as to its serviceability. It should be remembered that the fabric ought to be hard and firm. The separation of the plies referred to is generally due to the fact that the tires have been under-inflated, creating a weaving movement that rapidly destroys the construction.

Discolored fabric on the interior lining is indicative of a puncture which has permitted moisture to penetrate the plies and it is only a question of time when deterioration of the fabric takes place, and the blow-out occurs. What appear to be trifling cuts in the tread may be serious and the extent of the injury can only be determined by a very careful examination of the interior of the casing. All cuts should be vulcanized, although there are preparations marketed for mending the breaks if the owner prefers to do his own repairing. Unless one be familiar with the ills to which tires are subjected, it is best to carry the casings to the tire man and abide by his judgment.

The removal of the shoes affords an excellent opportunity to clean the rims. More or less rust or deposits will gather after considerable service and should be removed. The work may be performed by sandpaper or emery cloth, depending upon the nature of the deposits. After cleaning the metal, prepare a mixture of powdered graphite and oil, using enough of the latter to make a thick paste. Apply the mixture freely, after which remove the surplus with a cloth or piece of waste. A high polish can readily be imparted to

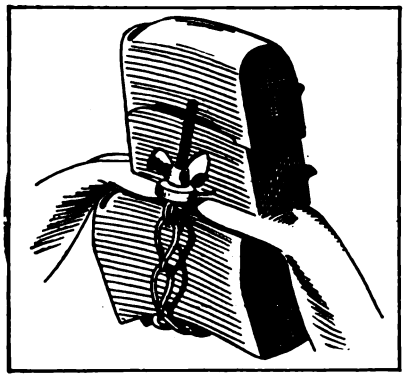


The Shaler Vul-Kit, a Moderately Priced Automatic Vulcanizer Employing Gasoline.

the metal and it is surprising how easy it is to change a shoe with graphited rims. The graphite will fill each pore of the metal and resist the ac-

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tion of water, dirt and heat. The locking rims, nuts, bolts, etc., should be similarly treated. Those who do not care to use the graphite mixture can employ preparations marketed for this purpose, and some of these include graphite. While some advocate the use of shellac or paint, graphite or preparations including graphite are to be preferred as they do not increase the diameter. This may appear to be a very small factor, but in fitting a new shoe it is generally found to be an important one.



McVey Vulcanizer Using Gasoline.

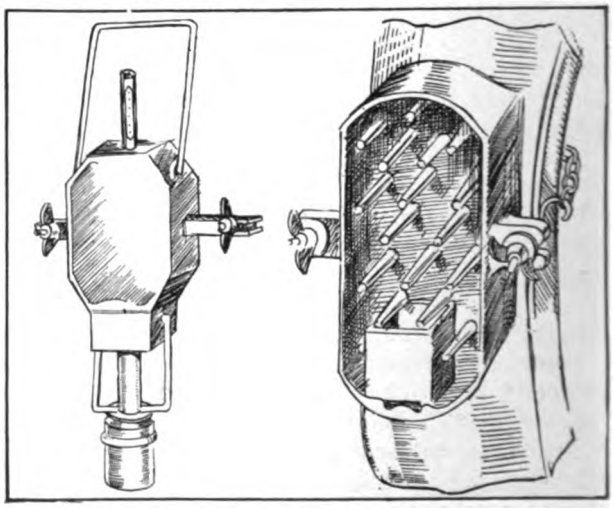
In replacing the shoes those in the best condition should be fitted to the front wheels; that is, if the same size is utilized all around. This will make for increased mileage. It also is a good plan to place those formerly on the right hand side of the machine on the left hand wheels, as it is estimated that the shoes on the right are subjected to more stresses than their mates.

The number of spares to be carried will depend on the condition of the present shoes, the contemplated mileage and the car. Some machines are very easy on tires and often exceed the mileage guaranteed by the maker. On the other hand, the car may be hard on tires. There are a number of conditions entering into the service of shoes which are not given consideration by all motorists. In spite of the fact that tire manufacturers spend large sums in endeavoring to educate the automobilist in the care of tires and the need for proper inflation, the advice is not followed. It is safe to predict that were 25 cars stopped on the road and the pressure taken of each 50 per cent. would not be found to be up to that recommended by the maker. This may appear to be a broad statement, but if one will note the rear tires of passing machines, it will be surprising how many will be seen to be slightly flattened where they contact with the road. The importance of proper tire inflation was dealt with in a recent issue of The Automobile Journal and it may be added that much more satisfaction will be derived when seeking an adjustment if the tire has been kept to proper pressure.

In the inspection of the tire equipment the inner tubes should not be overlooked. Doubtful members should be inflated and tested for leaks, and if the valves of any have been giving trouble, remove them, clean or fit new. The number of spare inner tubes required will depend largely on the car and the owner. Some make it a practise to carry but one, relying upon cement and patches, while others have six or eight. As the number of possible punctures is an unknown quantity, no rule can be laid down as to the proper extra tube equipment.

The care of the extra casings is important. The best plan is to employ covers, although the new tire is well protected by the wrappings from the factory. In mounting the extra members care should be exercised that the straps or holders do not chafe the rubber as it requires but a few miles of running under such conditions to remove a considerable amount of the rubber.

Inner tubes should not be exposed to the light, heat, oils or greases, or stowed carelessly. The best plan is to purchase a tube bag and these may be procured for a small sum. The proper method of folding inner tubes is shown in an accompanying illustration, the steps being alphabetically arranged. First remove the valve and fold the tube so as to allow the escape of the air as shown at A. Next roll as indicated at B, beginning with the end farthest from the valve. This will enable the displacement of the air, but it will be noted that some will accumulate at the end because of the bend. By moving the valve and rolling at the same time, all air may be displaced and the tube rolled as shown at E. The tube should be compressed to prevent air entering while the valve and cap are replaced. The



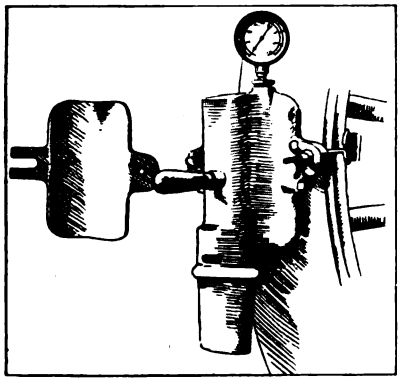
National Portable Steam Vulcanizer, Adapted for Both Tires and Inner Tubes, and the Mascot.

tube is now ready for the bag. Open the tube as shown at C, keeping the valve in the centre, and fold each end inward as illustrated at D, making

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a final fold as at F. The result is a flat package. The folds may be secured by rubber bands and these may be made from an old inner tube. A small quantity of soapstone or talc in the bag is recommended.

Concerning the equipment: One should be very careful in the examination of the pump and if it has not been operating satisfactorily, it should be repaired or a new one purchased. It is optional as to type of patches to be carried, also the cement. Some make it a practise to include a blow-out patch and an outside sleeve in the equipment, but this is a question the owner must decide for himself. They take but little space and may prove of decided value. Every tourist should carry at least one pair of Weed tire chains, and some include two. These are invaluable in touring over wet and slippery roads as not only is skidding eliminated, but proper traction is provided. A few extra tire valves cost but a few cents and may save considerable pumping.

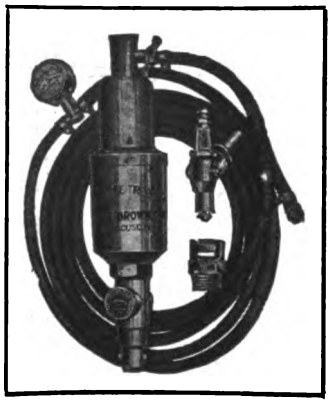


Van Steam Portable Vulcaniser.

There is no disputing the fact that inflating tires by hand on a warm day is a disagreeable task. This may be eliminated by the fitting of a power tire pump if the machine is not thus equipped. Power pumps are not expensive, are very compact and in the event of several punctures the driver is saved considerable exertion, as the motor does the work.

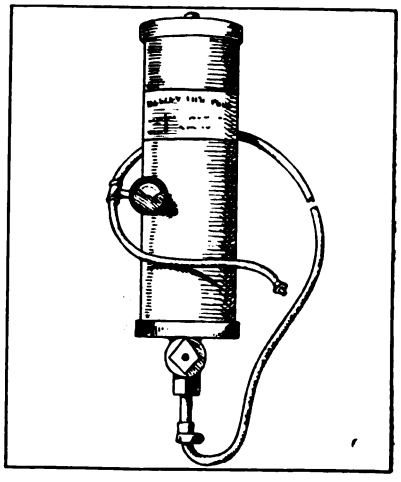
Among the makers of power tire pumps is the Dewey-Anderson Company, Toledo, O., manufacturer of the Dewey, which is shown in an accompanying illustration. It is constructed of high grade material and the workmanship is first class in every respect. It may be carried in the car or permanently fitted to the motor, as suits the convenience of the motorist. In the first named case a spark plug is removed from a cylinder and the pump inserted, an operation performed easily by the hands and without the aid of tools. The Dewey is but 12 inches high, weighs less than four pounds, and will inflate a shoe with pure, fresh air in a very short period. Suitable length of hose, pressure gauge, self-opening connections and a control member are included in the equipment.

Another illustration presents the Brown Impulse tire pump, which also is operated by the compression of the motor and may be used either as a permanent fixture or attached when desired. When fitted permanently a hole is tapped into the cylinder head and the pump operated in a horizontal position. Only fresh air is forced to the tire by the pump, which is constructed in a similar manner to a motor. The cyinders are made of gray iron, bored and reamed to exact size, and it is held that the pump requires no attention after installation. The outfit includes 12 feet of flexible hose, pressure gauge and control member. It is manufactured by the Brown Company, Syracuse, N. Y.



Brown Impulse Tire Pump.

There are a number of high grade, moderately priced vulcanizers of the portable type which may be carried easily in the car, and by including one in the equipment it is possible to complete repairs to inner tubes and shoes while en route. The use of these devices does not require a knowledge of the process of curing rubber, as the vulcanizers are entirely automatic in their work. They are made in several forms and employ gasoline for obtaining the necessary heat for curing. By pouring a predetermined quantity of the fuel in the receptacle provided for the purpose, and lighting it, the proper curing temperature is obtained. Some types are so designed that cuts in the tread of a shoe may be vulcanized without removing the casing from the wheel. The equipment invariably includes all material necessary to complete a repair, and a large number of vulcanizations can be made from a conventional outfit. Individual opinion differs as to the tire repair kit and this is a problem that is best solved by the owner.



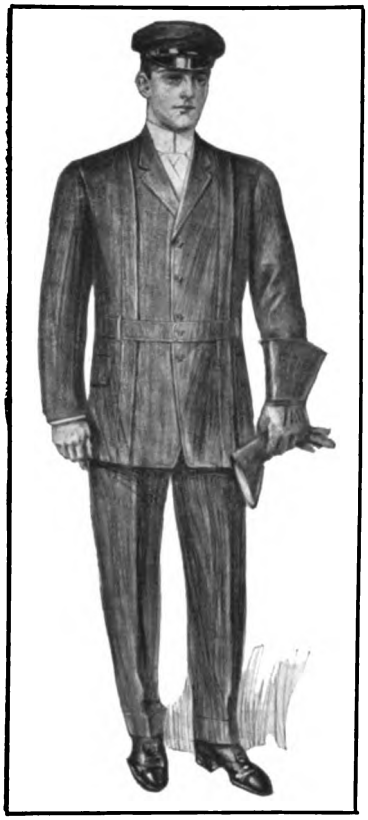
Dewey Power Tire Pump.

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PRACTICAL GARMENTS FOR MOTOR TOURING.

Suggestions for the Man Who Desires to Be Well Dressed While on the Road—Protection for the Clothing When at Work About the Car, Etc.

IN UNDERTAKING long tours, especially, the motorist desires to be equipped for every emergency. This applies quite as forcibly to the subject of clothing, as to the matter of extra tires, for instance, and while ordinarily this contains more of interest to the women of the party, practically no man plans a tour covering any considerable distance without giving the question consideration. And no matter whether the trip is to occupy two or three days, or takes on the aspect of a transcontinental journey, the possibilities are many.



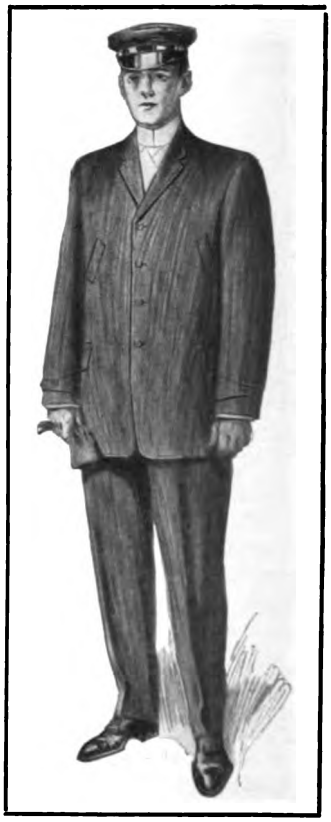
The Norfolk Is One of the Most Popular Models.

Naturally, the man who drives his own car must provide for a greater number of contingencies than he who employs a chauffeur. The latter may feel that he is well equipped if he has with him sufficient garments to protect him from the rain, the dust and the cold. The former, since he combines the duties of the chauffeur with those of pleasure or recreation, needs a somewhat larger wardrobe. But in either instance, it is not wise to carry too much for several reasons.

First of all, the tourist requires a good serviceable suit, one which will present real wearing qualities and which can be worn upon almost any occasion without attracting unfavorable comment. It must be remembered that when touring in the mountains, for instance, it is quite possible that one will meet friends at the night stop, with whom it is desired to spend the evening in a social way. It hardly can be expected that a motorist will at all times be prepared with a dinner coat, but the thoughtful man will dislike to give offense by appearing in a suit that bears unmistakable evidence of the road.

It should not be considered at all necessary for the man who drives his own car to purchase an expensive suit for a trip of this character, and it will be found that in most cities it is possible to make a most satisfactory selection from the stock of ready made goods carried by the local merchant. Some men are accustomed to pay more for their clothing than others, but usually the motorist confines himself to a figure ranging between $18 and $35 for a touring suit. This depends largely upon the man and his position in life.

Perhaps one of the most popular models this season is the Norfolk, either with a belt completely around the waist or with a short belt in the back, patch pockets or pockets giving this effect, and a turn-down notch collar or a soft rolling collar. At the prices quoted above it is possible to secure this model in cheviot, homespun or tweed, and the prevailing colors are blue or the lighter shades. For those who prefer, the single-breasted sack suit with notch collar and vertical breast pockets is considered quite as desirable in every respect.



The Single-Breasted Sack Suit Also Finds Favor.

As a protection against ordinary road dust and dirt, nothing has been found to equal the linen duster. It is light in weight, durable and readily washed when soiled. The prices range all

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The Duster Comes in Many Styles and Fabrics.

the way from $1.50 to $35, although for every practical purpose one which costs about $5 or $6 is held to be as serviceable as any. Among the newer models is that which is supplied with a convertable collar, permitting of buttoning closely about the neck, although it may be worn open at the throat if desired, in which event it presents the appearance of the ordinary turned-down collar.

When touring in the mountains, or in the early evening, almost throughout the season, it is found desirable to have a somewhat heavier coat. This applies particularly to the man who is not driving. And in this line there is a wide opportunity for selection.

The Gabardine model is new and is meeting with decided favor. It is made of an English material, closely woven and cravenetted. The color is usually tan or olive, and the price ranges from $15 to $25. The coat may be considered light in weight, although somewhat heavier than the linen duster, and might be used in place of the latter if desired.

The Oxford is made of worsted and comes with and without the convertible collar mentioned previously. This is still heavier than the Gabardine, but not quite as heavy as the tweeds, which are utilized for what may be considered an overcoat model. Both of these may be had at prices ranging from $20 to $50.

The Mackinaw has enjoyed wide popularity on both sides of the Atlantic for the past year. It is of heavy material, and it is maintained that it will not wet through even after a long drive in the rain. The prices are from $7.50 to $12.50, and the garment may be regarded as exceedingly practical in every way.

In the longer automobile coats there is what is termed the Regent Street model, with full skirt and sleeves, but with shoulders very narrow. Another imported model is with raglan shoulder, Prussian military collar and a full sweep to the skirt. These are both furnished in tweed. Then there is a garment of English army cloth, with a belted back and so-called bell bottom sweep of 86 inches. It may be stated that the full skirt is quite noticeable in all of this year's models.

While it has been stated that the Mackinaw is regarded as capable of protecting the wearer against rain under most unfavorable circumstances, there are many who will desire to place dependence upon the rubberized coat. There is a wide variety from which to make selection, the prices being almost anything from $3.50 up.

Perhaps some mention should be made of special suits applicable for touring in the South or in the hottest part of the season, and with these the list includes two-piece suits from $4 to $30, the materials being linen, flannel, mohairs, khaki, etc. These come in both the Norfolk and plain sack coat models, and, of course, only in the lighter shades.

In the matter of caps, it usually will be found that these match the suit. Sometimes it is possible to secure a cap that is made of the same material as well as shade. There are several styles, among the most popular being the Crackerjack with a band around the side, the tietop with ribbon flaps tied at the top and the golf shapes. Some drivers prefer the stiff visor cap, which is favored very largely for chauffeurs.

No attempt has been made herein to differentiate between the man who drives his own car and the man who employs a chauffeur, for the reason that many of the models mentioned are considered



Double-Breasted Ulster with Military Collar.

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Alligator Long Coat Buttoning in Front.

quite as applicable to each. Those who are interested in providing quite the proper thing for the chauffeur will find that the Norfolk suit is very popular here as well, although it is more often worn with the yoke buttoned to the neck and a military collar. It is permitted that the chauffeur may wear either long trousers or breeches and leather leggins. Among the newer importations is an English leggin, closed at the top with a spring and strap.

The man who finds it necessary to make repairs on the road requires a combination overalls and jumper, which covers him completely from head to foot. The market affords a number of designs, but perhaps one of the most practical of these is the Fast Limited, made by the Detroit Overall Company, Detroit. This is a one-piece garment of heavy pin check denim, which is closed tightly at the neck and wrists, and being of light weight makes for decided comfort. There are four large pockets, in which tools may be kept, and the whole garment is made with deep, continuous sides, relieving the shoulders from all strain and affording complete protection in any position.

There is also the chauffeur's auto-shirt, so-called, which is made of rubber. The garment slips on over the head and completely envelopes the wearer, being designed to protect from the rain, as well as from dirt, etc., when making repairs. Still another design of a similar nature, although intended only for protection from rain, is the rubber auto-coat, with double fly buttoning across the chest.



Another Alligator Model of Water Proof Material.

Among the specially designed rubber motoring coats are those bearing the Alligator trade mark, made by the Ferguson Waterproof Company, St. Louis, Mo. Two of these models are shown herewith, one of them being made to button entirely down the front and the other opening only at the throat and slipping on somewhat like the auto-shirt previously mentioned. The latter is fitted with draw strings at the wrist so as to protect the wearer fully. These come in army drab and black, and the material is soft, pliant, tough and leathery after wearing. It is stated by the maker that oil and gasoline do not hurt them and that they improve with age.

Obviously, it would be impossible in the limited space available to enumerate all the garments designed for automobile wear, and it is unnecessary to do more than make mention of gloves, goggles and other articles of this nature. It may be added, however, that the line of gloves offered includes those of colt's skin and suede, with lisle backs and cape arms.



Rubber Auto-Coat Buttoning Across the Chest.

Except where credit is given otherwise The Automobile Journal is indebted to Filene's of Boston for the description of the various models presented, and to Browning, King & Co. of New York City, with branches in Chicago, St. Louis, Milwaukee, Cleveland, Cincinnati, Buffalo, Boston, Philadelphia, Providence, Kansas City, St. Paul, Minneapolis and Omaha, for the cuts illustrating this article.

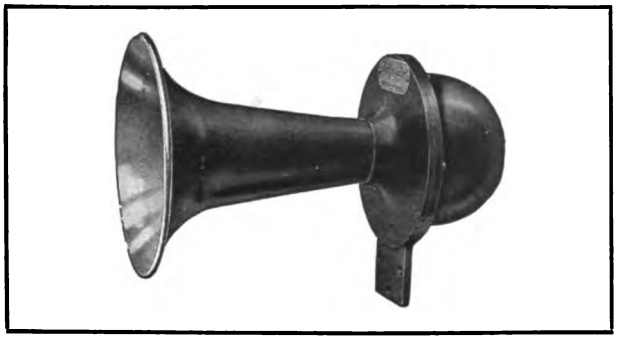
THE REACTO HORN.

Holtzer-Cabot Electric Company Marketing an Efficient Electrical Unit.

The Holtzer-Cabot Electric Company, Chicago and Boston, is marketing an electric horn

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which has a clear and penetrating, but not harsh tone. Although the Reacto signalling horn is moderately priced, it is constructed of high grade



Reacto Electric Horn of the Single-Blow Hammer Type and Having a Penetrating but Not Harsh Tone.

material and with the care for which the products of this company are noted. It is of the simple hammer blow type, a construction that secures a direct application of the power to the diaphragm and consequently instantaneous response, preventing rasping or discord in the sound produced.

One of the features of the horn is that it will respond to battery voltages 25 per cent. below normal and therefore does not require adjustment. Means are provided, however, for changing the tone. Sparking between the heavy platinum contact points is prevented by the use of a well designed condenser, which also serves to improve the tone. The casing and projector are of the best material and of the proper weight. The entire construction is sturdy.

The rear casing may be removed easily when connecting in circuit by displacing the retaining screws. The standard finish is japan, baked on, with nickel throat, but it is also finished with polished brass throat or in full nickel or brass. The Reacto horn is designed to meet the requirements of motorists desiring a strictly high grade signal, one having a pleasing tone, and capable of maximum service without attention. With the normal six-volt adjustment it will operate throughout a range from 4.5 to eight volts. The company also manufactures Reacto horns for any specified voltage from four to 125, thus adapting them for electric pleasure and commercial vehicles and factories, as well as gasoline automobiles.

EDISON IGNITION BATTERY.

New Type Adapted for Lighting as Well, and Developed from Traction Unit.

In perfecting his storage battery for electric trucks and pleasure cars, Mr. Edison incidentally produced a battery that is ideal for ignition and lighting. Before it was put on the market the traction battery was made to withstand the following tests: To be dropped on a solid block from a height of .5 or .75 inch for 2,000,000 consecutive times and have as great an electrical capacity as before the tests; to be afterwards secured to a truck, longitudinally, and the truck projected against a stone wall 500 times at a speed of 15 miles an hour at moment of impact; to be then placed laterally across the truck and the 500 impacts repeated. When a type of cell that would stand this treatment was finally produced the Edison Storage Battery Company of Orange, N. J., started business.

The ignition and lighting cells are practically the same general type as the larger used for traction. The receptacles for the active materials are held in steel grids about one-half as high as in the traction cells, but in other respects the manufacture of the two types is nearly identical. The elements are nickel hydrate and iron oxide with an alkaline electrolyte, potassium hydrate solution. There is claimed to be no chemical action, therefore, when the cell is standing idle—either charged or discharged—so that the cars using Edison storage batteries can be laid up or stored for months without affecting the battery. The container is made of nickel plated steel, like the grids, poles and all other parts, except the actual active material and insulation, and is held to be absolutely unbreakable. The cells will stand, without injury, continuous charging indefinitely,



Eighty Ampere-Hour Edison Ignition and Lighting Battery.

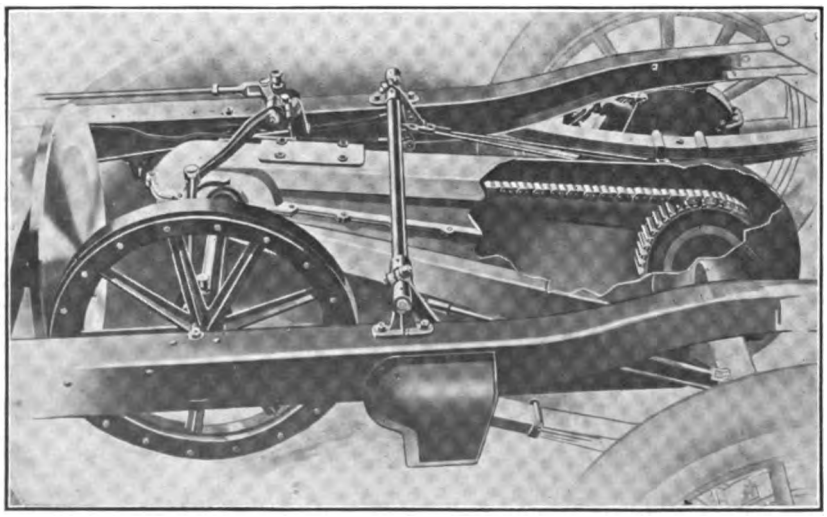
dead short circuiting, charging at several times the normal rate and practically all the errors and misuse to which "battery troubles" are traceable.

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FEATURES OF CARTERCAR TRANSMISSION.

CARTERCARS, produced by the Cartercar Company, Pontiac, Mich., comprise one chassis known as the model 5, to which is fitted five styles of bodies. These comprise the 5 A, a five-passenger touring; 5 B, a two-passenger roadster; 5 C, a three-passenger coupe, and 5 D, a five-passenger sedan. These models contain many refinements and conveniences, including electric lighting and starting, and the equipment is very complete.

The power plant is practically the same as that utilized with the model R chassis with the exception that the motor is constructed higher and more narrow, providing considerable more room under the hood, as well as giving a neater appearance. The four cylinders are of the L head type, cast in pairs, and have a bore of 4.125 inches and stroke of 4.75. The valves are ample in size, enclosed and very accessible. Throughout the material and workmanship of the motor is in keeping with the policy of the company to produce a strictly high grade engine capable of giving maximum service with a minimum of care.



Sectional View of Chain in Oil Drive Used in Cartercar Model 5—The Simplicity of the Friction Drive Is Also Shown.

Cooling is by a centrifugal, direct driven pump, which with the ample capacity radiator and large water jackets insures proper motor temperature under all conditions of service. Ignition is by a dual, low-tension magneto with an auxiliary system consisting of a battery and a single non-vibrating coil. The carburetor is an automatic float feed type. The lubrication system is held to be very efficient and economical of oil. It is of the splash type, a constant level being maintained by a positive plunger pump which provides an equal supply to each cylinder. The lower crankcase is divided into compartments, insuring a proper supply of lubricant, irrespective of grades. A sight feed glass, through which the lubricant is forced, enables the driver to regulate the supply to suit conditions.

The transmission is the well known Cartercar friction which has proven its economy and efficiency under the severest conditions of service. The practicability of the principle has long been established by sound engineering practise, and tests have demonstrated its ability to transmit the maximum power of motor with a minimum loss of energy.

The simplicity of the transmission is shown in an accompanying illustration, and it will be noted that there are but two unit parts, a friction disc and a fibre faced wheel. The former is composed of a heavy ribbed casting or plate, and a facing plate of a special metal alloy. The disc is secured directly to the end of the drive shaft and is practically integral with it. The driven, fibre faced wheel contacts with the plate wheel, and the combination of the materials utilized affords the utmost cohesion as the two roll together.

The moving of the disc across the face of the driving member provides an indefinite number of speeds, forward or reverse, permitting anything from a pace slower than one can walk to the maximum. Control is by a pedal and lever, the former breaking the contact, while the lever is utilized in moving the driven disc to any desired position. Changes are made without noise and the maker points out that the transmission is particularly adapted to traffic where stopping and changing of speeds are necessary. Another advantage afforded by the transmission is that the car may be started easily and slowly, thereby effecting tire economy.

Final drive is by silent chain, enclosed and operating in a bath of oil. The chain has triangular shaped links which mesh perfectly in the teeth of the sprockets which are two inches wide. The links are treated by a special hardening process, are very durable, and it is stated that the

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chain is free from stretching or wearing loose on the sprockets. Both driving and driven discs are readily accessible, as is the silent chain and sprockets. It is pointed out that these components make for maximum service.

The frame is of pressed steel with channel construction of great strength and rigidity, of the single drop pattern and a patented rear cross member suspension. The springs are semi-elliptic in front and three-quarter scroll elliptic in rear. The wheelbase is 116 inches. The front axle is a drop forging, of the I beam section type, and the yokes, tierod ends and steering knuckles are drop forged, insuring a large factor of safety. The rear axle is of the three-quarter floating type with removable shafts. The differential is a bevel gear, and the gear ratio or drive is 3.6:1. The wheels are artillery, 10 spokes in front and 12 in the rear and are equipped with demountable rims and shod with 36 by four-inch tires. One extra rim is standard equipment.

The brakes of the Cartercar are ample in size and very efficient. The service members are of the external contracting type on the rear wheels and are actuated by pedal. The emergency set is internal expanding, operated by the conventional lever. The steering gear is of the worm and nut, irreversible type, and provision is made for the elimination of play or wear. The steering column is set at a comfortable angle and is surmounted by an 18-inch walnut wheel. The spark and throttle levers are located on a sector on the wheel, and throughout the steering mechanism is noticeable for its sturdy construction.

The various types of bodies fitted to the Cartercar chassis are very neat and well designed, having straight lines and fenders that harmonize with the designs. The seats are roomy and there is ample room both in the tonneau and front. The springs are of the double deck type and the seats and backs are upholstered with a high grade leather and include the best curled hair. The finish is in keeping with the other high grade construction, there being 25 processes, including 15 coats of varnish and paint. The colors include raven blue, French gray and black—quiet colors, yet having enough variety to please the most particular. Nickel plate and black enamel trimmings are employed throughout.

The equipment is very complete and includes in addition to electric lighting and motor starting, a mohair top, curtains, envelope, ventilating windshield, speedometer, horn, robe and foot rails, tire irons, trunk rack, rebound straps, tire pump, tire repair kit and a full set of tools.

FOUR VS. SIX-CYLINDER CARS.

President of Mercer Automobile Company Discusses Present Situation.

It will be remembered that about a year ago it was freely predicted that the season of 1913 was to be a six-cylinder year. The machines on view at the various shows last winter failed to bear out this assertion entirely, although the number of new sixes was noticeably large. The following discussion of the subject is from the pen of William T. White, president and general manager of the Mercer Automobile Company, Trenton, N. J., maker of Mercer cars:

It is our confident belief that the popularity of six-cylinder cars is gradually on the wane, and that before many months four-cylinder cars will again be in greater favor than they ever were before. This belief is borne out by the fact that buyers of the current season are extremely painstaking in determining the weight, fuel consumption, tire mileage and general upkeep expense of the car they contemplate buying.

This condition is quite largely the result of the rapid rise in the price of gasoline. The average motorist can very easily see the folly of using a six-cylinder car and getting only about seven or eight miles to the gallon of gasoline, when he can secure a high grade medium weight four-cylinder car that will average 12 to 14 miles to a gallon of fuel. Coupled with the excessive use of gasoline in a six-cylinder car he has tire and general upkeep expense that are almost out of reason, owing to the extra weight.

It has always been claimed for the six-cylinder car that it is superior to the four because of its efficiency and flexibility. This may be true so far as the comparison with some four-cylinder cars is concerned, but the Mercer Automobile Company has been very successful in its manufacture of four-cylinder cars, and anyone who will take the trouble to investigate will find that it would be very difficult indeed to find a six-cylinder motor capable of showing greater efficiency, flexibility, silence, or smoother operation than the Mercer motor. As for speed, it is a well known fact that no speed records of any consequence have ever been made with anything but four-cylinder cars.

Europe has always been a fairly good barometer of the trend of automobile conditions, and it has been observed that already the French and English makers are reverting to fours after several years of very strenuous six-cylinder activity. Over on the other side the four-cylinder motor is unquestionably now recognized as the standard car, and the six is slowly but surely being rejected.

It is true there will always be six-cylinder advocates, and plenty of buyers who will have nothing but sixes, but the present outlook indicates most clearly that four-cylinder cars are again coming into popular favor.

It will be noticed that the trend of design in both Europe and the United States is toward the motor that has a bore not larger than 4.5 inches and is capable of very high speed, some attaining 3000 revolutions a minute, and developing much greater horsepower than the old motors of larger bore or the newer motors having six cylinders.

The G. H. A. Goodwin Company, Los Angeles, Cal., reports having leased for J. Hartley Taylor to the Homer Motors Company, two acres of land on the San Fernando road, just beyond Elysian park, in the new industrial district, on the lines of the Salt Lake & Southern Pacific railroad. This company proposes to engage in the manufacture of automobiles and traction engines.

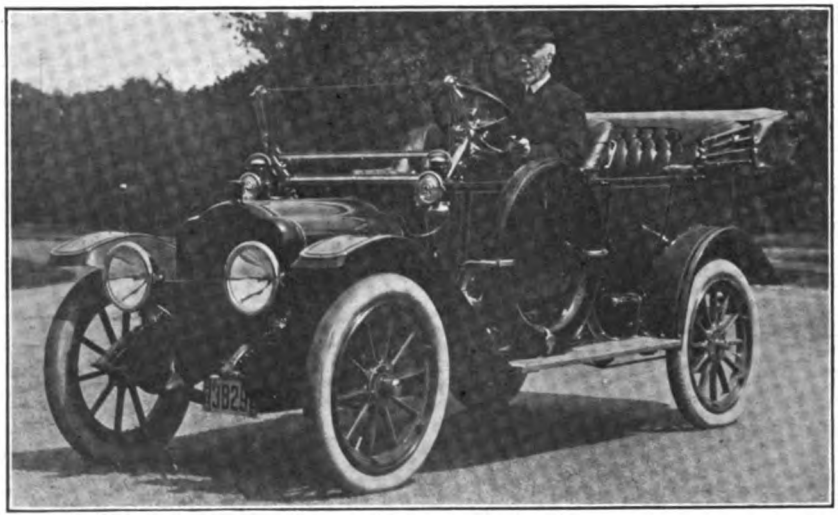
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KEETON IN SOUTH AMERICA.

Detroit Concern Establishes Connection in Argentine Republic.

In an effort to secure its full share of the automobile business in South America, the Keeton Motor Company, Detroit, maker of Keeton cars, has closed an agency proposition with William H. Knox & Co., of the River Platte Agency, Rivadavia 1385, Buenos Aires, Argentine Republic. This concern maintains an office in the White Hall building, New York City, from which point three fully equipped 1914 models have been shipped to Argentine.

The Knox company is a leading concern in South America and has been doing a splendid business in automobiles in that country. P. F. Rockett of Buenos Aires, who is regarded as an expert on motor car sales in that country, and who is a firm believer in the possibilities for the American manufacturer providing reputable dealers are appointed to handle the product in South America, speaks very highly of this concern.



A. B. Hambleton, Cleveland, O., 84 Years of Age, at Wheel of White Car.

NEW KISSELKAR LINE.

Will Include Three Chassis, Two Sixes and a Four-Cylinder.

The new series of KisselKar pleasure cars will consist of three chassis models, a four-cylinder 40 horsepower, a 6-48 and a 6-60. This eliminates from the line the "Thirty" and "Fifty," both four-cylinder types, heretofore built by the Kissel Motor Car Company of Hartford, Wis. Only details of the 6-48 are announced, a description of the new design appearing elsewhere in this issue. The new car is manufactured at the auxiliary plant of the company at Milwaukee, Wis. The other designs will be produced at the main factory in Hartford.

AN OCTOGENARIAN TOURIST.

A. B. Hambleton of Cleveland to Visit New York City and Cape Cod.

Not many men of 80 years have the inclination to drive motor cars, to say nothing of planning and accomplishing long distance tours, but A. B. Hambleton, who lives at Shaker Heights, Cleveland, O., is 84 years of age and drives a new 30 horsepower White car, made by the White company of that city. In fact, Mr. Hambleton is a long distance tourist of some note, and he intends to pilot this machine on a tour to New York City and Cape Cod this month.

Mr. Hambleton has been driving motor cars for eight years and in that period he has made a number of journeys that would be notable even if made by a Glidden tour enthusiast. A little run to New York and back is a mere incident in his motoring career, while he regards a trip to Buffalo and return with no more concern than the routine of driving down town. He takes care of his own car for the amusement he derives therefrom.

On this present tour there will be no chauffeur in the car. In his eight years' experience Mr. Hambleton has suffered but one accident, which occurred while cranking, resulting in a broken wrist. In purchasing his latest machine he selected a White because he was favorably impressed with the simplicity and efficiency of its electrical system of starting and lighting. Although he is now retired, he has had wide experience along mechanical lines, having been instrumental in building up the Globe Iron Works, now the American Shipbuilding Company, which makes engines among other things.

Bert Dingley, in a National racing car, made by the National Motor Vehicle Company, Indianapolis, Ind., recently created a new record between Modesto and Stockton, Cal., covering the 30 miles in 29 minutes.

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MULFORD WINS AT COLUMBUS.

Takes 200-Mile Event on Dirt Track with Mason, Creating New Record.

According to unofficial reports from Columbus, O., this year's 200-mile dirt track race, which took place July 4, was won by Ralph Mulford in a Mason car, his time for the distance being 3:21:48. Last year's event was won by Spencer E. Wishart in a Mercer, creating a new record for the distance of 3:28:04.5. It would appear that Mulford secured a new. mark. Harry Endicott in a Nyberg was second in 3:45:34.55; Ernest Reeder in a Mercer third in 3:47:53.65, and Ralph DePalma in another Mercer fourth in 4:00:42.61.

There were 16 entrants, the others including E. V. Rickenbacher, Mason; John Jenkins, Schacht; William Fritsch, Cino; Lewis Meneghetti, Fiat; John Raimey, Ohio; Harry Matthews, Ohio; N. E. Walker, Garford; F. L. Adams, Smada; Joseph Horan, Lozier, and Harry Knight in a front-wheel driven machine. The contest was marred by the death of Knight, who had been out of the race because of necessary repairs for 39 minutes and was making every effort to regain a place in the field when his car overturned on the 110th lap. McCallis, the mechanician, also was fatally injured and died later in the day. Knight began his driving career when 13 years of age, being the first to take a car cross country from his home in Indianapolis to Washington, D. C., and had been prominent in all the Glidden tours, as well as many racing events.

VERBECK IN CALIFORNIA.

Assisted by Willeford He Takes the Panama-Pacific Race with Fiat Car.

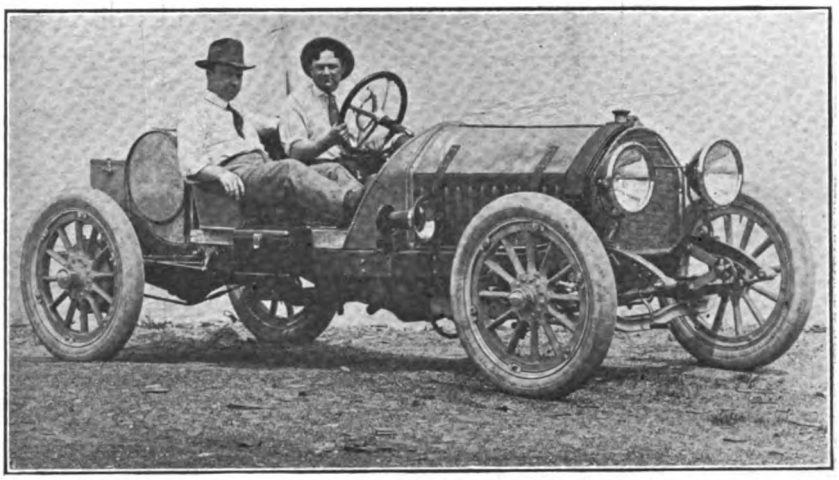
Forty-six cars were entered for the Panama-Pacific road race from Los Angeles to Sacramento, Cal., July 4, the distance being 444 miles. Frank Verbeck and C. C. Willeford, driving a Fiat car, took the event in 11:01:16. E. S. Waterman and Clifford Perry in a Buick were second in 11:21:25, while Barney Oldfield at the wheel of a Mercer was third in 11:22:53.

Verbeck's Fiat was entered by E. E. Hewlitt, and as true of all racing cars owned by Mr. Hewlitt, was fitted with Miller tires, made by the Miller Rubber Company, Akron, O. A telegram has been received by the Miller company assuring it that the performance of its tires were the feature of the event.

AROUND LAKE MICHIGAN.

Fourteen Entries for Chicago Event Still Two Months Distant.

Although the annual tour around Lake Michigan, held by the Chicago Motor Club, is not scheduled until Sept. 8, 14 entries already have been received, as follows: Z. Elkin, Rambler; P. E. Ennis, Marmon; R. Wolfe, Henderson; T. Hay, Staver; H. Staver, Staver; B. Sykes, Paige; C. Anderson, Stutz; A. A. Landry, Marion; M. J. Kavanaugh, Midland; M. C. Meigs, Case; A. M. Robbins, Abbott-Detroit; W. E. Stainaker, Premier; F. C. Lewin, Chadwick, and Foraker Motor Truck Company, Bessemer truck. The tentative route follows:



O. W. Kern at the Wheel of the KisselKar Which He Drove in Los Angeles-Sacramento Road Race, July 4.

Chicago to	Noon Control	Miles
Green Bay, Wis.	Meeker, Wis.	225.0
Marquette, Mich.	Iron Mt., Wis.	221.9
Newberry, Mich.	Escanaba, Mich.	197.3
Petoskey, Mich.	Mackinaw, Mich.	103.3
Muskegon, Mich.	Manistee, Mich.	230.1
Chicago, Ill.	Dowagiac, Mich.	262.4
Total miles		1240.0

Louis Disbrow, driving his Simplex "Zip," created a new world's dirt track record for 12 miles at the Fourth of July meet in Sioux City, Ia., covering the distance in 9:20.8. He also won the 48-mile event, his time being 40:11.

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GASOLINE ECONOMY CONTEST.

One of the Interesting Features of the Annual Run in Springfield, Mass.

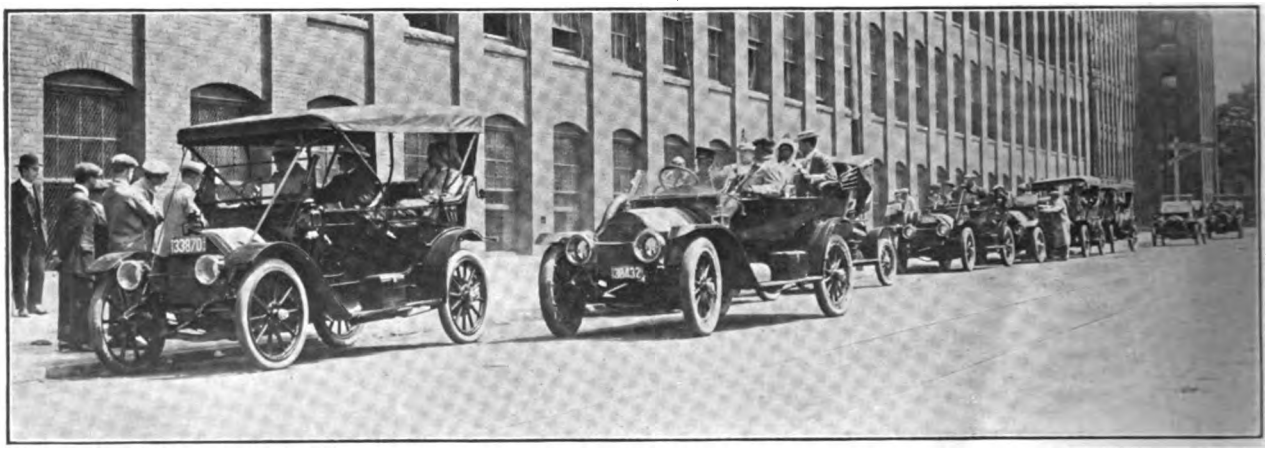
The annual run and clambake of the Automobile Club of Springfield, Mass., last month, was of more than local interest because of the added feature, in the nature of a fuel economy test. The run itself was over a course covering some 30 miles, with secret controls, the winner of the Fiske cup being the driver who came the nearest to a predetermined schedule. The fortunate driver was Henry Cave, who took the award last year.

The object of the fuel test was not so much to determine an accurate rating of the machines entered as to afford an interesting comparison for the use of the members themselves, as to the efficiency of their cars. The method adopted for measuring the gasoline was by a pump cylinder such as is utilized on a standard portable measuring tank, together with a suitable measuring scale. All contestants were instructed to bring their cars to the contest with tanks practically full, the slight amount used up in arriving at the starting point being filled when the car was weighed in. A small metal bob was inserted in each tank and the tank filled up even with the filling hole, after which the bob was removed, giving sufficient displacement so that the fuel would not slop over.

At the end of the run the tanks were again filled and the amount put in carefully measured, affording the basis of computing the gasoline economy of the car. In order to give the fairest possible result, the figures were computed on the basis of 1000 pounds of actual car weight with passengers, rather than on merely the miles a gallon which were made by each individual machine.

The showing made by the local Knox machines was particularly striking, being such as to indicate the relative economy of the larger type of cars. A Knox six-cylinder touring car carrying three people made the highest showing of any of the water-cooled cars, while the eight Knox cars averaged over 16 miles to the gallon, or about 71 miles to the gallon on the 1000-pound basis. The score follows:

Car and Driver	Weight	Pass.	Mileage
Franklin, W. F. Anderson	3750	4	108.6
Knox, H. G. Farr	5135	3	106.0
Knox, F. E. Muzzy	4655	5	85.8
Knox, C. E. Alstrom	4665	5	83.6
Oldsmobile, F. E. Ward	4025	4	71.6
Buick, L. G. Erickson	3435	2	70.4
Cole, Dr. Brigham	3500	5	68.9
Knox, Lawrence	3450	3	67.5
Everitt, James Anderson	4045	4	65.0
Overland, J. F. Lawson	2920	2	63.0
Knox, F. J. Hillman	4800	5	62.3
Knox, E. A. McClintock	4455	4	60.8
Overland, H. Van Delinda	3090	4	57.0



Cars Taking Part in the Annual Run of the Automobile Club of Springfield in Front of the Knox Automobile Company's Factory.

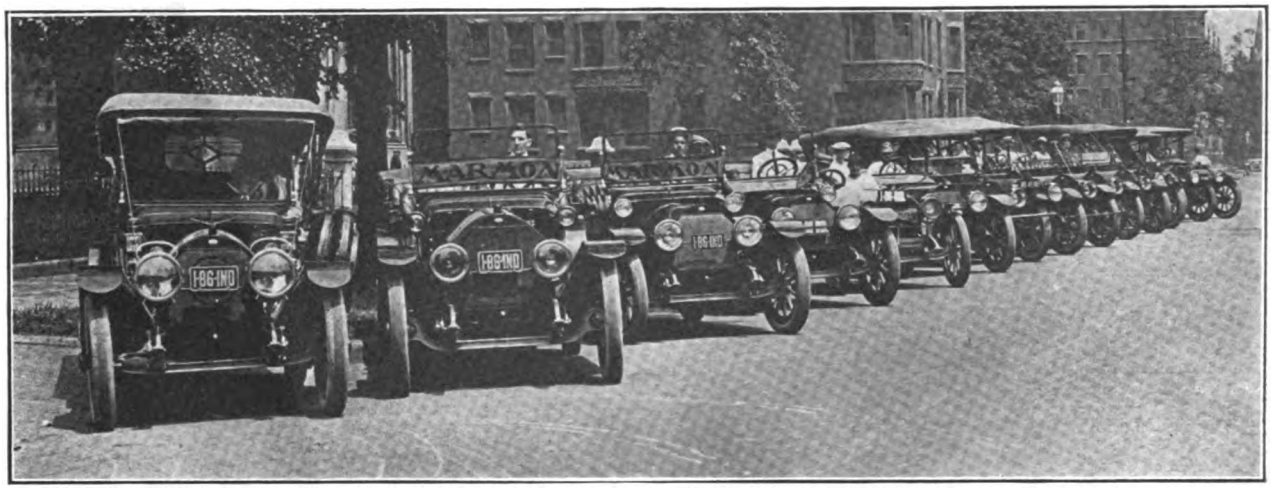
Knox, E. F. Stearns	3535	2	56.2
Abbott-Detroit, A. J. Goyette	3235	3	55.5
Buick, P. P. Noel	3725	3	54.7
Knox, A. E. Lerche	4075	2	54.7
Metz, M. C. Barrett	1605	2	53.1
Thomas, P. I. Lombard	3465	3	52.7
Stevens-Duryea, F. W. S. King	2710	2	52.0
Ford, F. S. Carr	1980	2	51.6
Overland, G. F. Reed	3240	4	51.0
Franklin, N. Gebo	4120	2	50.7
Franklin, F. G. Jager	2320	2	50.7
Buick, Dr. Lukes	3560	3	49.7
Cadillac, F. W. Gumble	3795	4	49.4
Reo, T. B. Gilbert	3080	3	47.9
Little, W. L. Bunker	3410	4	46.5
Oakland, A. Van der Wolk	3410	3	44.2
Ford, F. P. Strout	1810	2	43.7
Hudson, H. L. Sprague	3275	4	43.6
Stevens-Duryea, F. F. Storms	3770	4	43.5
Overland, H. S. Alstead	2795	2	43.4
Atlas, A. J. Skinner	2515	2	43.3
Knox, H. E. Corey	3900	4	42.7
Cadillac, H. E. Marsh	3315	2	41.3
Stoddard-Dayton, L. J. Spear	4335	3	38.3
Knox, D. I. Allen	3600	1	37.3
Cadillac, W. E. Wright	2220	2	29.0
Hudson, Clarke Hill	2490	2	27.1
Ford, F. I. Bartlett	1995	2	26.7

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INDIANA MAKERS OFF TO THE COAST.

Twenty-Two Cars Leave Indianapolis for the Long Drive Over the Proposed Lincoln Highway—Contest Assumes Proportions of National Importance.

WHEN the Indiana Automobile Manufacturers' Association adopted the suggestion of Carl J. Fisher of Indianapolis that the Four-States tours of former years be extended in 1913 to embrace a transcontinental trip from Indianapolis to the Pacific Coast, it could by no means have been foreseen that this was to be one of the most important undertakings in the motor car industry. The tourists left Indianapolis July 1 and are scheduled to be in San Francisco July 27, and Los Angeles Aug. 2. Obviously, the entire story of the tour cannot be written until after the latter date, and in the strictest sense of the word it undoubtedly will be many years before the complete history of the whole enterprise shall have been recorded in all its details.



Competing Cars in the Indiana Automobile Manufacturers' Association Transcontinental Tour Lined up for the Start in Indianapolis.

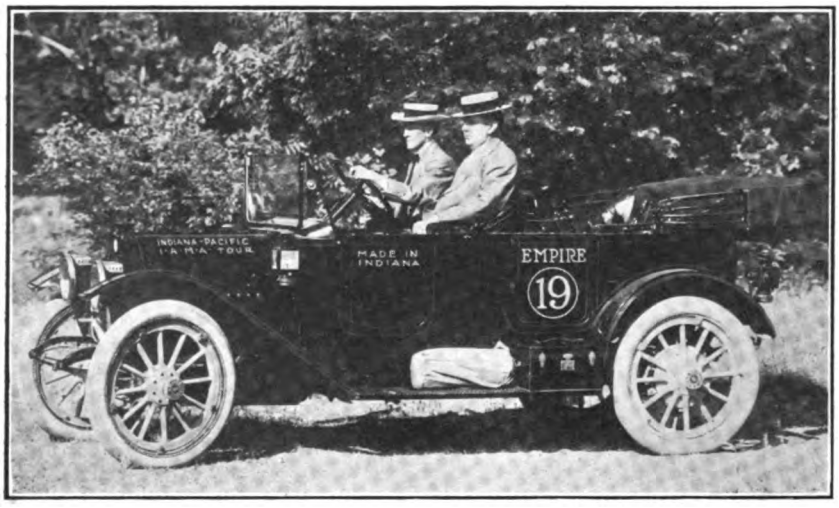
It was shortly after the completion of the 1912 tour that Mr. Fisher made his suggestion, which at that time was considered somewhat premature. While it is true that a large number of parties had made transcontinental trips from ocean to ocean, notably that of the Premier tourists in 1911, the added features of a run of this character participated in by manufacturers of competing machines seemed to involve problems by no means easy of solution.

In the meantime, Mr. Fisher began to interest motorists and others in the construction of a permanent national highway, to be built by popular subscription and to be known as the Coast-to-Coast rock highway. It was estimated that the cost of this project would reach $10,000,000, and an organization was formed to secure the necessary funds. So successful was this enterprise that last month articles of incorporation were issued by the secretary of state at Lansing, Mich., to the Lincoln Highway Association, and the name of the road was changed to the Lincoln highway, in memory of the martyred President.

As an indication of the national character of this body, it may be noted that the association has established permanent headquarters in the Dime Bank building, Detroit, and has elected the following officers: President, Henry B. Joy, Detroit; vice presidents, Carl G. Fisher, Indianapolis, and A. R. Pardington, New York City; treasurer, Emory W. Clark, Detroit; secretary, A. R. Pardington. Including these officers, the executive committee and directors comprise Paul H. Deming, Cleveland; Russell A. Alger, Detroit; Roy D. Chapin, Detroit; A. Y. Gowen, Cleveland, and F. A. Seiberling, Akron, O. It ought also to be said that $4,200,000 of the necessary $10,000,000 has been subscribed.

As a further indication of the national importance of the enterprise, it is announced that A. L. Westgard, particularly well known as a pathfinder for the American Automobile Association, is participating in the tour, unofficially, as a representative of the National Highways Association,

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The Empire 19, the Smallest Car in the Transcontinental Tour.

which body is interested in a system of national highways covering the entire country. It is understood that Mr. Westgard will represent this association exclusively in the future.

Mr. Fisher, who is prominently identified with the Indianapolis motor speedway, as well as with a number of Indianapolis plants in the industry, was active in the organization of the Indiana Automobile Manufacturers' Association. These tours were inaugurated by this association for the purpose of directing attention to the products of the industry in that state, and they have been decidedly successful.

This year's tour was organized for that purpose, and the purpose will by no means be entirely lost to view, in spite of the other factors which have entered since its inception. But all efforts will be made throughout the journey to interest the general public in the Lincoln highway, these including numerous banquets and talks at various points along the way, with full opportunity to subscribe to the fund and become members of the Lincoln Highway Association.

That the members of the Indiana Automobile Manufacturers' Association are willing to submerge their interests, at least partially, in order to aid in this larger undertaking, is but another example of the broad-mindedness of the men comprising the motor car industry. And it will in no way reflect upon the success of the tour from a publicity standpoint. The work of the Indiana made cars will be watched with increased interest, because of the enlarged scope of the contest.

There were 22 cars in the party when the start was made from Indianapolis July 1, the makers and drivers being as follows: American 1 and 2, American Motors Company, Indianapolis, Ind., D. S. Menasco and Charles Boyden; Henderson 3 and 4, Henderson Motor Car Company, Indianapolis, R. P. Henderson and Ray Harroun; Stutz 5 and 6, Ideal Motor Car Company, Indianapolis, H. C. Stutz; Marion 7 and 8, Marion Motor Car Company, Indianapolis, W. McK. White and E. G. Gager; Premier 9 and 10, Premier Motor Manufacturing Company, Indianapolis, John B. Orman and Ray McNamara; Haynes 12 and 13, Haynes Automobile Company, Kokomo, R. C. Crawford and Elwood Haynes; Pathfinder 14, Motor Car Manufacturing Company, Indianapolis, Bruce Daniels; McFarlan, 16, McFarlan Motor Car Company, Connersville, A. H. McFarlan; Apperson 17 and 18, Apperson Bros. Automobile Company, Kokomo, Elmer Apperson and Edgar Apperson; Empire 19, Empire Automobile Company, Indianapolis, Harlow Hyde; Pilot 20 and 21, Pilot Motor Car Company, Richmond, G. Fred Smith and Russell Gear; Marmon 22, Nordyke & Marmon Company, Indianapolis, C. G. Fisher. This does not include the G & J tire truck, driven by J. M. Ward. The membership of the party totalled about 70.

The cars were parked on New York street at 9:30 in the morning. An official luncheon, attended by the governor, mayor of Indianapolis.



Ray Harroun at the Wheel of the Henderson, Utilizing Kerosene.

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29th Street, Norwood, Birmingham, Ala. Road built with "TARVIA X".

The Modern Road Binder

PLAIN macadam roads are adapted to slow horse-drawn traffic. Modern traffic, with its high speed, disintegrates and destroys the ordinary macadam. Its mineral binder cannot resist the thrusts of a driving wheel.

Roads adequate for modern traffic must be bonded with something adhesive, ductile and resisting. Such a binder is Tarvia, a specially prepared coal tar compound which retains its good qualities through all weathers and seasons and holds the stone firmly in place resisting all classes of modern traffic.

Tarvia is made in three grades:—"Tarvia X" is a very dense material to use as a binder in the large voids of new construction; "Tarvia A" is of thinner consistency for surfacing operations; "Tarvia B" is used cold, can be applied from a sprinkling cart and is sufficiently limpid to percolate into the pores of an old and well compacted road.

"Tarvia X" is required where new construction is called for. "Tarvia A" and "Tarvia B" are used in improving and protecting roads already in use.

A tarviated road or pavement is practically dustless and mudless and the maintenance cost is, in most cases, so reduced as to more than save the cost of Tarvia treatment.

Booklets on request.

BARRETT MANUFACTURING COMPANY

New York Chicago Philadelphia Boston St. Louis Kansas City Cleveland
Cincinnati Minneapolis Pittsburgh Seattle Corey, Ala.
THE PATERSON MFG. CO., Ltd.:—Montreal, Toronto, Winnipeg, Vancouver, St. John, Halifax, Sydney, N. S.

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officials of the Indiana Automobile Manufacturers' Association, the Hoosier Motor Club, Chamber of Commerce and other civic bodies, was held at noon. The parade began at 2 in the afternoon, a moving picture machine in the tonneau of a Marmon car recording the event for reproduction throughout the country.

The escort, composed of a large number of motorists in Indianapolis and vicinity, lined both sides of North Meridian street and proceeded to Eagle Creek bridge, where they again formed in two lines, through which the contestants passed, after the official pilot car had been presented with a large American flag by Lieut.-Gov. O'Neil. The contesting machines left at one minute intervals, the start being indicated by the firing of minute guns.

Each car bears its number in a prominent place so that it may be identified easily and, in addition to the passengers, a tent, blankets, lunch hampers, folding water buckets, block and tackle with 150 feet of rope, spade, folding axe, tire chains, jack, mudhooks and lantern. W. McK. White is tour chairman and C. G. Fisher official pilot. The pilot car acts as pacemaker each day and no machine is permitted to pass it. The detailed itinerary follows:

	Night Stop	Miles
July 1,	Terre Haute, Ind.	71.7
July 2,	Springfield, Ill.	150.0
July 3,	St. Louis, Mo.	117.7
July 4,	Columbia, Mo.	136.0
July 5,	Kansas City, Mo.	158.9
July 6,	in Kansas City.	
July 7,	Fort Riley, Kan.	156.6
July 8,	Ellis, Kan.	177.8
July 9,	Burlington, Col.	169.8
July 10,	Colorado Springs, Col.	165.9
July 11,	Denver, Col.	69.2
July 12,	in Denver.	
July 13,	Hot Sulphur Springs, Col.	89.8
July 14,	Glenwood Springs, Col.	104.2
July 15,	Grand Junction, Col.	104.5
July 16,	Green River, Utah.	154.0
July 17,	Salt Lake City, Utah.	203.2
July 18,	in Salt Lake City.	
July 19,	detour to Ogden, Utah.	74.4
July 20,	Kearney's Ranch, Nev.	146.8
July 21,	Ely, Nev.	124.3
July 22,	Austin, Nev.	147.3
July 23,	Reno, Nev.	183.5
July 24,	Lake Tahoe, Cal.	72.0
July 25,	Sacramento, Cal.	143.0
July 26,	Oakland, Cal.	130.7
July 27,	San Francisco, Cal.	6.0
July 28-29,	in San Francisco.	
July 30,	Del Monte, Cal.	150.0
July 31,	San Luis Obispo, Cal.	149.9
Aug. 1,	Santa Barbara, Cal.	119.6
Aug. 2,	Los Angeles, Cal.	105.8

Particular interest attaches to at least four of the cars in the event. Two of these are the Haynes machines, one of which is being driven by Elwood Haynes, who began experimenting with automobiles in 1891 or 1892. It was 20 years ago, in 1893, that the first Haynes car was produced, and the fact was recalled by Mr. Haynes as he stepped into his machine at the start.

"This is quite different from 1893," he said. "When I got into my first car I was supremely happy if, after some horses had pulled it along for a ways until the engine started, I could travel a few miles at a speed of 6.5 miles an hour. Times have changed, and now we start on a 3500-mile trip, over all sorts of roads and the desert as though we were entering a Pullman car. I expect to see still greater developments in the future, and within the next 10 years I hope to be able to step into my car and travel from coast to coast over an ideal highway."

The other two are the Henderson cars, at least one of which is equipped with the new Harroun kerosene carburetor. This machine is being driven by Ray Harroun, who already has made a name for himself in racing with Marmon machines, and who invented the carburetor in question. He proposes to cover the entire distance on kerosene and establish a new fuel economy record.

The smallest car in the event is the Empire, which expects to compete successfully with such well known long distance veterans as the Marmon, Stutz, Pathfinder, Premier, Apperson and McFarlan. The Pilot and Marion entrants also will bear watching, as soon as the returns begin to come in. A special telegram from Kansas City reports that the tourists arrived at that point on scheduled time without trouble, but the most difficult portion of the tour will be encountered after leaving Denver.

STUTZ WINS TWICE AT TACOMA.

Robert Burman in Keeton Finishes in Second Place in 200-Mile Event.

Earl Cooper, driving a Stutz car, won the 200-mile road race for the Potlach trophy at Tacoma, Wash., July 5, covering the distance in 2:49:32. Robert Burman in a Keeton was second, finishing the last 72 miles of the course with only three cylinders working. Latta in an Inter-State was third. The exact distance covered by the contestants was 200.81 miles.

Cooper and the Stutz also won the 250-mile free-for-all, July 6, covering the distance in 3:32:08.2. Hugh Hughes in a Tulsa was second and Harry Endicott in a Nyberg, third.

The performance of the Keeton car in the 200-mile event was particularly worthy of note, the finish of the race being made after the machine had been ditched in a brush with Tetzlaff. It averaged 60 miles an hour on three cylinders.

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IN THE REALM OF THE MOTORCYCLISTS.

Manufacturers Lease Chicago Coliseum for November—Show Trophies for National Meet in Denver—Results of Independence Day Contests.

FOLLOWING an emergency meeting of the show committee of Motorcycle Manufacturers' Association at Chicago, the lease for the Coliseum in that city, for week of Nov. 3-8, to accommodate the Chicago national motorcycle show, has already been formally signed. The manager of the show is to be President A. B. Coffman of the association, and he has asked prospective exhibitors to make immediate application for space reservations, addressing him at 6 Glenwood court, Toledo, O. As was the case last year all privileges will be extended to the manufacturers of bicycles and accessories, as well as to motorcycle producers. The show committee consists of President Coffman, Arthur Davidson and R. W. Henderson.

Manufacturers Donate Trophy.

The Motorcycle Manufacturers' Association has presented to the Federation of American Motorcyclists a silver cup valued at $250, to be competed for under rules as laid down by the federation. The award will be known as the M. M. A. trophy cup, for private owners, to be competed for at each annual F. A. M. race meet. In case the event is postponed by rain or other causes the trophy shall be competed for before the first day of January following.

The time and place for such competition is to be decided by the chairman of the F. A. M. competition committee. Owners competing for the trophy must ride stock machines with full factory equipment, except that drop handle bars may be used and several other minor changes permitted. The trophy must be won three times in succession by the same rider to retain permanent ownership. The temporary holder must file a surety bond of $250 with the chairman of the competition committee to guarantee its safe keeping and prompt return. The first competition for the cup will be held during the national meet at Denver, Col., July 23-26.

Rules for Bosch Award.

The Bosch Magneto Company, New York City, maker of Bosch magnetos, has for the third consecutive year donated a magnificent silver trophy cup, known as the Bosch trophy, to be presented to the motorcycle rider who accomplishes the most consistent performance in the national amateur championship races of the United States during the national convention of the Federation of American Motorcyclists at Denver, Col., July 23-26.

The presenting of this trophy each year has brought out a new title in the F. A. M. rules, so that the winner this year will be officially recognized throughout the country as the amateur champion of America and will be in a position to defend his title against all comers, if necessary. The awarding of the Bosch trophy is to be determined by a point system, as follows:

Winner of the one-mile race to receive four points, second three, third two; two-mile winner six, second four, third two; five-mile winner seven, second five, third three; 10-mile winner eight, second six, third four; 25-mile winner 12, second seven, third five; 50-mile winner 15, second 10, third eight.



Bosch Trophy to Be Awarded at Denver Meet.

It will be necessary for the winner of the trophy and title to compete in all events, the point system thus allowing the rider who may receive only third place in the one-mile race to have excellent chances to win the trophy by bettering his position in the succeeding races. It is expected that the interest in the coming national meet will be sustained throughout the three days, as the winner of the trophy will not be known until the last championship race has been run and all of the various marks for each event have been totalled for each man.

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New One-Hour Record.

The one-hour motorcycle record was exceeded at Brighton Beach Stadium motordrome, New York City, when Michael Costello of New Rochelle, N. Y., led a field of seven at the finish with 74 miles and one lap to his credit. The former record of 62 miles was held by William Ray, made last year over the same track. John Cox of New York City was second with 73 miles and two laps, and Hartley Thomas third with 70 miles and two laps.

Worcester to the White Mountains.

The Worcester Motorcycle Club, Worcester, Mass., recently held a 24-hour endurance run, which covered 430 miles, beginning at Worcester and including Arlington and Lowell, Mass., Concord, the Weirs, Conway and Bretton Woods, N. H., returning by way of Plymouth, N. H. Of 40 machines which started 21 finished. Of these 11 were Indians, three Excelsiors, five Harley-Davidsons and one Thor. The official figures show the run was won by Worcester second Indian team, comprising C. Nelson Robinson, F. L. Kidder, Gustaf Johnson and Paul Brown. This team scored 3806 points, while the Excelsior team, consisting of Edward L. Plimpton, W. S. Bunker, Ralph A. Corey and John Livingston, was second, with 2916 points. The Harley-Davidson team took third place with a total of 2811, while the Indian No. 1 team scored an even 2000 points.



Members of the Providence Motorcycle Club, Providence, R. I., Enjoying a Clambake on a Recent Outing.

Following are those who finished with perfect scores: F. D. Johnson, Indian; Roy Dow, Indian; W. S. Bunker, Excelsior; Robert Corey, Excelsior; C. N. Robinson, Indian; F. L. Kidder, Indian; G. Johnson, Indian; A. H. Batchelder, Indian; Edward Coderre, Indian; A. L. Hawkes, Indian; E. Hills, Thor; B. C. Thayer, Harley-Davidson; William Tannebring, Harley-Davidson; C. Loftes, Harley-Davidson. Other scores were: A. Zimmerman, Indian, 988; A. LaRose, Indian, 980; W. H. Burnett, Harley-Davidson, 980; J. Livingston, Excelsior, 916; E. W. Padelford, Harley-Davidson, 911; P. Brown, Indian, 806.

Elgin National Road Race.

Over the Elgin course at Elgin, Ill., the motorcycle classic of the year was held July 4, under the direction of the Chicago Motorcycle Club, the 250-mile race being witnessed by a record breaking crowd. Charles Balke, riding an Indian machine, was the winner, with an average speed of 55.4 miles an hour. Erwin G. Baker finished a close second, with Charles Gustafson, third. These two riders also were mounted on Indian machines.

The supremacy of the board track riders seems to have been demonstrated in this event, as all three winners have national reputations as motordrome racers. Speculation was rife previous to the race whether the board track men could successfully compete with the experienced road men. The riders were started at intervals of 30 seconds and the first prize was $500 in gold coin; second, $250, and third, $125. Following are the teams entered by the various factories:

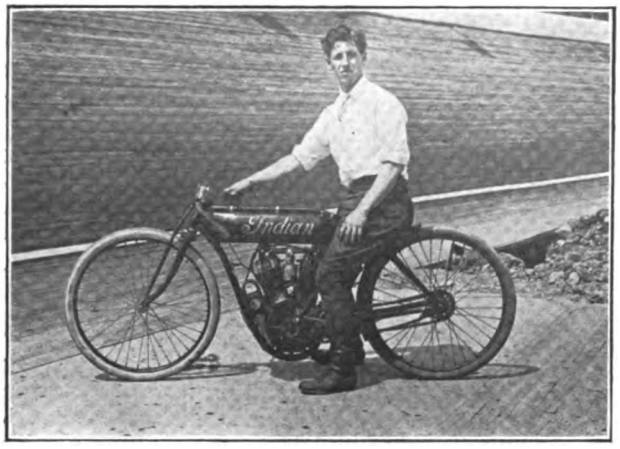
Indian, Charles Balke, Ray Seymour, Charles Gustafson, E. G. Baker; Flying Merkel, S. Taylor, Roy Bowser, Ray Snyder, Herman Sill; Yale, Ivan Jacobs, Shorty Matthews, Raymond Ray; Excelsior, Leslie Allen, Daniel Armstrong, Edward Bomark, Joseph Wolters; Dayton, George Lyons, F. C. Raff, William L. Walsh; Jefferson, W. G. Hamilton, Ray Comstock, Rudy Thoms; Harley-Davidson, R. Ketcham; R-S, Gray Sloop, champion of North Carolina, whose real name is not disclosed. In addition to these teams there were many individual riders entered.

New Official Repair Shops.

New repair shops recently registered with the F. A. M. are as follows: George D. West, Eskridge, Kan.; A. T. Crabb, 214 West National avenue, Brazil, Ind.; Taunton Cycle Company, 28

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Cohannett street, Taunton, Mass.; Amos Shirley, 935 Eighth avenue, New York City; Edward Nyswander, Grand Rapids, O.; Seeber & Hofheins, 704 Main street, Buffalo, N. Y.; Wheeler & Davidson, 71 East Market street, Corning, N. Y.; Hugo Scheeren, 3119 Third avenue, New York City; George E. Whitcomb, Marshall, Minn.



J. U. Constant, Brooklyn, N. Y., Who Took Five Out of Six Events at Elmira.

Constant a Consistent Winner.

John U. Constant of Brooklyn, N. Y., had an easy task in winning five out of six racing events at Elmira, N. Y., July 4, in connection with the New York State convention of the F. A. M. In only the 10-mile event was he forced to exert himself, A. R. Duff of Toronto, Can., finishing second by a close margin.

State and Local Commissioners.

Roy Pascal, 270 South Sixth street, Newark, N. J., has been appointed a state commissioner of the F. A. M. by President B. J. Patterson. Other local commissioners appointed are: C. F. Dix, box 114, Stockton, N. J.; W. C. Tatham, Waterloo, Ind.; D. B. DeMuth, 1116 Byron street, Huntington, Ind.; J. A. Anderson, 211 North Michigan street, South Bend, Ind.; Charles C. Palmer, Chalmers, Ind.

Merkel Retires from Miami Company.

Joseph F. Merkel, mechanical engineer of the Miami Cycle & Manufacturing Company, Middletown, O., maker of Merkel motorcycles, and one of the veterans of the motorcycle industry, has retired from that concern. Mr. Merkel returned two weeks ago from a business trip abroad in the interests of the company and having fulfilled his mission his retirement followed.

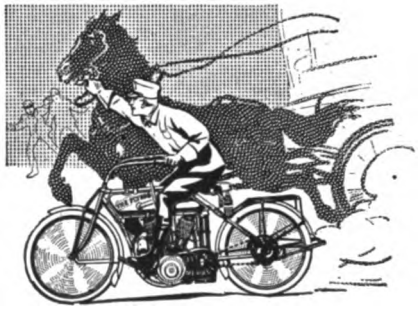
With his brother, Mr. Merkel formed the Merkel Motor Company at Milwaukee, Wis., about 12 years ago and since that time he has been identified with the motorcycle industry. He was the first to apply a spring frame to a motorcycle. When the motor car began to attract attention Mr. Merkel commenced the manufacture of a car at his factory, but later confined his endeavors to the production of motorcycles. The company was subsequently taken over by the Light Manufacturing & Foundry Company, Pottstown, Penn. That concern could not carry on the manufacture of motorcycles readily because of its other interests, so the business was sold about three years ago to the Miami Cycle & Manufacturing Company, when Mr. Merkel also became identified with that concern, the striking success of which is too well known to need repetition.

Winners of Old Sol Lamps.

E. M. Estabrook, chairman of the membership committee of the F. A. M., has announced the following clubs as the winners of Old Sol lamps in the membership contest: Corning Motorcycle Club, Corning, N. Y., two lamps; Nashville club, Nashville, Tenn., and Passaic club, Passaic, N. J., one lamp each.

Goodyear Tires Cost Less.

S. A. Falor, manager of the motorcycle tire department of the Goodyear Tire & Rubber Company, Akron, O., maker of Goodyear tires, recently announced a 10 per cent. reduction in the



ALWAYS READY FOR ANY EMERGENCY!

With its ability to pick up speed quickly—(60 miles an hour from a standing start within a city block)—the 1913 Flying Merkel Motorcycle is always ready for instantaneous use. These features and the fact that the Flying Merkel Motorcycle is the most economical in the world to operate has led to its universal adoption by Police Departments, Park Boards, Gas Companies, Telephone and Electric Light Companies and all other business concerns and individuals whose requirements demand a sturdy, reliable motorcycle at the minimum cost of upkeep. Remember, the Flying Merkel

"Made Its Name on Merkel Mileage."

Free Art Catalog on Request.

The Miami Cycle & Mfg. Co.

320 Hanover St. Middletown, Ohio, U. S. A.

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prices of motorcycle tires to dealers, consumers and jobbers. In explaining the reduction Mr. Falor said it was not due so much to the fact that the crude rubber market was lower, but because of the increased volume of motorcycle tire business which his company now has.

Results at Bay State Meet.

Some fine motorcycle racing was staged on the old race track at Saugus, Mass., July 4, during the convention of the Bay State Motorcycle Club, which was held at Boston. Over 5000 persons attended the meet, one of the chief attractions being Ronald Pope of Los Angeles, Cal., who captured the main event of the day, the 25-mile race for professionals. The closest contest was the 10-mile professional, which was won by H. F. Smith of Boston, second place going to



Two Members of the Merkel Team in Elgin Road Race: At Left, L. S. Taylor; at Right, Ray Snyder.

Theodore Carrol of Springfield, Mass., after the hardest kind of a battle on the home stretch. The following are the results:

Five miles, novice—First, Bernardt Gorgensen; second, E. W. Scherer; third, Ernest Marble; time, 6:22.

Ten miles, professional—First, H. F. Smith; second, Theodore Carrol; third, Ronald Pope; time, 11:11.8.

Ten miles, amateur—First, Bernardt Gorgensen; second, Ernest C. Poole; third, E. W. Scherer; time, 11:07.8.

Five miles, amateur—First, C. E. Vesselo; second, B. E. Dexter; time, 7:04.8.

Five miles, professional—First, H. E. Hendrickson; second, Ronald Pope; time, 6:39.4.

Twenty-five miles, professional—First, Ronald Pope; second, Porter Halliwell; third, Thomas Grace; time, 29:10.

1913 F. N. SHAFT-DRIVE MOTORCYCLES.

Lightweight Single, with Two-Speed Gear $275
Only Machine Built With Handle Bar Control of Clutch.
Four-Cylinder $300
With Handle Bar Control of Clutch $350
Two-Speed Gear, Extra $50
Equipment includes two brakes, footrests if desired, compound spring fork, combined luggage carrier and stand.

American F. N. Company, Boston, Mass.

Branch—415 Trumbull St., Hartford, Ct.

Stewart-Warner Speedometer Prizes.

Motorcycle riders and that part of the general public which patronizes or even passes motorcycle dealers' stores, are to be given an opportunity to show their ability as judges of high class art, with several substantial prizes as a reward for their efforts. They are to be asked to suggest an appropriate title for a painting purchased by the Stewart-Warner Speedomoter Corporation, maker of Stewart-Warner speedometers. A first prize of any motorcycle manufactured, costing $300 or under, and three other rewards of Stewart motorcycle speedometers are offered for the four best titles submitted.

Every motorcycle dealer in the United States will be provided with copies of the painting, to be hung in the windows and on the walls of the store. Customers and others will be invited to suggest a title for the picture, post card blanks being provided by the dealers. The titles will be sent to the Stewart-Warner corporation and the winners will be decided by competent, disinterested judges. The dealer in whose store the copy of the painting which suggests the winning title is hung, will also be awarded six model D Stewart speedometers.

New Affiliated Clubs.

The following new clubs have affiliated with the F. A. M.: Wheeling Motorcycle Club, Wheeling, W. Va., 26 members; secretary, Herbert L. Cotton, Elm Grove, W. Va. Eugene, Eugene, Ore., 18 members; secretary, C. Earl Fonda, 832 Olive street, Eugene, Ore. Bronx County Motorcycle Club, New York City, 20 members; secretary, Hugo Scheeren, Jr., 3119 Third avenue, New York City. American Indian Motorcycle Club, Chicago, 37 members; secretary, F. H. Kemper, 619 Diversey avenue, Chicago. Niagara Falls, Niagara Falls, N. Y., 59 members; secretary, J. F. Mackenna, 819 Ashland avenue, Niagara Falls, N. Y.

JOIN THE F. A. M.

which is the National Organization fostering the interests of motorcyclists along legislative and other lines. Cut this out, mail it, and you will get the reasons.

E. M. ESTABROOK
Chairman Membership Committee Federation American Motorcyclists,
BANGOR, MAINE.

Please send me the F. A. M. Booklet and all information interesting to prospective members.

Name .....

Address .....

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NATIONAL RELIABILITY TOUR.

Thirty Cars Will Leave Minneapolis on Long Run to Glacier National Park.

Everything is ready for the 1913 national reliability tour of the American Automobile Association, and according to the most recent announcement of the committee in charge no less than 30 cars will leave Minneapolis, July 11, for the nine-day run to Glacier national park. The tour will follow closely the itinerary used by the Minnesota State Automobile Association on its Minneapolis-Helena run in 1911, departing from that route only during the last day, when the detour will be made to the gates of the national reservation.

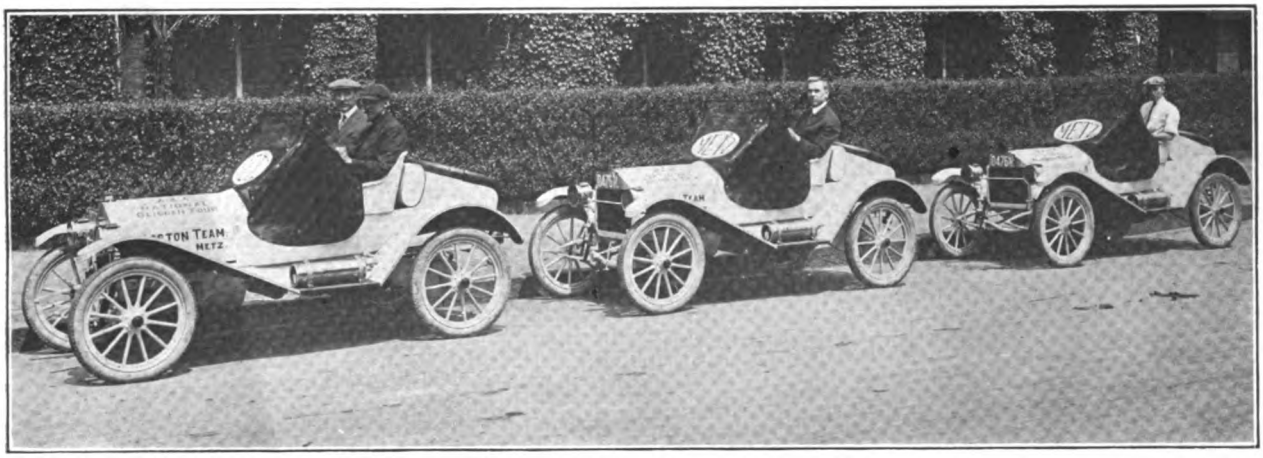
In several respects this event will be an innovation. It takes the place of the so-called Glidden tour, the first of which was held in 1905. No contest of this character was held last year, although a pathfinder was sent over the road from Detroit to New Orleans, after which the project was abandoned. For the first time in the history of the industry, American Indians are to compete, driving their own cars, and women have been permitted to enter as well.

Most of the entrants are private owners, although there are three factory teams. In the East, considerable interest attaches to the entry of three Metz cars, by the Metz Company, Waltham, Mass., this team representing Boston. Still another Metz machine will make the trip, this being driven by the Metz twins, the Misses Irene and Lillian. The official Metz team will be driven by John McGann, Walter Metz and Lawrence Cathcart.

The other factory teams are composed of K-R-I-T and Hupmobile cars, entered by the K-R-I-T Motor Car Company and Hupp Motor Car Company, both of Detroit. The K-R-I-T team will be in charge of Frank Witt, M. Mullaney and R. Hanson, and the Hupmobile cars will be driven by Frank J. Mooney, Thomas Hannon and R. W. Munser, Jr.

Following the plan which was adopted by the Minnesota state association in 1911, a hotel train will accompany the tourists throughout the long journey. The night stops and daily mileages follow: July 11, Alexandria, Minn., 144.4 miles; 12, Fargo, N. D., 123.8; 13, rest at Fargo; 14, Devil's Lake, N. D., 194.6; 15, Minot, N. D., 135.6; 16, Williston, N. D., 136.8; 17, Glasgow, Mont., 163.8; 18, Havre, Mont., 156.1; 19, Glacier Park, Mont., 178.

A special feature in connection with the run is the additional road test to which one of the Metz cars will be subjected. This machine left Boston at midnight, July 4, in charge of Walter Metz, for an overland journey to Minneapolis, and was due to arrive at the city hall in that city in 96 hours. This adds several hundred miles to the 1233.1 of the tour. The Metz team is illustrated herewith.



The Metz Team in the American Automobile Association's National Tour: Drivers, John McGann, Walter Metz and Lawrence Cathcart.

The Cole Motor Car Company, Indianapolis, Ind., maker of Cole cars, has issued the July number of the Cole Bulletin, the house organ. The issue is one of the best appearing from this house and contains numerous articles of a solid business nature by Homer McKee, director of sales and advertising, C. J. Corkhill, district sales manager, and others. The publication is finely illustrated with half-tones and altogether is a commendable literary effort.

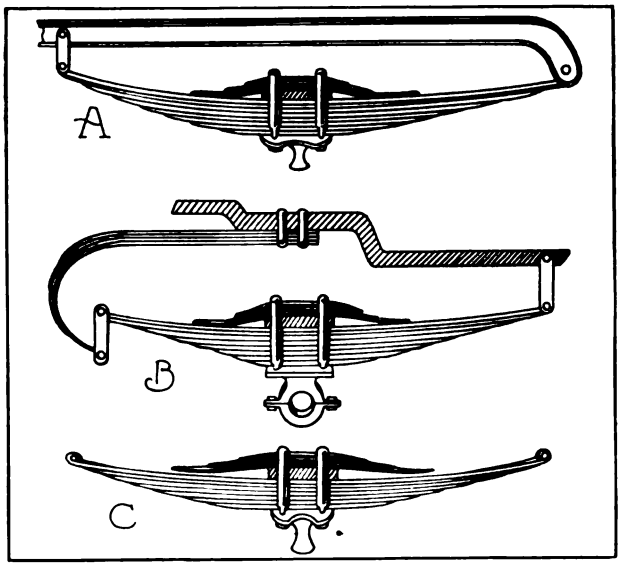
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AMES SHOCK ABSORBER.

Operates Automatically, Absorbs Vibration, Simple in Design and Easily Attached.

It is a well known fact that it is the recoil, not the down-thrust when the car encounters an obstruction, that breaks springs. It is the elimination of the abnormal upward movement, and the absorption of vibration and shocks, which stresses shorten the life of the machine and tires, that designers of shock absorbers seek to overcome. A shock absorber which presents practical features as well as makes for ease of attachment is the Ames automatic, for which Clarence N. Peacock & Co., 1790 Broadway, New York City, is exclusive licensee.

As will be noted by the accompanying illustration the Ames is simply an inverted three-leaf steel spring rigidly fastened to the main leaf spring with a carefully adjustable steel spacing block between them. When the car strikes an obstruction the recoil travels back and forth from the main spring to the shock absorber, instead of reaching the body of the machine, the stress of the recoil being wasted. It is a counter spring in that the vibration is smothered, preventing its communicating with the main member, and it is held that the action is very gentle. As the Ames works one way and the spring the other, all movements are compensated for. It is automatic in its action in that it adjusts itself to the character of the roads and lying as it does close to the spring it does not detract from its appearance.



Showing Simplicity of Ames Shock Absorbers: A, Method of Fitting to Front Spring; B, Rear Installation; C, Position of Absorber and Spring at Sudden Deflection.

The simplicity of application will appeal to those motorists who care for their own cars, as it can be attached easily by removing the regular spring clips and substituting those furnished by the maker, placing the spacing block and tightening nuts with a wrench. The Ames is constructed of chrome vanadium steel, heat treated and assembled by skilled workmen. The absorbers come in sets of four and are adapted to any type of spring and vehicle. As they do not affect in any manner the normal action of the regular springs, simply absorb the recoil and vibration, it will be seen that there are no adjustments to be made or other factors to be considered.

SPECIAL WEED CHAIN PRIZES.

Maker Will Award Cash for Best Window Displays of Product.

Tourists and others cannot help but have their attention called to the necessity for carrying Weed tire chains during the next few weeks. The maker, the Weed Chain Tire Grip Company, New York City, is offering $250 in cash in prizes—$100 to the first, $50 to the second and $10 each for the next 10—for the best window displays, the award being based upon general attractiveness.

The company does not furnish display material for this contest, the idea being to secure originality on the part of the dealer. The Waite Auto Supply Company, Providence, R. I., for instance, has evolved an interesting object lesson in reproducing a scene at a railway crossing, in which one of the cars is equipped with Weed chains and the other—the one which is the victim of the accident—is not. Toy cars and locomotive and miniature dolls are used with good effect.

All photographs of displays entered for the prize must be in the hands of the company not later than July 15, and it is planned to announce the winners Aug. 1.

BOWERS CARBURETOR.

Gilbert Manufacturing Company Announces New Popular Priced Design.

Announcement is made by the Gilbert Manufacturing Company, New Haven, Conn., of a new type Bowers carburetor which will sell at a popular price. The model G contains all of the latest improvements and is guaranteed to show a high efficiency as well as economy of fuel. The company also makes a high grade line of accessories, including tire and lamp covers, tube bags, etc.

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ANNOUNCES NEW MODEL.

Lozier Returns to Four-Cylinder Motor After Producing Sixes Exclusively.

One of the surprises of the past week was the announcement made by the Lozier Motor Company, Detroit, of a new four-cylinder model for the 1914 season. This is of particular interest because of the fact that the Lozier company has been producing sixes exclusively for the past two years. The announcement was made in connection with the annual convention of district and sales managers at the plant in Detroit.

It is understood that the new model will resemble the Lozier Little Six in general appearance, the body following the stream line design, although several new features will be incorporated. Notable among the latter will be the crowned fenders now quite the style in Europe. It will seat seven passengers, the two extra seats in the tonneau being so arranged as to fold against the back of the front seat when not in use.

The new motor is of the L head type, with bore of 4.25 inches and stroke of 6.5. The lubrication system is the same as that which has been utilized with success on the six-cylinder models. Ignition is by Bosch magneto. The clutch is of the multiple disc type, housed in the engine flywheel and running in oil. The transmission affords three forward speeds and reverse.

The frame is raised over the rear wheels, lowering the body and centre of gravity and making for easy riding qualities. Left hand steer and centre control are continued with this model. The wheelbase is 120 inches and the wheels are shod with 36 by 4.5-inch tires all around. The equipment will be complete in every detail, including Gray & Davis lighting and starting system.

DETROIT'S FIRST CYCLECAR.

Keeton Officials Interested in Company Producing the Carnation.

The first completed cyclecar to make its appearance on the streets in Detroit is the Carnation, an illustration of which is shown herewith. This is to be produced by the American Voiterette Company, of which Charles B. Shaffer, president of the Keeton Motor Company of that city, is president. William G. Houck, 2nd., vice president and director of sales with the Keeton company, holds the same positions with the new concern, which is capitalized at $500,000.

The Carnation is a cyclecar in every sense of the word, having a 44-inch tread and 100-inch wheelbase. The motor has four cylinders, with bore of 3.25 inches and stroke of 3.75, being rated at 18-24 horsepower. The car has three forward speeds and reverse, and drives from the centre with right hand shifting lever. The wire wheels are shod with 30 by three-inch tires.

There are three models and with all the seats are of the French type, having sloping backs, and the upholstering is Bedford cord. The model illustrated, which is the first to be produced, has two seats, arranged tandem. The others are a touring car, seating four persons, and a roadster, seating two people side by side. The car weighs 710 pounds, is low in construction and has a speed of about 50 miles an hour.



Detroit's First Completed Cyclecar, the Carnation, Made by the American Volterette Company.

BIG MILEAGE RECORD.

Franklin Car Utilizing Newcomb Carburetor Exceeds Former World's Mark.

Utilizing a Newcomb carburetor, made by the Holtzer-Cabot Electric Company, Boston, Mass., a Franklin car covered 83.5 miles on a gallon of fuel in tests under the auspices of the Automobile Club of America, in New York City, June 21, creating a new world's record. The trials were conducted over the Long Island roads under ordinary highway conditions.

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JOINS THE COLE FORCE.

J. G. Monihan Becomes a Member of Homer McKee's Sales Organization.

John Guy Monihan of the Premier Motor Manufacturing Company, Indianapolis, Ind., maker of Premier cars, has become associate director of sales and advertising of the Cole Motor Car Company, Indianapolis, maker of Cole machines. This is in accordance with the plans for expansion worked out by Homer McKee, director of sales and advertising, at the suggestion of President J. J. Cole. Edward F. Harris, whose work in the sales department of the Cole organization justified his advancement, has been promoted to field sales manager. This expansion follows closely on the recent announcement of increase in Cole stock to $1,000,000, the doubling of the Cole output and the closing of a contract for another big addition to the factory on East Washington street.

In securing Mr. Monihan, Mr. Cole believes that his already strong sales and advertising organization has been materially strengthened. Mr. Monihan has been in the automobile business for the past five years. His most recent experience has been with the Premier company, where he was closely associated with President H. O. Smith and R. W. Macey. With his co-operation Premier business has steadily increased. He was the originator of the amateur transcontinental ocean-to-ocean tour in 1911 and has won a name as a sales lecturer. He has written several books and is a member of numerous clubs and organizations throughout the country.

GOODYEAR ELECTRIC TIRE.

Well Known Maker Announces New Product Will Be Ready Shortly.

L. C. Rockhill, manager of the automobile tire department of the Goodyear Tire & Rubber Company, has returned to the factory in Akron, O., after an extended tour of the Pacific Coast section, investigating motor car conditions in that portion of the country. Shortly after his return he announced a new electric vehicle tire, to be known as the Goodyear Power Saver pneumatic tire, which he says will be ready for distribution at the various branches of the company about the middle of the month.

The new tire is the result of long experience on the part of the engineers connected with the Goodyear company, and is expected to afford the maximum of efficiency in every respect. In discussing the matter Mr. Rockhill mentions that very few people diffentiate between tires for gasoline cars and those especially built for electrics, although he says any automobile engineer knows that the former absorbs more energy than the latter. In order to secure a product that should prove satisfactory in every respect, the company is using only the better grade of gum and the very best cotton in an effort to obtain extreme durability without loss of resiliency.

H. S. Quine, manager of the advertising department of this company, also makes an announcement, in which a proposition is placed before Goodyear dealers whereby they can co-operate with the company in securing road signs at a saving of some 82 per cent. of the cost. The signs are lithographed on steel, 10 by 28 inches, and besides calling attention to the merits of Goodyear No-Rim-Cut tires, carry the advertisement of the local dealer. The plan is advanced as another step in the effort of the Goodyear company to co-operate with its representatives in every way possible.

The Chicago automobile insurance interests have appointed a committee made up of A. T. Graham, Fred H. Moore and A. F. Shaw to prepare a constitution and by-laws for the permanent organization to take the place of the tentative organization which has been in charge for some time. It is probable that it will be called the Automobile Underwriters' Board of Cook county. The eastern conference rates are practically in effect in Cook county.

The Bosch Magneto Company, New York City, maker of Bosch magnetos, has donated. through its president, Otto H. Heins, a one-mile international record cup to be known as the Bosch trophy, to the Motor Boat Club of America. The award is to be perpetual and a silver replica of the cup will be presented to the owner of the winning boat in appreciation of his efforts. It is necessary that boats representing two or more countries shall compete and the winning club shall hold the trophy for one year. This year's competition will be under the direction of the Royal Motor Yacht Club of England, as the donor requests that whenever possible it shall be competed for in connection with the Harmsworth trophy races. The winner will be entitled to the distinction of being recognized as the fastest motor boat in the world.

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The touring season in the Southwest is being formally ushered in this year by the second annual Grand Canyon run, which, with 50 cars in line, promises to be the largest and most important event of its kind in Arizona. The initial run was held last year as a protest against the rough, uncared-for roads, and already highway improvement has become apparent. The event, like that of last year, is open to Studebaker cars only. Though starting at Phoenix, it includes entries from Prescott, Tucson, Flagstaff and other Arizona towns, with several cars from Los Angeles. On the six-day itinerary the tourists will spend one night at Prescott and one in the tourist hotels at the Canyon. The other three nights the party is to be cared for at the famous Harvey houses of the Santa Fe railroad system.

Following its official non-stop run of 300 hours at the Automobile Club of America, New York City, the Packard 38 motor, which established this record, is prolonging its endurance test by additional mileage on the road. After the completion of the block test, which more than doubled the previous world's record of 132 hours, the motor was sealed under the observance of the technical committee of the Automobile Club and replaced in the chassis from which it had been taken. It was then run at full speed on the Long Island speedway and from New York to Philadelphia. It still carries the seals which show it has undergone no adjustments. During the 300 hours of continuous running on the test rack the motor made 21,600,000 revolutions at a constant speed of 1200 a minute. This represents 11,238 miles, a distance greater than a run from New York to Shanghai, China.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC.

Of **The Automobile Journal** Published **Semi-Monthly** at **Pawtucket, Rhode Island,** required by the act of August 24, 1912.

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None.
Known bondholders, mortgagees and other security holders, holding 1 per cent. or more of total amount of bonds, mortgages or other securities:
None.

WILLIAM H. BLACK, Editor.

Sworn to and filed with Postmaster July 11, 1913.

ARTHUR H. CAPWELL,
Notary Public.

My commission expires June 30, 1914.

The legislature in Vermont recently passed a law forbidding motorists from using red lights at the rear of their machines. The action was taken following an insistent request from railroad engineers, similar to that which has been made in several other states. The law does not go into effect until Jan. 1, 1915.



PATENTS APPLIED FOR

Artistic Steel Garage with a Guarantee

Write for Catalogue

The Taylor Mfg. Co.
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REMY

STARTS—LIGHTS—IGNITES
SILENT—SIMPLIFIED—STURDY

Apparatus furnished in any combination, but the starting and lighting system is sold only to manufacturers.

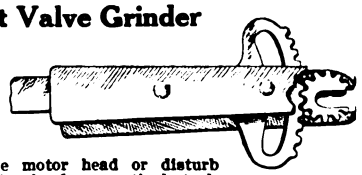
Why bother with ignition troubles? Write for our magneto exchange proposition. Put new life into your old car.

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Branches and Service Stations Everywhere.

WILL GRIND FORD VALVES

Wall's Perfect Valve Grinder

Patent Pending.
Patents Allowed.



No need to remove motor head or disturb valve mechanism. A simple, practical tool, that works automatically and any one can operate it. Guaranteed, and will last for years. A new, simple and practical guide for owner, driver and repairer. Keep your valves in perfect condition. Cost of grinder saved first time used. For circulars and price list write

J. H. WALL, 290 Hope Street, BRISTOL, R. I.

GYROSCOPE PRINCIPLE

The New Jones Speedometer Unaffected by Heat or Cold

Any motor car maker will equip with it if you state plainly you want nothing else, no matter what speedometer he may list in his catalog as equipment.

Write us for facts, test and experiments that show Jones supremacy beyond question.

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New England's Largest and Oldest Ignition House

Specialists in all kinds of ignition repair work
Consult our repair department when in trouble

All Makes of Magnetos, Coils, Generators and Batteries Repaired

NEW ENGLAND DISTRIBUTORS FOR

Eisemann Magneto Company — Planhard Carburetors
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Parts for all makes of magnetos always in stock — Get our prices before placing your order

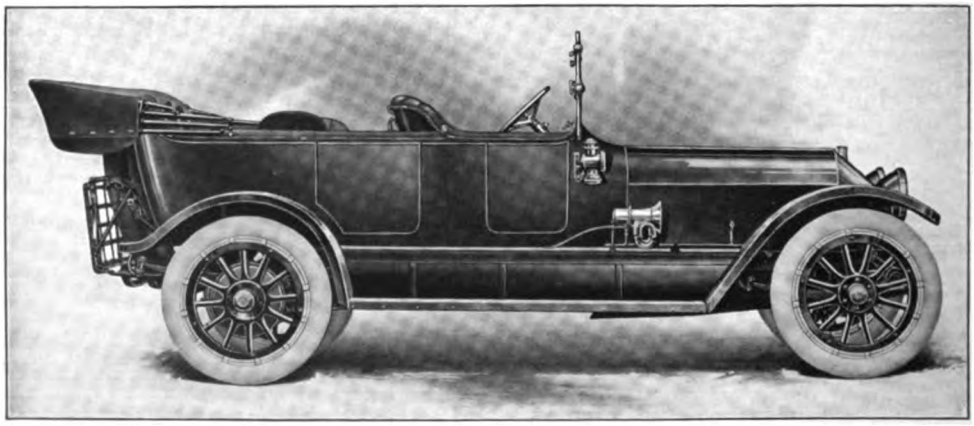
EISNER-LENK COMPANY, Boston, Mass.

Main Office, 1074 Boylston Street — Branch Office, 83 Church Street

Knox

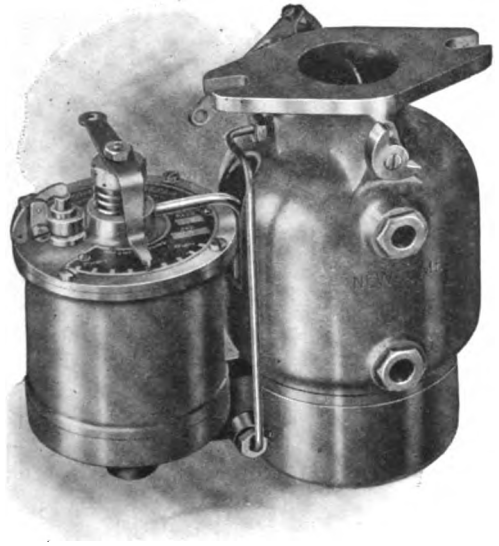
"LITTLE SIX"

A car of thorough mechanical perfection. With distinctive body designs, possessing rare beauty, comfort and style.



Send for "Knox Knowledge".
Made in New England at Springfield, Massachusetts
by the Knox Automobile Company
Boston Branch, 885 Boylston Street, New York Branch, 1966 Broadway,
Chicago Branch, 1458 Michigan Ave.

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83.5 Miles on a Single gallon of fuel

all mileage records were broken on June 21st by a Franklin car equipped with a

Newcomb Carbureter

Send for Booklet 160J and Test Reprint

You are doubtless familiar with this test, run under the auspices of the Automobile Club of America—Why not get familiar with the Carbureter that meters out and atomizes the scientifically correct amount of fuel for every driving condition.

THE HOLTZER-CABOT ELECTRIC CO.

BOSTON CHICAGO NEW YORK BALTIMORE

VALVOLINE OIL CO.

Heavy, Medium and Light

Automobile Oils

27 STATE STREET, BOSTON, MASS.

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The Thoroughbred Car.

Electric self-cranking, electrically lighted.
Four Forward Speeds.

"Six Thirty-Six" Touring Car and Roadster - $1850
Model 30 Touring Car - $1350
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Live wire dealers, write for unallotted territory.

HERRESHOFF MOTOR COMPANY, Detroit, Mich.

DON'T let rim rust destroy your tires;
Paint them twice a season with

THOMAS' ANTI RIM RUST PAINT

One dollar a can at your dealers, or write us

The Anti-Rust Paint Co., Dept. 7, Akron, Ohio

GEORGE SUMNER, Inc.

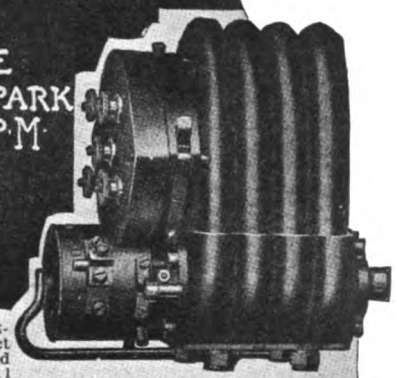
AUTOMOBILE SPECIALTIES

"DIVA" HEADLIGHT "ACME" SHOCK ABSORBER
"S U" CARBURETOR

1926 BROADWAY NEW YORK

HECO-Magnetos

INSURE A STEADY SPARK AT ANY R.P.M.



HECO MAGNETOS are the product of experts specialized in the electrical business. They embody all that the electrical industry knows about magnetos.

By our special method of winding the secondaries we are able to positively guarantee them against burning out or breaking down.

HECO MAGNETOS supply a spark of equal intensity for any number of revolutions per minute.

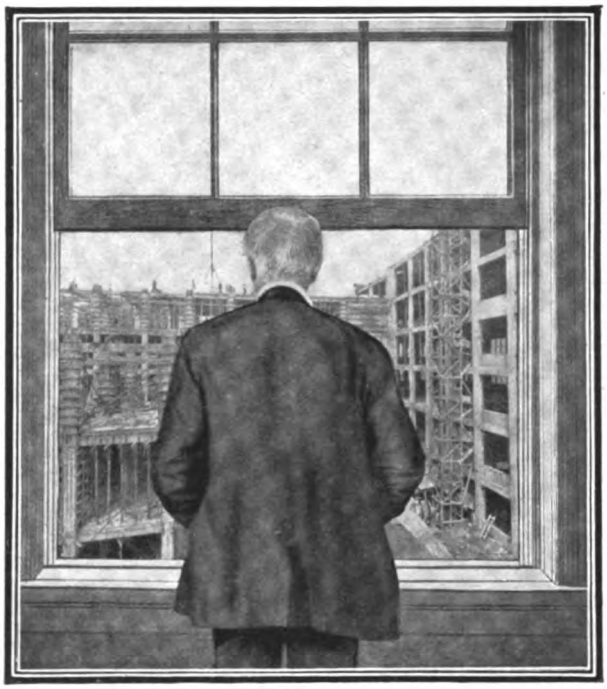
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Factories and Gen'l Office, Lowell, Mass.
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Looking out at the new factory extensions made necessary by our increased business reminds me of my prophecy that the Alkaline Storage Battery would bring about important changes in transportation

Thomas A Edison

GOING UP!

WE wish every Automobile Owner and Manufacturer, Garage Manager and Supply Dealer could stand with Mr. Edison and watch the growth of our factory. The increased business which necessitates the present additions is in no small part for our Type B Cells—the kind used in Ignition and Lighting Equipments.

THE EDISON STORAGE BATTERY

IS GUARANTEED FOR 4 YEARS

It has been proved by test to many times outlive its guarantee.

THE NEW FACTORY IS BUILT TO MAKE BATTERIES—NOT REPAIR PARTS

Write for Bulletins of Batteries for Ignition, Lighting, and Traction. Also for those describing the Edison Alterating Current Rectifier for charging Ignition and Lighting Batteries.

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STOP INFLATION AND SPARK PLUG TROUBLES

The Brown Impulse Tire Pump and the B'Co. Quick Detachable Spark Plug will do it.

Give a quarter turn and lift out the core of your spark plug, drop in the pump and give a quarter turn.

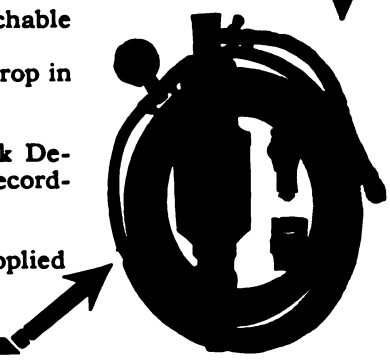
It's done in a jiffy—no wrench, no broken plugs.

The 1913 Brown Tire Pump is equipped with a B'Co. Quick Detachable Spark Plug, self opening valve connection, High Grade Recording Gauge and 12 feet of air hose.

You need this outfit as part of your 1913 equipment.

Sold by first class dealers everywhere. If you cannot be supplied locally, write us.

BROWN COMPANY, 222 Bellevue, Syracuse, New York



If the greatest engineers

in the world were to meet in convention and build a car, when they finished the car it would look and be like the STUTZ in all its essentials. Write today for advance Booklet A-5 Sturdy STUTZ Announcement.

STUTZ MOTOR CAR COMPANY,
Indianapolis - - - - - Indiana

For Perfect Control and Safe, Comfortable Driving use

Weed Anti-Skid Chains

At all Reputable Dealers
Weed Chain Tire Grip Co., New York

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America Is Richer in Ruins by a Thousandfold Than All of Europe Combined

In the Great Southwest, One of the Most Enlightened Races the World Has Ever Known Lived, Departed and Left No History Within the Knowledge of Today.

"The Trail of The Bull Dog"

By CHAS. G. PERCIVAL, M. D.

Tells the Story of These Ruins, Which Belong to a Civilization Compared to Which the Oldest of European Monuments Are of a Period so Recent as to Seem But Yesterday.

This book contains the incidents of Dr. Percival's two years' automobile trip into all parts of the North American Continent—1500 miles in Mexico during the height of the recent insurrection—1000 miles farther north than ever before by motor car, driving over the dreaded White Pass Trail from Skagway, Alaska, tidewater to the headquarters of the mighty Yukon River in the Klondyke, and north of 62 degrees—lost in the Arizona Desert and rescued from death by thirst by Troop K of the 4th United States Cavalry—crossing the highest points of the Sierra Nevada and Rocky Mountains, and visiting every state in the Union.

It is the most interesting and instructive book on America for Americans that ever has been printed.

You should read it before beginning the tour—You should read it even if you do not tour—Learn about the country you live in.

Splendidly Illustrated with Hundreds of Photographs Taken by the Author.

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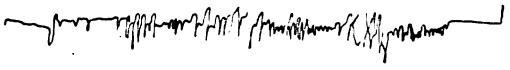
CHAS. G. PERCIVAL, M. D.
27 Vandewater St. NEW YORK CITY

J. M. Shock Absorber



Here is proof that will convince any man on earth

THESE SIMPLE GRAPHS TELL THE STORY:



WITHOUT J. M. Shock Absorbers—excessive vibrations



WITH J. M. Shock Absorbers—all roads are smooth

This diagrammatic record was made by the oar of Earle L. Ovington, the famous aviator, on Boston's finest boulevard—Commonwealth Avenue. It proves more convincingly than volumes of generalizations the fact that

You *Need* J. M. Equipment On *Your* Car

not only as protection against jolting on rough roadways, but also for continuous service on the best city streets.

We have prepared an interesting booklet "D" giving the full results of the noteworthy Ovington experiments on shock absorption—conducted with scientific accuracy over roads of various sorts. The facts contained therein should be known to every well-informed motorist.

Send your name and address—a postal will do—and a copy will immediately be forwarded, postpaid.

J. M. Efficiency Begins Where Laminated Springs Fail

The J. M. Shock Absorber Co., Inc.

210 South 17th Street, Philadelphia, Pa.

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25 Miles to Gallon

PAID FOR ITSELF

Lawrence, Mass., May 16, 1913.
Gentlemen:—I get 20 miles and over on a gallon and I never got more than 14 miles on the ——— I took off. G. A. Schmidt.

19 to Gallon on Cadillac

Planhard Co.—Edgewater, N. J., May 21, 1912. I am very much pleased with my new Planhard Carburetor. I made a test of gasoline consumption from Edgewater to Hyde Park, N. Y., and return, and got a fraction over nineteen miles to the gallon. This is on my Cadillac.
John H. Hinners.

18 Miles on Buick

Malvern, Iowa, April 8, 1913.
Gentlemen:—The Planhard beats anything I ever saw. My first run was 55 miles on 3 gallons, and roads not good anywhere, 20 miles being very hilly and rough. An auto man said it was simply a wonder. It is a peach. Impossible to make it miss. Lots of power. All O. K. believe me. J. A. Tyler.

3¾ More Miles

When Planhard Carburetors were put on the 6 cylinder, 4 cycle Frisble motor of the fast boat Delphi II, she increased 230 R. P. M., and 3¾ more miles per hour.

Much More Power

Bath Marine Construction Co.—"The gasoline consumption at normal power was better than others and it would develop much more power when pushed." H. D. Bacon, President.

On a Ford

North Fairfield, O., May 16, 1913.
Gentlemen:—After taking the old Carburetor off my Ford car and putting on a Planhard, I increased my mileage from 18 to 25 miles per gallon, and my engine, which was a notorious heater, runs as cool as desirable for the best results. I am using 60 to 62 gasoline, and as I have a hydrometer, I know what I am talking about. A. W. Grandon.

Gallon Less Per Hour

on semi-speed boat

HARTFORD III

owned by A. N. Smith, Portland, Maine, who gets better control.

Old Glory II

had a Planhard on her Loew-Victor on her famous trip to Nova Scotia.

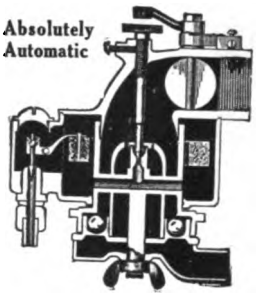
Valient II and Alfred S

took all their prizes with Planhards on Metropolitan motors.

Emerson III

made a mile in 1 minute 8 seconds over the Washington government course with Planhards.

Absolutely Automatic



Note Simplicity.

New England Distributors

Eisner-Lenk Co.

1074 Boylston St.
Boston, Mass.

Want Dealers in New England Cities to Handle Planhards

Planhard Carburetor

Other Distributors

Southern N. J. & Eastern Penn., Gustave Muller, Jr., Bourse Bldg., Philadelphia.
Buffalo: Theo. P. Meinhard, 774 Main St.
Hermann Engineering Company, Equitable Building, Detroit, Mich.
Robt. H. Richter, 180 N-Market St., Chicago.
J. G. Davis, 1224 Music St., New Orleans, La.

Planhard Mfg. Co., 1790 Broadway, N. Y.

Gentlemen:—Send at once your chart and book concerning Planhard Carburetor.
Name .....St.....
City ..... State.....
Engine .....Carburetor....Size....in.
Threaded? Flanged? Horizontal? Vertical?

SPLITDORF

"Always There"

The SPLITDORF "TS" COIL is new and the best and most effective coil on the market today. You can have your car equipped with this new style SPLITDORF COIL to work in connection with the SPLITDORF MAGNETO on your car.
The "TS" is interchangeable with any type tube or dash coil and can be attached to any car. We will make you a very liberal allowance on your old coil in exchange for one of the new style.
You can also have your entire ignition system exchanged for the latest type SPLITDORF MAGNETO and COIL at an exceptionally attractive price.



"New ignition for old" is our slogan—we intend to install SPLITDORF IGNITION throughout our territory and, to aid us in doing so, we have a SPECIAL EXCHANGE PROPOSITION of great interest to every owner of a gasoline motor. Write TODAY for particulars.

SPLITDORF ELECTRICAL COMPANY

ATLANTA, 8 Harris St.
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CHICAGO, 64-72 E. 14th St.
DETROIT, 972 Woodward Ave.
KANSAS CITY, 1823 Grand Ave.
LOS ANGELES, 1226 S. Olive St.
NEWARK, 290 Halsey St.
NEW YORK, 18-20 West 63rd St.
PHILADELPHIA, 210-212 N. 13th St.
SAN FRANCISCO, 1028 Geary St.
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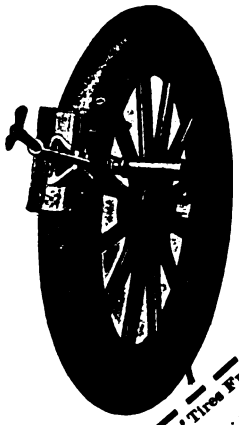
Why don't you *own* the vulcanizer you're *paying for?*

Yes, actually paying for it in tire service that you might have—but don't get.

You know what happens when you let a casing cut gather dirt and water for a hundred miles. The fabric, that ought to be protected by the tread, rots, and you have a blow-out that ruins the tire.

Unless you have a vulcanizer, casing cuts will never get any attention. They don't look important enough to turn over to a garage for repair.

Result—you buy two tires where one would do as well.



SHALER Vulcanizer

If you'll fill the cuts and gashes in your tires with new, live Para rubber, and weld it in with a Shaler Vulcanizer, the tire will be as good as new until the tread is worn through. Why endure the trouble and danger and expense of blow-outs when there's this sure remedy? There is no satisfactory substitute for vulcanizing. No other method makes permanent repairs. All tube injuries are mended with the same vulcanizer.

You or your chauffeur can do the work in spare moments. No skill or experience necessary. Full directions and a supply of repair material accompany each machine.

Shaler Vulcanizers operate from your electric lighting circuit or with alcohol lamp. Prices, $2.00 and up.

Send This Coupon

today and receive a complimentary copy of "Care and Repair of Tires." It gives a remedy for every tire emergency. Write today.

Send me a copy of Care and Repair of Tires Free.
NAME.....
ADDRESS.....
C. A. SHALER CO., 958 Fourth St., Waupun, Wis.

C. A. SHALER CO.

958 Fourth Street **WAUPUN, WIS.**

When your

DAYTON AIRLESS

tire strikes a stone—

the stone sinks into the tire, rubber is displaced, the "pier" (A) squeezes down and bulges out into the open spaces between (B). Naturally it follows that the tire passes over the stone with a very slight vibration or "bounce." With an air filled tire you are bound to get greater bounce—there is no outlet for the air and it therefore shoots away from the obstruction point and back again with a rush, throwing you into the air. Dayton Airless tires provide for the comfort—the ease that you *must* have.

But much more; "airless" means complete freedom from tire trouble, punctures, blowouts, etc., and the long train of worry, danger, delays, annoyance, expense. ¶"Air-free, care-free," and wear-free besides; they last longer than any other kind. We guarantee Dayton Airless for 5000 to 8000 miles; according to the weight of your car.

¶Ask us to prove these facts to you. Send for our Cathechism; shows you that tire economy is not always in the first cost; shows you a newer kind of automobiling pleasure.



The construction does it

To agents: Write us about territory for this practical, sure-selling line of tires.

Dayton Rubber Mfg. Co., Dayton, Ohio

Dayton Airless Tire Co., 1878 Broadway, New York City.
Dayton Airless Tire Co., 589 Boylston Street, Boston, Mass.
Dayton Airless Tire Co., 80-84 West Mohawk Street, Buffalo, N. Y.
Dayton Airless Tire Co., 2123 Michigan Avenue, Chicago, Ill.
Dayton Airless Tube Co., 332 No. Illinois Street, Indianapolis, Ind.

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TRY THE BOWERS CARBURETOR



Produces the greatest possible efficiency from an internal combustion engine.

Simple in construction, having but one adjustment for the operator.

Special diaphragm control giving same direction to fixed and supplementary air supplies.

MADE IN ALL SIZES

Send for catalogues describing these carburetors and our line of fabric supplies.

The Gilbert Manufacturing Co.

NEW HAVEN, CONN. **New York Branch: 2010 Broadway**

The "Black Eagle" Spark Plug

PATENTED



50 Cents Is Enough

The "Black Eagle" Spark Plug has made good because it was designed and manufactured with this result in view.

A person in close touch with the supply and manufacturing ends of the trade was a visitor at our factory recently, and was shown the details of construction, including the machinery, testing, and assembling of the "BLACK EAGLE" Spark Plug. What he said we believe will be of interest to you, as it indicates the effort on our part to supply a high grade plug at a reasonable price. We therefore quote below his impressions.

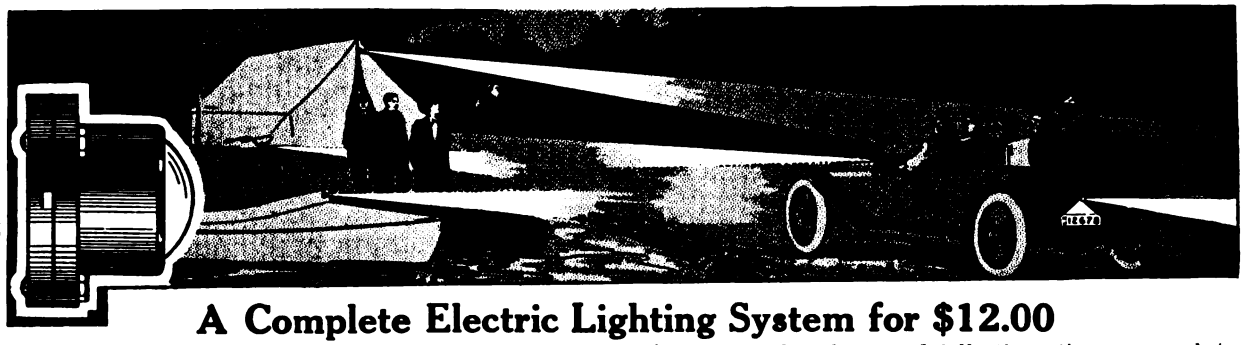
> "I am simply amazed at the workmanship, material, and construction of the 'BLACK EAGLE' Spark Plug. When I saw this plug advertised at a price of 50c to the consumer, I naturally supposed it was a cheap, common, plug such as you occasionally find in jobbing houses on the bargain counter. I am convinced, after seeing these plugs tested, and examining minutely the machine parts which enter into their construction, that **no better porcelain spark plug is offered by any one, regardless of the price they ask.**"

We are not **influenced** by what our competitors **charge for spark plugs!** We have **ignored price precedent,** for the reason that a **high grade spark plug** can be manufactured and sold at **50c each, and that is enough.**

Sent prepaid on receipt of price. Made in all standard threads.

THE STANDARD CO. Torrington, Conn., U. S. A.

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A Complete Electric Lighting System for $12.00

At last you can have an electric lighting system at a reasonable price. Just think of it--only $12.00 for a set of four electric lamps and the necessary wire for installing same. The cheapest standard electrical equipment on the market would cost you almost three times as much to buy—and fully three times as much to operate.

Do away with the rattle, dirt, bad odor and nuisance of refilling and polishing oil lamps and equip your car with

J-M MOBILITE ELECTRIC LAMPS

Operated by Dry Batteries

These lamps add to the neatness and attractiveness of an automobile. They are made of hard rubber, fitted with a Tungsten bulb, a powerful lens and reflector. Six No. 8 J-M Dry Batteries will operate a set of four lamps from 300 to 420 hours.

Used for dash lights, tail lights, speedometer lights and interior car illumination. Also for motor boats, camps, bungalows, etc.

Shipped direct from our nearest branch if not at your dealer's.

Write today for interesting booklet.

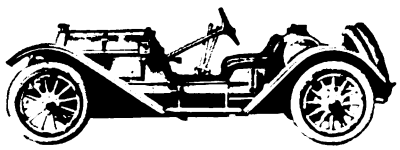
Dealers wanted everywhere to handle this quick-selling accessory. Big sales and liberal profits. Write today for Special Dealer Proposition

H. W. JOHNS-MANVILLE CO.

Albany	Buffalo	Cleveland	Indianapolis	Louisville	New Orleans	Philadelphia	Seattle
Baltimore	Chicago	Dallas	Kansas City	Milwaukee	New York	Pittsburgh	St. Louis
Boston	Cincinnati	Detroit	Los Angeles	Minneapolis	Omaha	San Francisco	Syracuse

THE CANADIAN H. W. JOHNS-MANVILLE CO., LIMITED. Toronto, Montreal, Winnipeg, Vancouver. 2098

Type 35 Series J Raceabout Guaranteed Speed—Mile in 51 Seconds



MERCER

The Mercer's speed and endurance record at Indianapolis and other important contests is a valuable asset from the dealer's viewpoint.

Some desirable territory open. Write today.

MERCER AUTOMOBILE CO., 1100 Whitehead Road TRENTON, N. J.

BRAENDER TIRES & TUBES

Are of the highest quality and the cheapest on mileage. They are built to last. Send for price list and particulars.

BRAENDER RUBBER & TIRE CO.

Main Office and Factory RUTHERFORD, N. J.

HAVOLINE

Automobile Cylinder Oils

INDIAN REFINING CO.

17 Battery Place New York



Pyrene

FIRE EXTINGUISHER

FOR AUTOMOBILE FIRES

Pyrene will not damage your engine, car or upholstery and is the only effective extinguisher of gasolene fires.

Pyrene is a combination of powerful gases in liquid form. As it touches the fire, Pyrene liquid is converted into a dense white gas blanket which surrounds the fire and smothers it instantly.

Write for booklet.

Included in the lists of approved Fire Appliances issued by the National Board of Fire Underwriters.

PYRENE CO. OF NEW ENGLAND

176 Federal Street BOSTON, MASS.

When Writing Advertisers, Please Mention The Automobile Journal.

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Eiker Carbureter

Simplest, Most Efficient and Economical Carbureter Made. All the Advantages and None of the Faults of Other Carbureters.



Small as the smallest.
No exposed air valves.
Weighs less than 4 pounds.

Advertising space is too costly to mince words, so here goes—

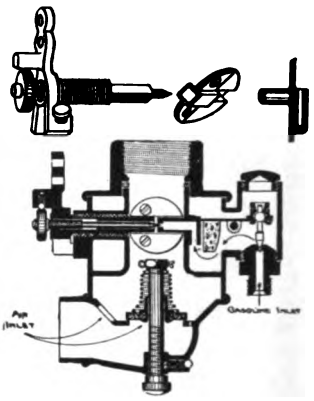
$5,000

That we can prove the statement in the above heading and that the Eiker Carbureter will outpoint two to one all other carbureters in everything that is essential and desirable in a carbureter.

Price for 1 inch size $14 Price for 1 1-4 inch size $14 Price for 1 1-2 inch size $21

The only carbureter on the market that can be installed and adjusted by purchaser without the aid of a "service department," expert adjusters or special instructions.

Money refunded at any time within 30 days if it does not prove 50 per cent better than your present carbureter.



Agents wanted everywhere except for Greater New York. Write, call or telephone for interesting booklet.

EIKER CARBURETER COMPANY, 1790 Broadway, New York

AVOID ACCIDENTS!
GET A TELL-TALE

The TELL-TALE is a simple device that will let you know instantly when your tail light is out. It can be attached to your electric horn or electric signal and when the light is out horn will blow.

Outfit complete consists of the TELL-TALE, wire, switch and buzzer.

Kerosene or Electric Outfit Complete $2.50
Combination Kerosene and Electric $3.50

Do not wait until your tail light has failed and caused you trouble. If not supplied, write---

CAMPBELL MANUFACTURING COMPANY
3715 Wentworth Ave. - - - CHICAGO
(*Dealers, Write!*)

DIXON'S No. 677

Graphite Grease is the Ideal Lubricant for Transmissions and Differentials. Write for the Book "Lubricating the Motor," No. 210.

JOSEPH DIXON CRUCIBLE CO.
Jersey City (2) New Jersey

Jackson

No Hill Too Steep
No Sand Too Deep

OLYMPIC - $1500
4 cylinders
MAJESTIC - $1975
4 cylinders
SULTANIC - $2500
6 cylinders

JACKSON AUTOMOBILE CO., 1203 East Main St. Jackson, Mich.



DECARBONIZER

Chemically removes carbon from cylinders, pistons, rings and valves

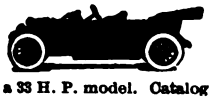
INCREASES POWER 20 PER CENT.

Volatilizes carbon, in which form it passes out thru exhaust; injury to metal impossible. Agents wanted in certain localities. Sample quart can $1.50. Write today for particulars.

MILWAUKEE AUTO SPECIALTY COMPANY
128 Second St., Milwaukee, Wis.

MIGHTY MICHIGAN "40"

40-Horsepower Touring Car or Roadster, absolutely silent in operation. Oversize tires 35x4 1-2---cylinders 4 1-4x5 1-4 in.---118-in. wheel base---four-forward-speed transmission ---demountable rims---nickel mountings ---massive, straight-line body---big, roomy seats---electric lighting by generator---everything. Price $1555, includes full equipment. We also make a 33 H. P. model. Catalog on request.



(163) MICHIGAN MOTOR CAR CO., 185 Lay Blvd., Kalamazoo, Mich.

COLE

1913 MODELS
Three Sizes
ALL FULLY EQUIPPED

Cole Sixty—Six-Cylinder - - - - - - - $2485
Cole Fifty—Four-Cylinder - - - - - - - $1985
Cole Forty—Four-Cylinder - - - - - - $1685

COLE MOTOR CAR COMPANY
INDIANAPOLIS, IND.

Subscribe to The Motor Truck

When Writing to Advertisers, Please Mention The Automobile Journal.

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Classified Buyers' Guide

A Handy Reference for Purchasers

ACCESSORY MANUFACTURERS AND JOBBERS.

Auto Parts Co., Providence, R. I.
Hopewell Brothers, Newton, Mass.
Branch: 1974 Broadway at 67th St., New York.
Johns-Manville Co., H. W., Madison Ave. and 41st St., New York City.
Miller, Chas. E., 97-103 Reade St., New York.
Branches: 202-204 Columbus Ave., Boston; Bridge and Dwight streets, Springfield, Mass.; 274 Trumbull St., Hartford, Conn.; 924 Eighth Ave., and 2782 Broadway, New York; 1421 Bedford Ave., Brooklyn, N. Y.; 318 North Broad St., Philadelphia; 824 Main St., Buffalo, N. Y.; 1829 Euclid Ave., Cleveland; 227 Jefferson St., Detroit; 259 Peachtree St., Atlanta, Ga.; 601-603 Baronne St., New Orleans, La.; 135 Central Ave., Albany, N. Y.; 274 Halsey St., Newark, N. J.
Milwaukee Auto Specialty Co., 128 Second St., Milwaukee, Wis.
Shaler Co., C. A., Waupun, Wis.
Waite Auto Supply Co., 81 Exchange place, Providence.

ACETYLENE TANKS. (See Tanks.)

ADJUSTERS.

Vansickle, John A., Indianapolis. (Ford Ideal Ball and Socket Joint.)

AIR COMPRESSORS AND TANKS.

Williams Foundry & Machine Co., Akron, O.

AUTO LOCKS. (See Locks.)

AUTOMOBILES. (See Cars.)

AUTOMOBILE SPECIALTIES.

Sumner, George, Inc., 1926 Broadway, New York.

BALLS AND BALL BEARINGS.

Boyd, F. Shirley, 903 Boylston St., Boston. (R. I. V.)
Bretz Co., J. S., 250 W. 54th St., New York. (F. & S.)
Marburg Bros., Inc., 1790 Broadway, New York. (S. R. O.)
New Departure Mfg. Co., Bristol, Conn. (New Departure.)
R. I. V. Co., 1771 Broadway, New York. (R. I. V.)

BATTERIES.

Electric Storage Battery Co., Philadelphia. (Exide.)
Geissler Bros. Storage Battery Co., 514 W. 57th St., New York.
Johns-Manville Co., H. W., Madison Ave. and 41st St., New York City. (J-M.)
Waite Auto Supply Co., 81 Exchange place, Providence. (Success.)
Willard Storage Battery Co., 5716 Euclid Ave., Cleveland. (LBA.)
Branches: 136 West 52nd St., New York; 1191 Woodward Ave., Detroit; 2241 Michigan Ave., Chicago; 243 Monadnock Bldg., San Francisco.

BATTERY EXTINGUISHERS.

Johns-Manville Co., H. W., Madison Ave. and 41st St., New York City.

BLOW-OUT PATCHES. (See Patches.)

BODIES, TRUCK.

Motor Truck Body Co., 320 Franklin St., Detroit.

BODIES—WOOD AND METAL.

Springfield Metal Body Co., 20 Medford Ave., Springfield, Mass.

(Continued on Next Page.)

EMCO AUTOMOBILE OIL
EMERY MFG. CO

Manufacturers of deodorized gasoline and lubricating oils of every description.

It costs You Nothing to try EMCO Automobile Oil.

SELDOM do we acquire valuable knowledge without a given amount of time and expense. Experimenting is a costly proposition, especially when Automobile lubrication is involved.

Emco Oils eliminate every element of chance, by permitting you to prove them to your own satisfaction. To learn this costs you nothing as the following guarantee will show.

If Emco Oil does not prove satisfactory to YOU in absolutely every respect, we will refund your money in FULL---pay freight (both ways if oil is returned) and make no charge for oil used in trial.

Emco is the one automobile oil refined exclusively from Pennsylvania Crude. Its freedom from acids and all animal and vegetable matter make it wonderfully efficient. It is light bodied, of high fire test, free from carbon and lasts nearly twice as long as most oils. Emco Automobile Oil has taught thousands the subject of correct lubrication.

If your dealer cannot supply you we will ship Emco direct to you in five or ten gallon cans, barrels or half barrels.

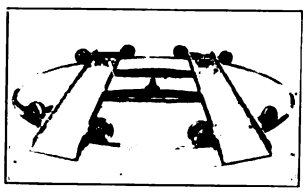
EMERY MANUFACTURING COMPANY
Lewis Emery, Jr., Propr.
General Offices—45 Main St., Bradford, Pa.

Largest independent oil refiners in the world using exclusively Pennsylvania Crude. Annual capacity about 1,000,000 barrels.



References: Dun's, Bradstreet's or any National Bank.

Drive Your Car On This



A child can turn any weight car around.

Simply drive your car onto one, a simple push and the car is turned clear around ready to be driven out of garage. Also handy for cleaning and repairing. Save enough on concrete work to almost cover cost. Lasts a life time.

Write for Catalogue and Prices.

PITLESS AUTO TURNTABLE CO.
1318 WEST 9TH STREET, KANSAS CITY, MO.

Hoffecker

"The Steady Hand"

Speedometer



Accurate, durable---the one speedometer with a daily trip register that can be set at any mileage at any time.

THE HOFFECKER COMPANY
Motor Mart —Main Offices—Boston, Mass.

PRICES $25 to $135

BRANCH OFFICES
1779 Broadway . . New York 1217 Huron Road . Cleveland
Sherridan & Palma, Pittsburgh Cor. Broad & Race Sts., Philadelphia

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AUTOMOBILE TURNTABLES

BOOKLET ON REQUEST
THE T. C. BEACH CO.

REPRESENTATIVES WANTED
168 Ottawa Street, St. Johns, Mich.

EDWARDS FIREPROOF STEEL GARAGES



For Automobiles and Motorcycles
$30 and Up
Easy to put up. Portable. All sizes. Postal brings latest illustrated catalog.
THE EDWARDS MFG. CO.,
414-464 Eggleston Ave., Cincinnati, Ohio



UNITED STATES TIRES
ARE GOOD TIRES

(BUYERS' GUIDE—Continued.)

BRAKE BANDING OR LINING.

Johns-Manville Co., H. W., Madison Ave. and 41st St., New York City. (J-M Non-Burn.)
Royal Equipment Co., The, 422 Housatonic Ave., Bridgeport, Conn. (Raybestos.)
Standard Woven Fabric Co., Worcester, Mass. (Multibestos.)
Branches: 903 Boylston St., Boston; 276 Canal St., New York; 720 Main St., Buffalo; 422 River St., Troy, N. Y.; 1427 Vine St., Philadelphia; 1430 Michigan Blvd., Chicago; 1598 Woodward Ave., Detroit; St. Louis; San Francisco.

BRAKES.

Royal Equipment Co., The, 422 Housatonic Ave., Bridgeport, Conn. (Duplex.)

BRUSHES, WIRE.

Williams Foundry & Machine Co., Akron, O.

BUMPERS AND FENDERS.

Sager Co., J. H., 271 South Ave., Rochester, N. Y. (Diamond.)

CABLES. (See Wires.)

CARBURETORS.

Planhard Mfg. Co., 1790 Broadway, New York. (Planhard.)
Sumner, George, Inc., 1926 Broadway, New York. (S. U.)

CARS—ELECTRIC PLEASURE.

Anderson Electric Car Co., 458 Clay Ave., Detroit. (Detroit Electric.)

CARS—GASOLINE PLEASURE.

Abbott Motor Co., 141 Waterloo St., Detroit. (Abbott-Detroit.)
Austin Automobile Co., Grand Rapids, Mich. (Austin.)
Cartercar Co., Pontiac, Mich. (Cartercar.)
Cole Motor Car Co., Indianapolis, Ind. (Cole.)
Empire Automobile Co., Indianapolis, Ind. (Empire, Little Aristocrat.)
Haynes Automobile Co., 166 Main St., Kokomo, Ind. (Haynes.)
Henderson Motor Car Co., Indianapolis. (Henderson.)
Herreshoff Motor Co., 620 Harper Ave., Detroit. (Herreshoff.)
Jackson Automobile Co., 1400 Main St., Jackson, Mich. (Jackson.)
Keeton Motor Car Co., Detroit (Keeton.)
Kissel Motor Car Co., 174 Kissel Ave., Hartford, Wis. (KisselKar.)
Knox Automobile Co., Springfield, Mass. (Knox.)
K-R-I-T Motor Car Co., Detroit. (K-R-I-T.)
Mercer Automobile Co., 1100 Whitehead Road, Trenton, N. J. (Mercer.)
Michigan Motor Car Co., 147 Lay St., Kalamazoo, Mich. (Michigan.)
National Motor Vehicle Co., 1033 22d St., Indianapolis. (National.)
Nordyke & Marmon Co., Indianapolis. (Marmon.)
Owen & Co., R. M., 19 W. 62d St., New York City. (Reo.)
Paige-Detroit Motor Car Co., Detroit. (Paige.)
Pierce-Arrow Motor Car Co., Buffalo, N. Y. (Pierce-Arrow.)
Reo Motor Car Co., Lansing, Mich. (Reo.)
Speedwell Motor Car Co., 80 Essex Ave., Dayton, O. (Speedwell.)
Studebaker Corporation, Detroit. (Studebaker.)
Stutz Motor Car Co., Indianapolis. (Stutz.)
White Co., The, 828 E. 79th St., Cleveland. (White.)
Branches: 320 Newbury St., Boston; Broadway and 62nd St., New York; 629-633 North Broad St., Philadelphia; 138-148 Beatty St., Pittsburg, Penn.; 610

(Continued on Next Page.)

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(BUYERS' GUIDE—Continued.)

S. Michigan Ave., Chicago; Market St. and Van Ness Ave., San Francisco; 120-122 Marietta St., Atlanta, Ga.; 74 Victoria St., Toronto, Can.
Willys-Overland Co., Toledo, O. (Overland.)

CARS—STEAM PLEASURE.

White Co., The, 828 E. 79th St., Cleveland. (White.)
Branches: See Cars—Gasoline Pleasure.

CARS—GASOLINE COMMERCIAL.

Adams Bros. Co., Findlay, O. (Adams.)
Available Truck Co., 2334 Hamilton Ct., Chicago. (Available.)
Bessemer Motor Truck Co., Grove City, Penn. (Bessemer.)
Blair Mfg. Co., Newark, O. (Blair.)
Brown Commercial Car Co., Peru, Ind. (Brown.)
Cartercar Co., Pontiac, Mich. (Cartercar.)
Clark, E. S., 242 Freeport St., Dorchester District, Boston. (Clark.)
Driggs-Seabury Ordnance Corp., Sharon, Penn. (Vulcan.)
Federal Motor Truck Co., Junction and Leavitt Sts., Detroit. (Federal.)
Garford Co., Elyria, O. (Garford.)
General Motors Truck Co., 26 Cadillac Ave., Pontiac, Mich. (G. M. C.)
Branches: New York, Chicago, Boston, Philadelphia, Kansas City.
Gramm-Bernstein Co., Lima, O. (B. A. Gramm's.)
Knox Automobile Co., Springfield, Mass. (Knox.)
Mais Motor Truck Co., Indianapolis. (Mais.)
Owen & Co., R. M., 19 W. 62d St., New York City. (Reo.)
Pierce-Arrow Motor Car Co., Buffalo, N. Y. (Pierce-Arrow.)
Reo Motor Car Co., Lansing, Mich. (Reo.)
Sullivan Motor Car Co., 611 East Ave., Rochester, N. Y. (Sullivan.)
Willys-Overland Co., Toledo, O. (Overland.)

CARS—ELECTRIC COMMERCIAL.

Anderson Electric Car Co., 458 Clay Ave., Detroit. (Detroit Electric.)
Atlantic Vehicle Co., Factory, Newark, N. J.; 1600 Broadway, New York City; 10 Postoffice Sq., Boston. (Atlantic.)
Couple-Gear Freight-Wheel Co., 575 Buchanan St., Grand Rapids, Mich. (Couple-Gear.)
Branches: 30th floor, Singer Bldg., New York; 178 Devonshire St., Boston.
General Motors Truck Co., 26 Cadillac Ave., Pontiac, Mich. (G. M. C.)
Branches: See Cars—Gasoline Commercial.
General Vehicle Co., Long Island City, N. Y. (G. V.)

CARS—FIRE, POLICE AND MUNICIPAL SERVICE.

Cartercar Co., Pontiac, Mich. (Cartercar.)
Couple-Gear Freight-Wheel Co., 575 Buchanan St., Grand Rapids, Mich. (Couple-Gear.)
Branches: See Cars—Electric Commercial.
Knox Automobile Co., Springfield, Mass. (Knox.)
White Co., The, 828 E. 79th St., Cleveland. (White.)
Branches: See Cars—Gasoline Pleasure.
Willys-Overland Co., Toledo, O. (Overland.)

CATALOGUE SYSTEMS.

Catalogue Systems Co., Fisher Bldg., Chicago, Ill.

CEMENTS.

Johns-Manville Co., H. W., Madison Ave. and 41st St., New York City.

CHAINS, TIRE, AND ANTI-SKIDDING DEVICES.

Weed Chain Tire Grip Co., 28 Moore St., New York. (Weed.)

(Continued on Next Page.)





REO THE FIFTH

Final and crowning achievement of R. E. Olds, pioneer designer of autos. A standard size 30 to 35 Horsepower four cylinder car of modern refinements priced at only $1,095.

R. M. OWEN & CO., General Sales Agents
(38) REO MOTOR CAR CO., LANSING, MICH.

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THE MOTOR TRUCK
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SAGER EQUALIZERS

The Shock Absorbers Which Save Your Car and Tires.
Nothing to Wear, Adjust or Require Attention.
They Take The "Sting" Out of Rough Roads.
Try Them At Our Expense For 30 Days.

Seven Years Of Success.

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Maxwell, Autocar, KisselKar, Dorris, Logan, Crawford, Meteor and Jewel

THOUSANDS OF DOLLARS
Saved Annually by Use of Sager Bumpers.
Don't Wait for a "Smash-up" to Buy Protection.
DO IT NOW.

PRICES $6.00 to $27.50. Liberal Discounts.

Diamond



Protection



Used Almost Exclusively On High Grade Cars.

Channel



Rochester



Clamped on Bumpers of Distinction. 30 Models. Attached in 10 Minutes
FORD SPECIAL, CLAMPED ON, $10.

J. H. SAGER CO.
271 South Avenue, Rochester, N. Y.

WARNER

AUTO-METER

The Warner is the finest and most highly developed speed and mileage indicator in the world.
THE WARNER AUTO-METER FACTORY, Dept. 9, Beloit, Wis.

PAIGE "36"—$1275
"25"—$ 950

Leaders of popular-priced cars—thoroughly built, completely equipped, backed by a strong organization. Specifications and catalog on request.

PAIGE-DETROIT MOTOR CAR CO.
306 21st Street, Detroit, Michigan

(BUYERS' GUIDE—Continued.)

CHAINS—TRANSMISSION OR DRIVING.

Boyd, F. Shirley, 903 Boylston St., Boston. (Baldwin.)
Miller, Chas. E., 97-103 Reade St., New York. (Brampton.)
Branches: See Accessory Manufacturers and Jobbers.)

CLOCKS FOR DASHBOARDS, ETC.

Boston Clock Co., 16 State St., Boston.
Chelsea Clock Co., 16 State St., Boston.

CLUTCHES—AUTOMOBILE FRICTION.

Bretz Co., J. S., 250 W. 54th St., New York. (Hartford Cone.)

COILS.

Heinze Electric Co., Lowell, Mass.

CONTROLLERS AND ECONOMIZERS.

Moller Brothers Controller & Economiser Co., 700 Betz Bldg., Philadelphia. (M&M.)

CYLINDER CLEANING COMPOUND.

Milwaukee Auto Specialty Co., 128 Second St., Milwaukee.
Prest-O-Lite Company, 271 East South St., Indianapolis. (Prest-O-Carbon Remover.)
Branches: Atlanta, Baltimore, Boston, Buffalo, Chicago, Cincinnati, Cleveland, Dallas, Denver, Detroit, Indianapolis, Jacksonville, Kansas City, Los Angeles, Milwaukee, Minneapolis, New York, Omaha, Philadelphia, Pittsburg, Providence, San Francisco, Seattle, St. Louis and St. Paul.

FIRE EXTINGUISHERS.

Pyrene Co. of New England, 176 Federal St., Boston. (Pyrene.)

FUNNELS, AUTO.

Dover Stamping & Manufacturing Co., Cambridge, Mass. (Dover.)

GASKETS.

Brown Co., Inc., Chas. D., 49 Federal St., Boston. (Vellumoid.)

GAUGES.

National Motor Supply Co., 1911 Euclid Ave., Cleveland. (Tire Pressure and Gasoline Tank.)
Branches: In all principal cities.

GEARS, STEERING.

Ross Gear & Tool Co., 794 Heath St., Lafayette, Ind. (Ross.)

GUNS, GREASE. (See Oil Pumps.)

HEADLIGHTS.

Sumner, George, Inc., 1926 Broadway, New York City. (Diva.)

HORNS.

Dean Electric Co., Elyria, O. (Tuto.)
Randall-Faichney Co., Boston. (Jericho, Jubilee.)
Branch: 918 Eighth Ave., New York.

INSULATION.

Johns-Manville Co., H. W., Madison Ave. and 41st St., New York City.

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(BUYERS' GUIDE—Continued.)

LAMP COVERS.

Hopewell Brothers, Newton, Mass. (Hopewell.)
Branch: 1974 Broadway, New York.

LICENSE NUMBER BRACKETS.

National Motor Supply Co., 1911 Euclid Ave., Cleveland, O.
Branches: In all principal cities.

LIGHTING SYSTEMS, ELECTRIC.

Apple Electric Co., Dayton, O. (Aplco.)
Dean Electric Co., Elyria, O. (Dynalux.)
Geiszler Bros. Storage Battery Co., 514-520 W. 57th St., New York.
Remy Electric Co., Anderson, Ind. (Remy.)

LOCKS, AUTOMOBILE.

Bracelet Auto Lock Co., 32 No. Clark St., Chicago.

LOCK SWITCHES. (See Switches.)

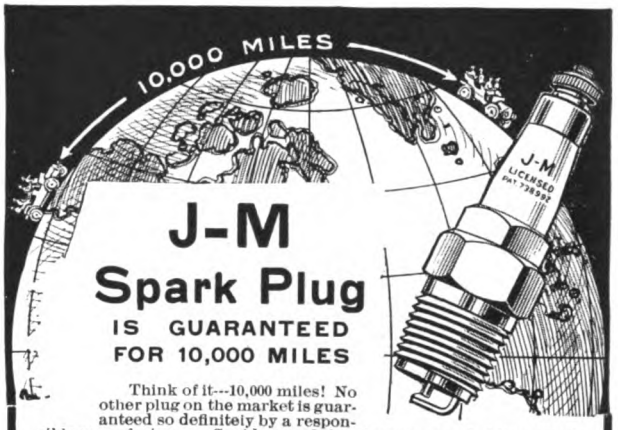
LUBRICANTS.

Borne, Scrymser Co., 80 South St., New York. (Colonial.)
Branches: Boston, Fall River, Philadelphia.
Dixon Crucible Co., Jos., Jersey City, N. J. (Graphite.)
Eagle Oil & Supply Co., 104 Broad St., Boston. (Eagle-ine No-Karbon.)
Harris Oil Co., A. W., 326 South Water St., Providence. (Harris.)
Branch: 143 No. Wabash Ave., Chicago.
Haws, Geo. A., 142-144 Front St., New York. (Panhard.)
Branch: 899 Boylston St., Boston.
Indian Refining Co., 17 Battery Place, New York. (Distributors of Havoline Oil.)
Branches: Pacific Coast—Kohl Bldg., San Francisco; Western—People's Gas Building, Chicago; Southern—Title Guarantee & Trust Bldg., Birmingham, Ala.; First National Bank Bldg., Cincinnati, O.; Lynchburg, Va.; St. Paul.
Refineries: Georgetown, Ky.; Lawrenceville, Ill.
Invader Oil Co., 80 Broad St., New York. (Invader.)
Branches: 284 Columbus Ave., Boston; 113 Arch St., Philadelphia; 3556 11th St., N. W., Washington, D. C.
Miller, Chas. E., 97-103 Reade St., New York. (Pan-American.)
Branches: See Accessory Manufacturers and Jobbers.
New York & New Jersey Lubricant Co., 165 Broadway, New York. (MoToRol, Non-Fluid, Kejex.)
Standard Oil Co., New York. (Polarine.)
Branches: In all cities.
Texas Company, The, 7 West St., New York.
Branches: Boston, Philadelphia, Chicago, St. Louis, Norfolk, Atlanta, New Orleans, Dallas, El Paso, Pueblo, Tulsa, Houston.
Vacuum Oil Co., Rochester, N. Y. (Mobiloil.)
Branches: 49 Federal St., Boston; 29 Broadway, New York; Fourth and Chestnut Sts., Philadelphia; 154 Exchange St., Bangor, Me.; 406 Hitchcock Bldg., Springfield, Mass.; 117 Commercial St., Portland, Me.; Fisher Bldg., Chicago; Ford Bldg., Detroit; Indiana Pythian Bldg., Indianapolis.
Valvoline Oil Co., 27 State St., Boston. (Valvoline.)

MAGNETOS AND SUPPLIES.

Bosch Magneto Co., 223-225 W. 46th St., New York.
Branches: 119-121 E. 24th St., Chicago; 1250 Woodward Ave., Detroit; 357 Van Ness Ave., San Francisco.
Bretz Co., J. S., 250 W. 54th St., New York. (U. & H.)
Heinze Electric Co., Lowell, Mass. (Heco.)
Marburg Bros., 1790 Broadway, New York. (Mea.)
Remy Electric Co., Anderson, Ind. (Remy.)
Splitdorf Electrical Co., 98 Warren St., Newark, N. J.
Branches: 10-20 W. 63rd St., New York; 1110 S. Michigan Ave., Chicago; 180-182 Massachusetts Ave., Boston; 1028 Geary St., San Francisco; 972

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Spark Plug
IS GUARANTEED FOR 10,000 MILES

Think of it---10,000 miles! No other plug on the market is guaranteed so definitely by a responsible manufacturer. Could you ask for stronger proof of the superiority of the J-M Spark Plug?

Moreover, the J-M Spark Plug is guaranteed to be perfect in material and workmanship. We'll replace any plug that proves defective. Every J-M Plug is doubly insulated---sheet mica around the electrode, and porcelain around the sheet mica. Break the outer insulation of porcelain and the mica still prevents short circuit or current leakage, even when a magneto supplies the current.

Any size J-M Plug can be used for either battery or magneto ignition. Sold by dealers; or shipped prepaid from our nearest branch. Price $1.00 each.

Our nearest branch will forward interesting booklet on request.

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Baltimore	Cleveland	Los Angeles	New York	Seattle
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Chicago	Indianapolis	Minneapolis	Pittsburgh	

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Guaranteed perfect satisfaction or money refunded
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"TWO-IN-ONE"
Ball Bearings
The only ball bearing that takes load from any direction with equal efficiency.
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Bristol, Connecticut

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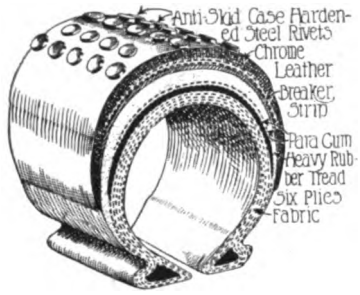
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INVINCIBLE NON-SKID TIRES

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By the INVINCIBLE process we rebuild completely your old, worn out casing, making it better than new. **New Fabric** and **Rubber** used throughout. The Chrome Leather is **solidly vulcanized** to casing, **eliminating heat** or **friction.** The **steel rivets** endure during life of shoe, a feature found in no other tire. The cost is but **four-fifths** that of a plain tread shoe. We pay express charges both ways.



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100% EFFECTIVE



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Canadian Agency: 325 St. James Street, Montreal.

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"The cars that include the most accessible motor made."

"25" $885. "35" $1290. "SIX" $1550

All prices for cars fully equipped F. O. B. Detroit.

STUDEBAKER - - Detroit, Mich.

(BUYERS' GUIDE—Continued.)

Woodward Ave., Detroit; 1228 S. Olive St., Los Angeles, Cal.; S. W. Corner Cherry and Juniper Sts., Philadelphia; 1823 Grand Ave., Kansas City; 1628 Broadway, Seattle, Wash.; London, Eng.; Buenos Aires.

MEASURES.

Dover Stamping & Manufacturing Co., Cambridge, Mass. (Auto and Savol.)

MIXING DEVICES, GASOLINE.

Approved Auto Specialties Co., 1731-37 Broadway, New York. (Wolf.)
Royal Equipment Co., 422 Housatonic Ave., Bridgeport, Conn. (Gyrex.)

MOTORCYCLE AND SUPPLIES.

American F. N. Co., Boston. (F. N.)
Branches: 49 Union St., Providence; 415 Trumbull St., Hartford, Conn.
Miami Cycle & Manufacturing Co., 320 Hanover St., Middletown, O. (Flying Merkel.)

MOTORING ORGANIZATIONS.

Federation American Motorcyclists, E. M. Estabrook, Bangor, Me.

MOTORS AND POWER PLANTS.

Continental Motor Mfg. Co., Detroit. (Continental.)
Rutenber Motor Co., Marion, Ind. (Rutenber.)

PACKING, FIRE.

Johns-Manville Co., H. W., Madison Ave. and 41st St., New York City.

PAINT, ANTI-RUST.

Anti-Rust Paint Co., Dept. 7, Akron, O. (Thomas.)

PATCHES.

Invincible Puncture Proof Tire Co., 53 Sabin St., Providence. (Invincible.)
National Motor Supply Co., 1911 Euclid Ave., Cleveland.

POLISH.

International Metal Polish Co., Quill St. and Belt R. R., Indianapolis, Ind. (Blue Ribbon.)
Johns-Manville Co., H. W., Madison Ave. and 41st St., New York City.

PRIMERS.

Interstate Auto Accessory Co., Indianapolis. (Ideal.)

PUBLICATIONS, AUTOMOBILE.

The Automobile Journal, 24 issues, $1.00 the year.
The Motor Truck (Commercial Car) Monthly, $1.00 the year.
The Accessory and Garage Journal, Monthly, $1.00 the year.

The A B C of Aerial Navigation	$1.00
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Overhauling, Rebuilding and Equipping the Motor Car	.50
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The A B C of Internal Combustion Engine Maintenance and Repair	.35
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The A B C of Magneto Systems	.35
The A B C of Battery Ignition Systems	.35
The Motorcycle, Maintenance, Repair and Construction	.35

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The A B C of Motor Car Chassis Maintenance and Repair ..... .25
Maintenance and Repair of Motor Car Tires..... .25
Sent Postpaid to any address in United States upon receipt of price. Address all communications to The Automobile Journal, Pawtucket, R. I.

PUMPS, OIL AND GREASE.

Randall-Faichney Co., Boston. (B-Line.)
Branches: See Horns.

PUMPS, TIRE.

Brown Co., Syracuse, N. Y. (Brown Impulse.)
Dewey-Anderson Co., Toledo, O. (Dewey Power.)

RADIATOR CONNECTORS.

Johns-Manville Co., H. W., Madison Ave. and 41st St., New York City.

RIMS—REMOVABLE AND DETACHABLE.

Boyd, F. Shirley, 903 Boylston St., Boston. (Dorian.)
Firestone Tire & Rubber Co., Akron, O.
Branches: In all principal cities.
Standard Welding Co., Cleveland. (Stanweld.)
United States Tire Co., Broadway and 58th St., New York. (Continental and Whittlesey Demountable.)
Branches: New York, Chicago, San Francisco.

ROAD BUILDING MATERIALS.

Barrett Manufacturing Co., New York. (Tarvia.)
Branches: Chicago, Philadelphia, Boston, St. Louis, Cleveland, Pittsburg, Cincinnati, Kansas City, Minneapolis, New Orleans, Seattle, London, Eng.; Montreal, Toronto, Winnipeg, Vancouver, Can.; St. John, N. B.; Halifax, N. S.

SELF-STARTERS.

Willard Storage Battery Co., 5716 Euclid Ave., Cleveland. (LBA.)
Branches: See Batteries.

SHIELDS, MOTOR.

Johns-Manville Co., H. W., Madison Ave. and 41st St., New York City. (Asbestos.)

SHOCK ABSORBERS AND SUPPLEMENTARY SPRINGS.

Boyd, F. Shirley, 903 Boylston St., Boston.
J. M. Shock Absorber Co., 210 St. 17th St., Philadelphia. (J. M.)
Sager Co., J. H., 271 South Ave., Rochester, N. Y. (Peerless.)
Sumner, George, Inc., 1926 Broadway, New York. (Velvet Auxiliary, Acme.)

SOAPS.

Hopewell Bros., Newton, Mass. (Paos.)
Branch: 1974 Broadway, New York.

SPARK PLUGS AND IGNITERS.

American Ignition Co., 319 Adams St., Dorchester, Mass. (Amico.)
Bosch Magneto Co., 223-225 W. 46th St., New York.
Branches: See Magnetos and Magneto Supplies.
Heinse Electric Co., Lowell, Mass. (H. E. Co. Priming.)
Johns-Manville Co., H. W., Madison Ave. and 41st St., New York City.
Mosler, A. R., & Co., P. O. Box M, Mt. Vernon, N. Y. (Spit Fire.)
Randall-Faichney Co., Boston. (Mac-Kae.)
Branches: See Horns.

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Ideal Hot Weather Lubricants

HARRIS

TRADE MARK REG. U.S. PAT. OFF.

OILS

On account of their purity and freedom from soot-producing carbon, they insure a cool, clean and efficient motor.

HARRIS OILS are SERVICE OILS —HIGH DUTY OILS. They are refined from Premium Pennsylvania Crude stock by a process evolved from 28 years of experience.

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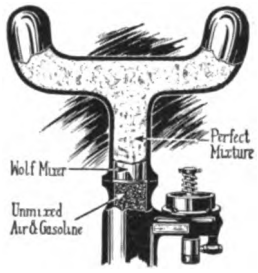
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A. W. Harris Oil Co.

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143 No. Wabash Avenue, Chicago, Ill.

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to prevent the increased cost of Gasoline, but you **CAN** cut your consumption **15** to **40%** with

Wolf Gasoline Savers

Get more power and flexibility.
Less noise, vibration and carbon deposits.
No moving or delicate parts.
No screens to clog.
Inserted in manifold in a few minutes.
No holes to bore.

PRICE, size up to

1 1-2 in.....$1.50
1 9-16 in. to 2 in..... 2.00
Special Ford Type..... 1.00

State make and model of car. Sent postpaid on receipt of price. Sold on two weeks' trial.

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Three Great Models. Pilot 40, four-cylinders, 4 1-2x5. Brake test, 53 horse power. 120-in. wheel base. Price, $2000. Pilot 50, four-cylinders, 4 1-2x6. Brake test 59 horse power. 126-in. wheel base. Price, $2250. Pilot 60, six-cylinders, 4x6. Brake test 67 horse power. 132-in. wheel base. Price, $2,500.

The Car Without a Mechanical Defect

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High-Grade Pleasure Car and Motor Truck Springs

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Five Passenger Touring Car, Fully Equipped	**$900**
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Splitdorf Electrical Co., 98 Warren St., Newark, N. J.
Branches: See Magnetos and Magneto Supplies.
Standard Co., The, Torrington, Conn. (Black Eagle.)

SPARK PLUG TERMINALS.

Johns-Manville Co., H. W., Madison Ave. and 41st St., New York City.
Randall-Faichney Co., Boston. (Mac-Kae Blitz.)
Branches: See Horns.

SPEEDERS.

Interstate Auto Accessory Co., Indianapolis. (Ideal.)

SPEEDOMETERS, RECORDERS, ETC.

Hoffecker Co., The, Motor Mart, Boston. (Hoffecker.)
Jones Speedometer, New Rochelle, N. Y.
Branches: Broadway and 76th St., New York; 109 Massachusetts Ave., Boston; 1416 Vine St., Philadelphia; 1430 Michigan Ave., Chicago; 852 Main St., Buffalo; 253-255 Jefferson Ave., Detroit; 530 Golden Gate Ave., San Francisco; 1229 So. Olive St.; Los Angeles, Cal.; 329 Ankeny St., Portland, Ore.; 917 E. Pike St., Seattle, Wash.
Service Recorder Co., 2245 East 105th St., Cleveland. (Servis.)
Stewart-Warner Speedometer Corp., Chicago. (Auto-Meter.)
Branches: 116 Edgewood Ave., Atlanta, Ga.; 925 Boylston St., Boston; 720 Main St., Buffalo; 2420 Michigan Ave., Chicago; 807 Main St., Cincinnati; 2062 Euclid Ave., Cleveland; 1518 Broadway, Denver; 870 Woodward Ave., Detroit; 330½ North Illinois St., Indianapolis; 1613 Grand Ave., Kansas City; 748 S. Olive St., Los Angeles, Cal.; 1902 Broadway, New York; 302 N. Broad St., Philadelphia; 5940 Kirkwood Ave., Pittsburg; 14 N. Seventh St., Portland, Ore.; 36-38 Van Ness Ave., San Francisco; 611 E. Pike St., Seattle, Wash.; 3923 Olive St., St. Louis; 559 Yonge St., Toronto, Can.

SPRINGS FOR AUTOMOBILE SUSPENSION.

Marburg Bros., Inc., 1790 Broadway, New York. (Marburg-Hagen.)
Perfection Spring Co., No. 1 Plant, 2414 Superior Ave., N. W.; No. 2 Plant, East 65th and Central Ave., Cleveland.

SPROCKETS.

Boyd, F. Shirley, 903 Boylston St., Boston. (Baldwin.)

STEEL PARTS, SEAMLESS.

Standard Welding Co., Cleveland.

STORAGE SYSTEMS—GASOLINE AND OIL.

Scaife & Sons Co., Wm. B., Pittsburg, Penn.
Branch: New York City.

TANKS, ACETYLENE GAS.

Prest-O-Lite Company, 271 East South St., Indianapolis. (Prest-O-Lite.)
Branches: See Cylinder Cleaning Compound.

TANKS FOR FUEL AND WATER.

Scaife & Sons, Wm. B., Pittsburg, Penn.
Branch: New York City.

TANKS, TIRE INFLATING.

Prest-O-Lite Co., 271 East South St., Indianapolis. (Baby Tire Filler, The Emancipator.)
Branches: See Cylinder Cleaning Compound.

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TAPE—ASBESTOS.

Johns-Manville Co., H. W., Madison Ave. and 41st St., New York City.

THERMOS CASES.

Dover Stamping & Mfg. Co., Cambridge, Mass.

TIRE ACCESSORIES.

Firestone Tire & Rubber Co., Akron, O.
Branches: See Rims—Removable and Detachable.
Shaler Co., C. A., Waupun Wis.

TIRE CASES.

Hopewell Brothers, Newton, Mass. (Hopewell.)
Branch: 1974 Broadway, New York.

TIRE CHAIN GRIPS. (See Chains.)

TIRE PRESERVATIVES AND PROTECTORS.

Approved Auto Specialties Co., 1731-37 Broadway, New York. (Goodman Tire Shield.)

TIRES—CASINGS AND INNER TUBES.

Braender Rubber & Tire Co., Rutherford, N. J. (Braender.)
Dayton Rubber Mfg. Co., Dayton, O. (Dayton Airless.)
Diamond Rubber Co., Akron, O. (Diamond.)
Firestone Tire & Rubber Co., Akron, O. (Firestone.)
Branches: See Rims—Removable and Detachable.
Fisk Rubber Co., Chicopee Falls, Mass. (Fisk.)
Branches: 811-813 Boylston St., Boston; 17½ Dorrance St., Providence.
Gaulois Tire Co., 1926 Broadway, New York. (Gaulois.)
Goodyear Tire & Rubber Co., Madison St., Akron, O. (No-Rim-Cut.)
Branches: In all principal cities.
United States Tire Co., Broadway and 58th St., New York. (Continental, G & J, Hartford, Morgan & Wright.)
Branches: See Rims—Removable and Detachable.
Walpole Tire & Rubber Co., Walpole, Mass. (Walpole.)

TIRES—CUSHION.

Cataract Rubber Co., Wooster, O. (Cataract.)
Branches: Boston, New York, Providence.
Firestone Tire & Rubber Co., Akron, O. (Firestone.)
Branches: See Rims—Removable and Detachable.
Motz Tire & Rubber Co., The, Akron, O. (Electric Special Motz Cushion.)
Branches: Boston, New York, Philadelphia, Pittsburg, Chicago, Kansas City, Detroit, Cleveland, Los Angeles.

TIRES—MOTORCYCLE.

United States Tire Co., Broadway and 58th St., New York. (Morgan & Wright, G & J.)
Branches: See Rims—Removable and Detachable.

TIRES—SOLID AND COMMERCIAL.

Diamond Rubber Co., Akron, O. (Diamond.)
Firestone Tire & Rubber Co., Akron, O.
Branches: See Rims—Removable and Detachable.
Fisk Rubber Co., Chicopee Falls, Mass.
Branches: See Tires—Casings and Inner Tubes.
Motz Tire & Rubber Co., The, Akron, O. (Motz.)
Branches: See Tires—Cushion.
Polack Tyre and Rubber Co., 246 W. 59th St., New York City. (Polack.)
Republic Rubber Co., Youngstown, O. (Republic.)
United States Tire Co., Broadway and 58th St., New York.
Branches: See Rims—Removable and Detachable.

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Type 22 Ammeter, 2¼" Diameter.

THE CALL FOR THE SMALL.

With the almost universal application of electric lighting to the gasoline pleasure car has come an imperative demand for smaller meters. This is but natural as the dashboard space is limited, and the space requirements many.

Six years ago the Hoyt Electrical Instrument Works recognized the value of meters in promoting the efficiency of the gas car and designed their Type 25 Ammeters and Voltmeters for the purpose. This was the smallest practical switchboard meter on the market, and was but 3" diameter over all.

Thousands of them in constant use on pleasure cars the world over testify in the strongest possible manner to their value as an aid to efficiency.

Recognizing the popularity of Hoyt Type 25 meters, many electrical instrument manufacturers are now making 3" meters, but even the 3" meter is now considered too large, and the call is heard on every side for something still smaller. The Hoyt Type 22 meter is the response. 2¼" diameter, accurate, rugged, reliable.

Many 1914 cars will carry these meters as regular equipment.

Ask for Bulletin No. 13 A.

HOYT ELECTRICAL INSTRUMENT WORKS,
Penacook, N. H.

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BUFFALO'S LEADING TOURIST HOTEL

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903 Boylston St. Boston, Mass.

Dorian Demountable Rims.

Supplementary Spiral Springs. R. I. V. Ball Bearings.

CAMERON CARS $975

All Up-To-Date Features

Four cylinder, water cooled, 30 H. P. Four forward speeds. 112 in. wheelbase. Left hand drive, centre control. Starts from seat. Pointed hood, beautiful lines and finish. Equipment unsurpassed at the price.

Write for full details and terms to agents

THE CAMERON MANUFACTURING CO. Beverly, Mass.

(BUYERS' GUIDE—Concluded.)

TOPS AND ATTACHMENTS.

Springfield Metal Body Co., 20 Medford Ave., Springfield, Mass.

TROUBLE FINDERS.

Hopewell Brothers, Newton, Mass. (Vibrator.)
Branch: 1974 Broadway, New York.

TRUCKS AND TRACTORS—(See Cars, Commercial.)

TRUNK RACKS.

Connecticut Steel & Wire Co., Hartford, Conn.

TUBING, GAS.

Johns-Manville Co., H. W., Madison Ave. and 41st St., New York City.

TURNTABLES.

Beach Co., T. C., 108 Ottawa St., St. Johns, Mich. (Beach.)

UNIVERSAL JOINTS.

Bretz Co., J. S., 520 W. 54th St., New York. (Hartford.)

VALVE GRINDERS.

Wall, J. H., 290 Hope St., Bristol, R. I. (Ford.)

VULCANIZERS.

National Motor Supply Co., 1911 Euclid Ave., Cleveland. (Garage and Individual.)
Branches: In all principal cities.
Shaler Co., C. A., Waupun, Wis. (Shaler.)
Vanderpool Co., Springfield, O.
Williams Foundry & Machine Co., Akron, O.

WELDING OUTFITS.

Prest-O-Lite Co., 309 W. South St., Indianapolis. (Prest-O-Welder.)
Branches: See Cylinder Cleaning Compound.

WELDING STEEL.

Standard Welding Co., Cleveland.

WHEELS.

McCue Co., The, Buffalo, N. Y. (Wire.)

WIRES AND CABLES.

Diamond Rubber Co., Akron, O. (Diamond.)

WIRE MECHANISM.

Bretz Co., J. S., 250 W. 54th St., New York. (Bowden.)

WRENCHES AND COMBINATION OUTFITS.

Allen Wrench and Tool Co., Providence, R. I. (Allen Friction Socket Sets.)
Coes Wrench Co., Worcester, Mass.
Cutter, George A., Taunton, Mass.
Walworth Manufacturing Co., Boston. (Stillson.)



Bay State Autokit, No. 1, $10

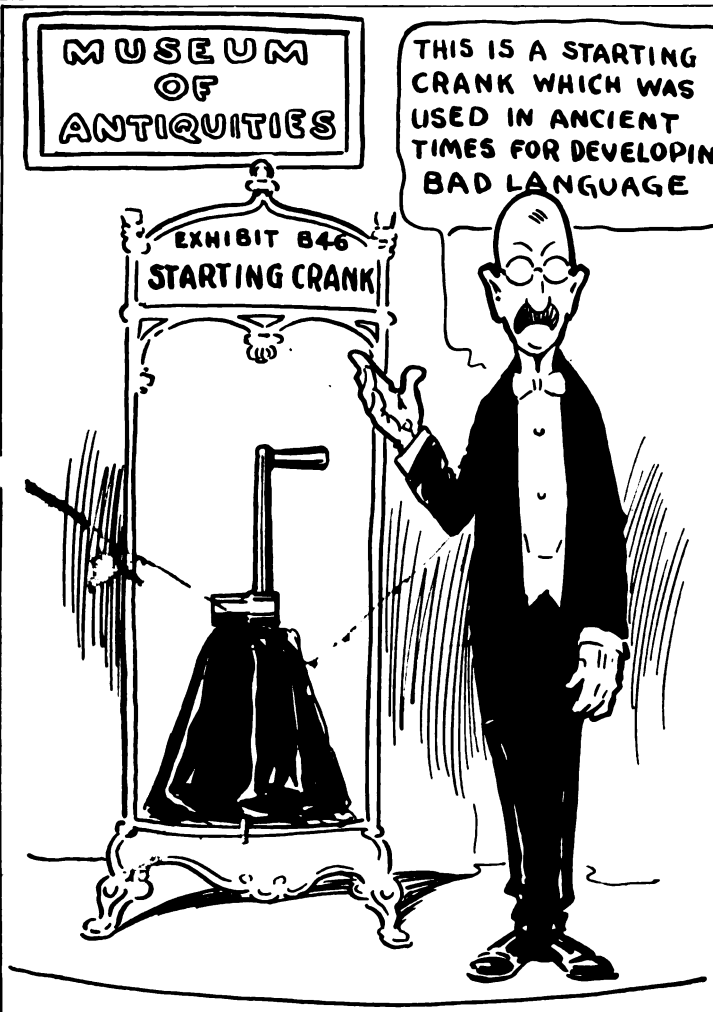
Bay State Autokit, No. 2, $7.50

Bay State Stickit, $3

GEO. A. CUTTER, Sales Agent

Taunton Mass.

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DON'T BE ANTIQUE BE UP-TO-DATE

In every museum there's a niche waiting for the automobile hand crank.

And soon there will be niches for the people who continue using them.

Don't be antique. What's the use, when there are Electric Crankers that know their business and can do a better job of cranking than any human being?

Every Electric Cranking System must have a Storage Battery. The most—and best—include in their equipment the

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Write us for full information

Willard Storage Battery Co.

New York Branch: 136 W. 52d St.
Detroit Branch: 1191 Woodward Ave.
CLEVELAND, OHIO
Chicago Branch: 2241 Michigan Ave.
San Francisco Branch: 243 Monadnock Bldg.
Indianapolis Branch: 438 & 439 Indiana Pythian Bldg.

Depots in all Principal Cities in the United States, Canada and Mexico

(32)

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Honest Now, Mr. Automobile Dealer

Are You Making Enough Money?

Here's what a lot of dealers are up against. Maybe you're in this class. They are doing a good business—selling quite a bunch of cars and making a good profit, *if* they could *hang on to it.* But here's where the trouble comes in. Every time something goes wrong, (fancied or real) with the car of the customer, ting-a-ling goes the phone, or in comes Mr. Customer to have his car fixed up, and, of course, there can be no charge, because he bought it from Mr. Dealer and *he* is responsible.

Now there's just one way to dodge all this kind of trouble—get a car that doesn't need much of this kind of attention. Through all these 20 years of auto building, our one goal has been—make the Haynes perfect—make it so trustworthy and simple that it will stay in running order and give satisfaction through hard use and even abuse in the hands of unskilled drivers.

Connect up with the

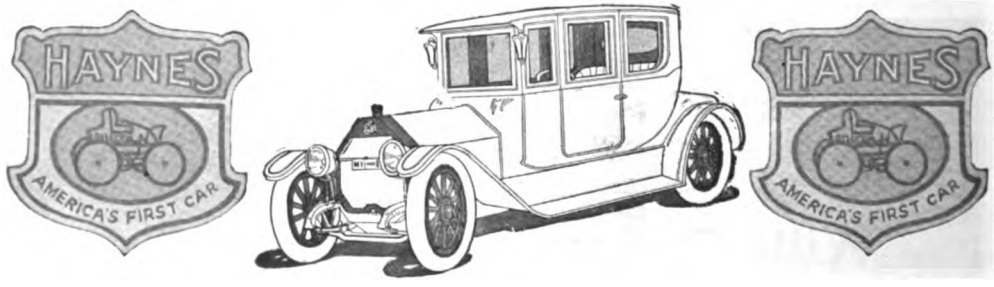
HAYNES

—the Car *Without* the "Come-Backs"

We'll be glad to tell you how simple the Haynes is in every part—glad to tell you how carefully each car is manufactured in our own shops or under our direct supervision—glad to tell you the tests which every separate part, and the car complete are required to meet. We'll also be glad to tell you what Haynes dealers say as to the satisfaction given by the Haynes and how little bother they have with "come-backs."

Specifications of the New Haynes

Motor—Bore 4 1-4 in., Stroke 5 1-2 in. L-head Haynes. Cylinders cast in pairs.
Cooling—Centrifugal pump and pressed steel fan.
Wheel Base—Model 26, 130. Model 27, 136. Model 28, 118.
Ignition—American Simms Magneto.
Lubrication—Splash and gravity feed.
Control—Left hand. Vulcan Electric Gear Shift.
Transmission—Selective Type, three speeds forward, one reverse.
Steering Column—Worm and worm gear type.
Clutch—Haynes contracting steel band.
Rear Axle—Full Floating Timken on Models 26 and 27; McCue, Model 28. Gourney Bearings.
Front Axle—I-Beam. O. H. steel heat treated.
Wheels—Artillery type. Funk demountable rims.
Tires—Models 26 and 27, 36x4 1-2. Model 28, 34x4.
Springs—Front Semi-elliptic 39 1-8x2, rear 48x2.
Brakes—15 1-4 external and 15 internal on Models 26 and 27. 12 and 16 internal on Model 28.
Finish—Indian dark blue body.
Gasoline Feed—Pressure. Automatic feed.
Upholstery—Buffed leather—deep cushions.
Starting and Lighting—Leece-Neville electrical system.
Dash Equipment—Electric lights, sight oil feed, automatic cut-out for generator, dash light, auxiliary air pressure pump, air gauge and speedometer. Models 26 and 27 have rim wind clock.
Other Standard Equipment—Top, top cover of silk mohair, mechanical tire pump, rain vision ventilating wind-shield, Vulcan electric gear shift, two large electric headlights, electric side lights, electric tail light, full dash equipment, electric starter, generator, 80 ampere hour storage battery, speedometer, horn, coat and foot rails, tire irons, full tool equipment, and one extra demountable rim.



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The New Haynes Models Have the Season's Biggest Feature—the Vulcan Electric Gear Shift

Here's another thing a lot of dealers are up against—and maybe this also applies to you. They're handling a good car, gives good satisfaction, customers pretty well pleased, but the drawback is—there is nothing different, nothing distinctive about the car to make people go out of their way to come in and see it.

The new Haynes has a selling wallop that brings the prospects in and helps you put over the sales. In addition to everything that can be desired in the way of comfort, convenience, equipment and prestige of twenty years building—it has the wonderful Vulcan Electric Gear Shift.

Connect up with the

HAYNES

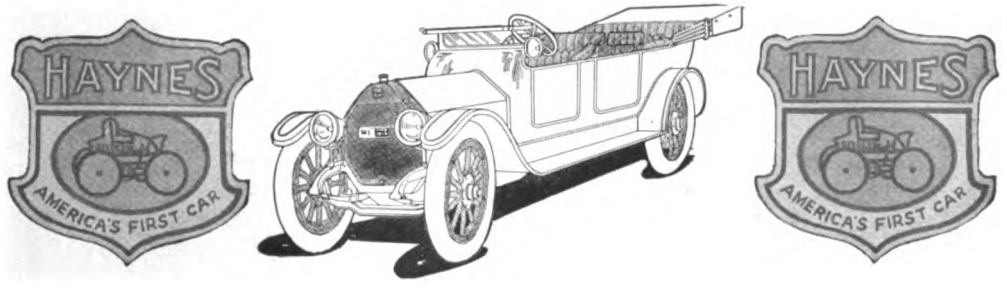
—the Car that Is Always *First*

True to its reputation as pioneer and pacemaker, the Haynes was first to adopt this, the greatest improvement in automobile equipment. Added to the electric self-starter and electric lighting, is everything else in the way of modern equipment—it makes the Haynes the strongest kind of a selling proposition. Read the specifications and see for yourself.

Get After the Haynes Agency Today

If you are in business for money, not merely for your health—if you would like to get hold of the agency for a car that's a live seller, that's famous for its quality and dependability—that stays sold and stops the "profit-killing come-backs"—if you would like to do business with a *stand-by* and a *fixture* in the auto business, insure your business for the future—and if you would like to make the coming year *your biggest year*, write us today about the Haynes, America's First Car and the car with the wonderful Vulcan Electric Gear Shift.

The Haynes Automobile Co., 6 Main St., Kokomo, Ind.



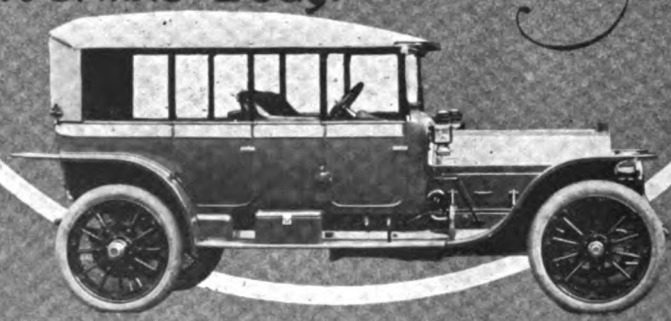
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SPRINGFIELD METAL BODY CO



Springfield Convertible Bodies
A Construction Giving the Qualities of a Limousine & Touring Equipment That May Be Converted as Quickly as a Folding Top Can be Raised or Lowered. When Folded the Full Space of the Touring Car is Available — When Raised It is a Regular Top or It Can Be Glass Enclosed.

Dealers, Who Insist on Quality Equipment, Specify The Springfield Convertible Body.



SPRINGFIELD, MASSACHUSETTS

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"The Easiest Riding Car In The World"

MARMON



Old School Honor Plus The Efficiency of Today.

Plain, old-fashioned honor has been the foundation of many industrial successes. An honest effort to make the best possible goods to meet the requirements of the purchaser, a fair price placed upon these goods and square dealing with the buying public—these are among the things covered by that one word "honor."

Twelve years before the battle of Gettysbury, Nordyke & Marmon Company began the manufacture of machinery to meet highly exacting requirements. Since then more than 40 manufacturing concerns have entered the same field. some with large production and low prices, others with special methods of obtaining business and others with various propositions. Today Nordyke & Marmon Company, with no variation of its policy, is among five survivors of this varied competition. During the 62 years, it has never marketed a product built for cheapness or with any other end in view than the best possible service to the purchaser.

Has this "old-school honor" paid? The answer lies here—in one of the leading manufacturing institutions of the great Middle West, a concern owned by the family that founded it, a company with 62 years of constant, healthy growth and unimpaired credit.

In the early days of the automobile industry Nordyke & Marmon Company began to build motor cars, the best that brains, experience, money and honest intent could produce. Always abreast and sometimes in advance of the marvellous development of this new device for the pleasure and convenience of mankind, the Marmon has become known the world over as among the very few cars classed in the first grade. It will continue among the best so long as this great manufacturing institution endures.

The great manufacturing plant of Nordyke & Marmon Company, equipped and organized at every point for up-to-the-minute efficiency, is open to your inspection. You cannot visit it without gaining from every department the indelible impress of years of sound, successful experience—without carrying away with you the greater confidence in the future and product of such an organization.

Nordyke & Marmon Company

Indianapolis (Established 1851) Indiana

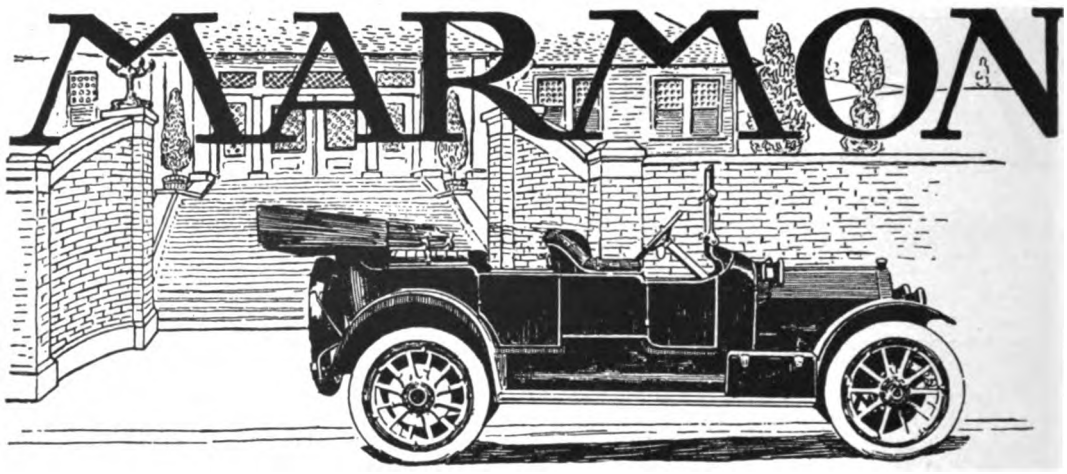
"Sixty Years of Successful Manufacturing"

When Writing to Advertisers, Please Mention The Automobile Journal.

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"The Easiest Riding Car In The World"

MARMON



The Marmon "32" Five-Passenger Touring Car

Price, $3,000. Four-cylinder, 32-40 h. p., 120" wheelbase, body types and equipment to meet every requirement. A rational, logical car for touring and city use. Years of satisfactory service have proved its economy in tires, fuel and upkeep—plus smooth, delightful operation and durability.

ANNOUNCEMENT

For the coming season the Marmon "Thirty-Two" offers all the latest ideas in equipment, style and appointment.

The features of exclusive Marmon design, the scientifically selected materials and conscientious, expert workmanship, attain their highest development in this car.

The experience of sixty-two years of successful manufacturers of high grade machinery stands back of the refinement and mechanical perfection of the Marmon "Thirty-Two."

A few of its many superior features:

Marmon "32" Motor—Proved the best by comparison with the finest products of European and American makers in the winning of the most arduous of long-distance races and road tours, and backed by years of consistent service in the hands of owners. Four cylinder, 4½" bore, 5" stroke, 32-40 h. p., two spark, dual ignition system, large valves, abundant power, combined with great flexibility and economy of fuel.

Lubrication—Marmon automatic force-feed, direct to bearing surfaces through hollow crank shaft. Widely copied, but never equalled. Simple and reliable, reducing oil consumption and wear to the minimum.

The Most Practical Three Point Motor Suspension. Straight Line Shaft Drive. Improved Cone Clutch.

Transmission—Unit with rear axle. Simple, strong, easy of access.

Internal Expanding Brakes—Two sets on each rear wheel, 403 square inches of braking surface. Clean cut design. Accessible and effective adjustment. Acknowledged by official investigation the most effective of braking systems

Rear Axle—Marmon design and construction. Pressed steel housing, light, strong and durable. Accessible differential.

Left Hand Drive—With center control and every feature for safe and easy operation, making a car that a woman may drive with assurance—a car that may be trusted in any emergency.

Bodies—The individual design and finish of the Marmon "Thirty-Two" bodies add a distinctive tone of beauty and refinement. Distinguished in appearance they indicate the high character of every detail of the car. They are made with every care, of finest materials, fitted with every appointment and extra deep hand-buffed upholstery. The running boards are clean, with metal boxes for batteries and tools set in front fenders.

Equipment—Electric starting and lighting system; tailor made top with dust boot and curtains; built-in windshield, adjustable for ventilation, black and nickel finished; speedometer and clock combination; electric horn with button on steering wheel; electric light to illuminate entire dash; shock absorbers front and rear; single tire carrier rear and one extra demountable rim; coat rail; foot rest; full assortment of tools and electric extension lamp. Box in rear and compartments in tonneau provide ample storage space for curtains, tubes, pump, jack and other articles.

Prices—Five-passenger Touring Car, $3,000; Four-passenger Suburban, $3,000; Two-passenger Roadster, $2,900; Speedway Type Speedster, $2,850; Limousine (seats seven), $4,000; Landaulet (seats seven), $4,100; prices f. o. b. factory, Indianapolis, Ind.

Detailed Information on Request.

Nordyke & Marmon Company

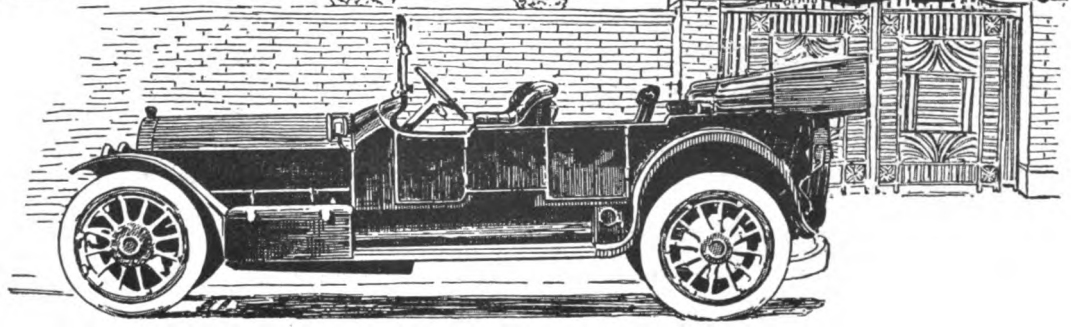
Indianapolis (Established 1851) Indiana

"Sixty Years of Successful Manufacturing"

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"The Easiest Riding Car In The World"

MARMON



The Marmon "48" Seven-Passenger Touring Car

Price, $5,000. Six-cylinder, 48-80 h. p., 145" wheelbase, with short turning ability, eliminating the old objections to long wheelbase. Body types and equipment to meet every requirement. The only big car with small car advantages. Wonderful riding qualities and surpassing power and flexibility. A car developed by years of exacting tests.

ANNOUNCEMENT

The more a man knows about motor cars—the more he will appreciate the Marmon "Forty-Eight."

It is distinguished by its exclusive features as the most complete, luxurious and capable of all high-powered cars.

It has abundant power in proportion to weight. It combines small car ease of operation with the comfort and luxury of big car smoothness, flexibility and easy riding.

A few of the distinctive features of the Marmon "Forty-Eight."

Marmon "48" Motor—The finest example of modern motor construction—silent and free from vibration at from three to sixty miles per hour on high gear—tremendously powerful—wonderfully flexible and responsive. Six cylinders, 4½" bore, 6" stroke, two-spark dual ignition system, large valves, enclosed, silent chain connection to electric starter.

Lubrication—A further development of the famous Marmon automatic force feed, oiling system, used first in this country by the Marmon and proven successful by over ten years of service on Marmon cars. The oil is carried through hollow cam-shafts direct to the cam-shaft bearings, as well as through the hollow crank shaft direct to the main bearings, connecting rod and piston-pin bearings.

Three Point Suspension, Straight Line Shaft Drive, Multiple Disc Dry Plate Clutch.

Transmission, Rear Axle and **Brakes**—of proportionate size and following the same general design developed on the Marmon "Thirty-Two" and proved by the most strenuous tests of racing on track and road and in the hands of owners.

Front Axle—One of the many exclusive features of this distinctive car. The vertical spindle is placed in the direct, center line of the wheel. It makes the safest, surest and easiest steering mechanism ever devised. It permits this 145-inch wheelbase car to be turned in a remarkably short radius—gives you all the pleasure and comfort of big car operation combined with the advantages of small car ease of control.

Simplicity and Accessibility—No other high-powered car on the market offers such freedom from complication of mechanism—gives so many aids to sure, quick and simple adjustment of working parts.

Capability—In the design and manufacture of this car the underlying idea was to meet every requirement of the discriminating buyer, who after long years of motoring experience has come to the exacting point of knowing and demanding the best. The Marmon "Forty-Eight" is alike the car supreme on the fashionable boulevard or on the most tortuous road or hill that long-distance touring provides. In all-round capability no car can equal its records of performances.

Bodies—The low-hung, graceful Marmon bodies mark a new note in design, distinctly in advance of anything heretofore presented to the public. In the beauty of line, in the comfort of even balance, well proportioned springs and deep upholstery and in luxury of appointment and finish, they leave nothing to be desired. The appearance is enhanced by clean running boards. Ample storage space is provided for luggage and supplies.

Equipment—Electric starting and lighting system; extra quality tailor-made top with dust boot and curtains; new type windshield, designed as part of the dash with provision for abundant ventilation; speedometer and clock; electric light to illuminate entire dash; electric step light under tonneau doors; electric emergency lamp with long extension cord; electric horn, power tire pump, shock absorbers front and rear, tire carrier rear and extra demountable rim, coat rail, foot rest, full assortment of tools.

Prices—Seven, Five, Four and Two-Passenger Body Types, $5,000; Limousine (seats seven), $6,250; Berline Limousine (seats seven), $6,450; Landaulet (seats seven), $6,350; prices f. o. b. factory, Indianapolis, Ind.

Detailed Information on Request.

Nordyke & Marmon Company

Indianapolis (Established 1851) Indiana

"Sixty Years of Successful Manufacturing"

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COES

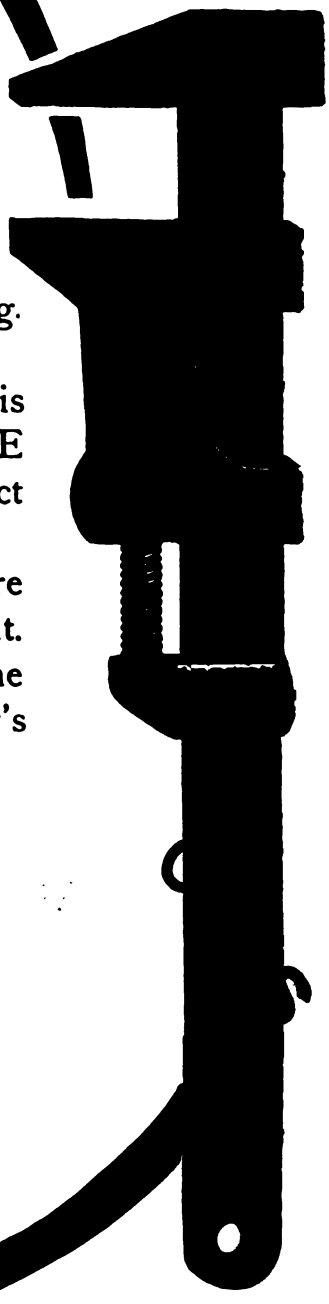
THE
Wrench Supreme

Strength without bulk or clumsiness.
Ease of handling without slipping or bruising.
Perfect balance and right grip

Everything the motorist desires in a wrench is to be found in the "COES" AUTOMOBILE MODEL, and you will never know perfect wrench service until you pin your faith to it.

It stands to reason that the 5 per cent. more you pay for a "COES" wrench goes for 60 per cent. more quality and service—put this wrench in the tool kit and shop. You will get your money's worth.

Send for Literature Now.

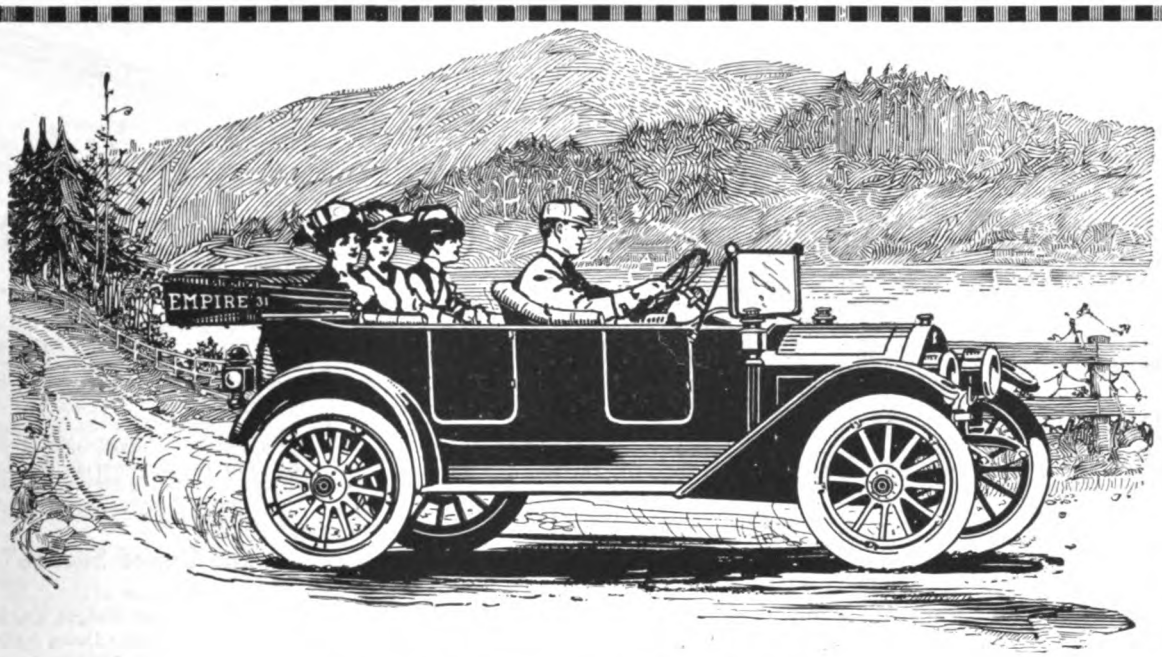


Coes Wrench Co.

WORCESTER, MASS.

J. C. McCARTY & CO.,
21 Murray St., New York City
JOHN H. GRAHAM & CO.,
113 Chambers St., New York City

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EMPIRE

"The Little Aristocrat"

COMPLETELY EQUIPPED $950

Demountable Rims	Windshield	Prest-O-Lite Tank	Speedometer
Mohair Top	Robe and Foot Rails	Gas Headlights	Oil Sight Feeds
Top Envelope	Oversize Tires	Oil Side and Tail Lamps	Rear Double Tire Irons
Enclosing Curtains	Tool and Tire Kits	Pump and Jack	Horn Under Hood
Shock Bumpers	Extra Rim	Dash Air Adjustment	Eisemann Magneto

It was the sturdy reliability and touring excellence of the Empire and its economy of upkeep and operation that brought the great flood of orders.

It is largely because of this that we are quadrupling our output for next season; and the increased production is under way right now.

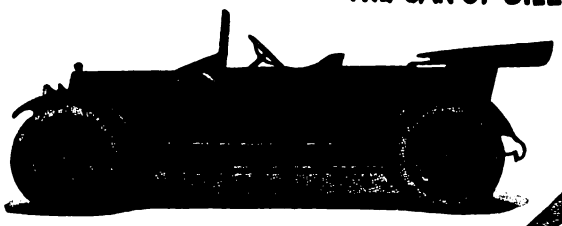
We are prepared to allot territory which is now open. If you are in open territory, tell us who and what you are.

Empire Automobile Co. Indianapolis, U. S. A.

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Lyons-Knight

"THE CAR OF SILENCE"



$2900

The Proposition

Here in brief are a few of the many individual and distinctive features of this car—announced here for the first time. Every element of the Lyons-Knight car is the culmination of years of effort and test—the best that engineering brains, backed by the facilities and materials of ample capital, can afford. Judge these few points:

Outline Specifications

Engine—Lyons-Knight, four cylinder, four cycle, 4½ inch bore, 5½ inch stroke, water cooled.

Horse Power—50

Oiling—Lyons-Knight pressure feed to all bearings, pistons and sleeves regulated in accordance to engine power.

Carburetor—Improved double jet, especially designed, with adjustment on steering column.

Ignition—Dual, water-proof, high-tension magneto.

Clutch—Three plate, raybestos faced.

Transmission—Silent, selective, three-speed, sliding gear type embodied in rear axle housing.

Driving Gear—Worm drive, silent, smooth and always efficient in operation.

Rear Axle—Full floating, Timken bearings.

Brakes—Two sets, double acting, internal and external on 16" rear wheel drums.

Front Axle—Timken drop forged "I" Beam with roller bearings in steering heads and hubs.

Wheel Base—130 inches, tread 56 inches.

Wheels—Wood with quick detachable, demountable rims and 37 x 5 inch tires, front and rear. Wire wheels special.

Famous Knight Engine

During five years of successful use the Knight engine has proved its wonderful stability and endurance. Its famous test by the Royal Automobile Club, of four years ago, has never been equaled, either in the severity of the test or power delivered. In the International Sweepstakes 500-mile race at Indianapolis, May 30th, a Knight car finished fifth. It had the smallest engine in the race, having 250 cubic inches piston displacement against 448 cubic inches of the winner. It was acknowledged by far the quietest, smoothest running car on the track. Its record for economy in tires was remarkable. The water in the radiator registered 130 degrees at the start—130 degrees at the finish. It did not replenish either water, oil or gasoline during the whole race.

The Knight engine has proved in actual service, by the testimony of owners, that it becomes better, more powerful, more efficient, after 100,000 miles of operation.

Worm Drive

"Like continuous coasting," is the term used by one passenger to express the smooth, silent operation of the Lyons-Knight car.

Added to the silent, smooth-running Lyons-Knight engine is another great feature—worm drive.

The worm gear insures absolute freedom from noise, roughness, vibration and grinding. Reports of the Society of Automobile Engineers show that while more expensive to manufacture than other gears, it is the nearest approach to 100% efficiency in the delivery of power to the axle. It also becomes better with use—gives more power and efficiency year after year.

"The Car of Silence"

Because of:

Silent Improved Knight Engine,
Silent Worm Gear Drive Axle,
Silent Improved Electric Starter,
Silent Transmission,
Silent Chain for Engine Parts.

The really startling thing about the Lyons-Knight is its remarkable silence and absolute freedom from vibration. The most delicate woman or child can ride in it for hours at high speed without the slightest fatigue. Noise means excessive friction and wear, and is directly responsible for the fatigue experienced in motoring. All mechanical noises have been entirely eliminated in the Lyons-Knight—the quietest car built. We want you to compare this exceptional car in every detail of construction and equipment with the costliest imported and American cars.

We believe you will find it equally as good—and in the multitude of individual and distinctive features and details, superior. We think you will readily agree no such value has ever been offered among cars of the first grade.

Get the Details

Any description of the details that could be crowded into an advertisement would fail to do justice to the car, since so much would have to be left out. But in justice to yourself you ought to know them before investing $2,000 or $3,000 more than is necessary in purchasing a car that will meet your highest ideals in service, capacity and class. Nor is there any reason why you should be content with a medium grade car when the best is within the reach of every man of moderate means. It is worth your while to study the details of this very remarkable car.

Write for the Lyons-Knight catalogue today.



THE LYONS-ATLAS FACTORY

Including 65 acres, six hundred and twenty-seven thousand square feet of floor space, six miles of railroad with locomotives and cars, giving a capacity for fifty thousand Lyons-Knight cars a year and backed by ample capital to produce this number or more.

Write for Complete Information

The Lyons Atlas Co.

INDIANAPOLIS IND

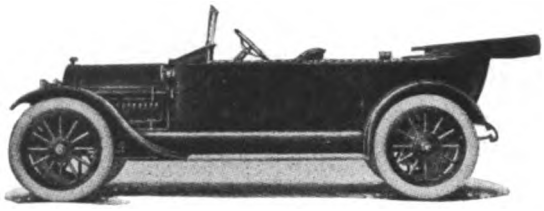
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Lyons-Knight

"THE CAR OF SILENCE"

To Dealers

$2980



You—who have had experience—
Know the greatest argument for any good car are the facts.
We are not making empty promises about the Lyons-Knight car.
We want to give you facts!

Here Is What the Lyons-Knight Actually Gives

(1) A big, high-powered car, combining six cylinder smoothness, flexibility and efficiency with four cylinder economy.

(2) A car with more distinctive and individual features—of better design and quality than has ever been offered at $5000.

(3) Silent Knight motor, silent worm drive, giving absolute freedom from vibration, growing better with 100,000 miles of service.

(4) The most complete facilities for manufacture backed by ample capital, insuring prompt deliveries on all orders.

(5) A most aggressive sales policy, including a great national advertising campaign to make the Lyons-Knight first among high-class cars.

(6) A most liberal dealers' proposition backed by extensive local advertising and sales effort from the factory to help every dealer make greater profits from Lyons-Knight cars.

(7) A complete line including large and small four cylinder Knight cars, six cylinder Knight cars, and light and heavy commercial cars with Knight motors.

What more can you ask for in any car? If you have other requirements—ask about them. The Lyons-Knight proposition may include them also.

You can write us.
We can describe the many distinctive and exclusive features of this car.

The catalog will give you some idea of it.

Our dealers' proposition is most liberal from your standpoint.

But the best way to know the whole matter is to get the facts for yourself.

The Lyons-Atlas factory is a reality. The Lyons-Knight car is not an idea—but an accomplished fact—the cars themselves are ready for delivery.

Come—see for yourself.

Sell the car to yourself first.

View every part in the course of manufacture.

Compare facilities, design, materials and workmanship with what any other automobile factory actually offers.

Ride in the Lyons-Knight.

Judge if any car—at any price—offers so much downright motor car satisfaction.

Every experienced dealer that has come to the factory has been fired with enthusiasm by what he saw.

Already we have closed much important territory with the best established, most experienced dealers.

They have been quick to realize the big, profitable factors in this Lyons-Knight proposition.

This opportunity may still be open in your territory.

Write and we will let you know promptly.

Outline Specifications

Gasoline Tank—22 gallon capacity, on upper part of dash over toe board, giving gravity feed direct to carburetor.

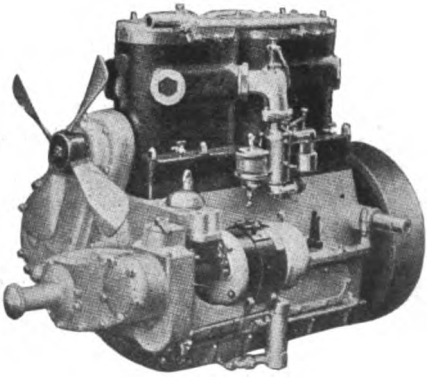
Drive—Left hand with center control.

Bodies—Exclusive design, with maximum room and comfort. Sheet aluminum with extra deep, soft, hand-buffed upholstery.

Finish—Standard colors, dark blue and Brewster green, with black and nickel trimmings.

Equipment—Electric starting and lighting, with dash lamp and two-tone electric horn, patent one-man pantasote top with drop side curtains, special windshield with ventilator, dust cover, speedometer and clock, combination tire holder and trunk rack, two extra demountable rims, coat and foot rails, cocoa matting in tonneau and complete tool and tire outfit.

Prices—Five Passenger Touring Car, $2900; Seven Passenger Touring Car, $2980; Sedan Type, $3900; Berline Type, $4300; f. o. b. factory, Indianapolis, Indiana.



THE LYONS-KNIGHT ENGINE

This four-cylinder Knight engine actually gives the power, smoothness and flexibility of a six-cylinder poppet-valve engine of 50% greater displacement. Its many individual features make it superior in silence, smoothness, reliability, economy and power. Ask for actual proofs by test.

Write for Complete Information

The Lyons Atlas Co.

INDIANAPOLIS IND.

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THE 8-DAY HIGH GRADE "CHELSEA" AUTO CLOCK

"SPECIAL"



"OFFSET"



"ROUND"



"LIMOUSINE"



Primarily intended for use inside the bodies of large enclosed cars, and for such use its case can be given a variety of fine finishes. It also makes an attractive clock for use on dashboards. Only made in 2¾-inch size.

The Justly CELEBRATED 8-Day, High-Grade "CHELSEA" AUTO CLOCK (*Trade-mark*)

NOW and for YEARS the RECOGNIZED STANDARD of EFFICIENCY

Clocks built with a view to stand the jars and jolts and rough riding of Automobiles. Reputation the highest. Used by parties demanding the BEST.

☞ ALL SIZES STATED ARE THE APPROXIMATE DIAMETERS OF THE DIALS.

All are 8-day High-Grade. All are in DUPLEX (patent applied for) polished cast brass cases, the most thoroughly waterproof case on the market. The "SPECIAL" clocks show dial on an angle; its inner cased clock, when removed from the outer (locked) case, is excellent for use on mantels, bureaus, etc., when touring; its outer case is screwed to dashboard by hidden screws. The "SPECIAL" clocks are in large demand from dealers for owners of finest cars.

The MOTOR CLOCK has the same clock movement which for years we have supplied for the hard use on Locomotives, Steam Fire Engines, etc.; its dial is of same appearance as the Auto Clock dial, but the Auto Clock movement has a somewhat finer train.

The 3¼ MOTOR "OFFSET" is likely to prove a quick, ready seller. Very attractive.

Ask for our new Auto Clock Circular and Price List, illustrating and pricing the above and three new models, C, D and E.

PRICE LIST (Per Clock)

		"Round"	"Offset"	"Special"	"Limousine"
"CHELSEA"	2¾-in. Auto Clock.....	$26.00	$28.00	$36.00	$28.50
	3¼-in. Auto Clock.....	28.00	30.00	45.00	Only made in
	3½-in. Motor Clock.....	24.00	26.00	41.00	2¾-inch size

If wanted fitted with outside (patent applied for) stem-winding and stem-setting device—the best of its kind—Add $3.00 to above Price Lists. (Such device we do not apply to the "Motor" Clocks or "Special" Auto Clocks.)

For Use on AUTOMOBILES and MOTOR BOATS

You want the Best? Ask your DEALER for the "CHELSEA"

On Sale by Leading Jobbers and Dealers

CHELSEA CLOCK CO., 16 State St., Boston, Mass.

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THE STURDY STUTZ

MADE GOOD IN A DAY

Announcement of the Stutz Series E Cars—four and six cylinder

No radical mechanical changes—they were not necessary

The Stutz has been given every test anyone could ask or demand.

It has been sent up against all comers in the hottest races of the world. Racing is subjecting a car to every possible disadvantage in the shortest possible space of time. Out of such tests comes either a car or a memory.

Harry C. Stutz, designer of the Stutz, built his first car in five short weeks, and it finished the first 500-mile race at Indianapolis without even a mechanical adjustment, and jumped into fame over night.

The Stutz is a car of fundamentals which embodies known, tested and proved principles of motor car building and motor car service.

Stutz Features

A Digest of the Pecrs

1 Dependable Electric Starter
2 Lighting System—Remy electric generator with storage battery
3 Cone Clutch
4 4¾x5½ T-head motor in 4-cylinder models; 4x5 T-head motor in six-cylinder models
5 Stutz special rear system
6 Timken front axle
7 Gemmer steering gear
8 Force feed oiling system through hollow crank shaft
9 Tires 34x4½
10 Black and nickel trimmings throughout

Stutz Cars are made in both four and six-cylinder models.

New models now ready

While we have not made any radical changes—they were not necessary—still we found it possible to add a few more refinements and conveniences—making these new models even more desirable than the previous Stutz cars.

For instance, the bodies of the touring cars are larger, roomier, and even more comfortable than heretofore. The upholstering will be generally more luxurious, and the springs a little longer.

The electric starting, lighting and ignition systems employed in the Stutz are separate units, thus eliminating any chance of complication. The self-starter is so simple that a child can understand it. It works quietly and certainly. Electrical experts regard our installation as the simplest, and therefore the best, on the market.

All the special Stutz features that insure strength, speed, sturdiness, ease of operation, have been retained.

Financial responsibility back of the Stutz

Back of the Stutz car is an institution that is substantial, solid and financially responsible.

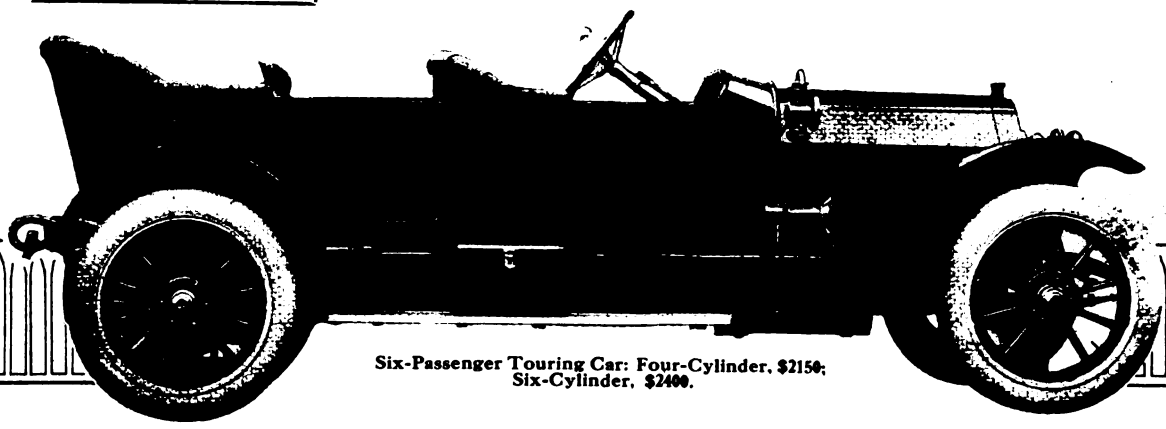
Our method of manufacture, as well as the sales distribution, has ever been safe, sane and economical—always with the idea of giving each Stutz owner full measure for his money.

If you are in the market for a car let us know and we will put you in touch with the nearest Stutz dealer—and also send you our new Series E catalog, No. A-5.

There are a few points where we are not now represented. We invite correspondence with responsible dealers.

Stutz Motor Car Company

Indianapolis, Indiana



Six-Passenger Touring Car: Four-Cylinder, $2150; Six-Cylinder, $2400.

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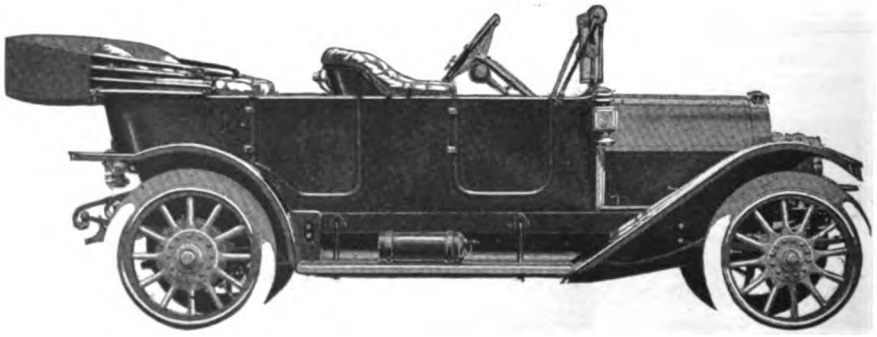
Overland

COMPLETELY comfortable, a masterpiece mechanically, the big, sturdy, thirty horsepower, five passenger Overland touring car furnishes daily motor car gossip as the greatest value for the least money.

Catalogue on request. Please address Dept. 52.

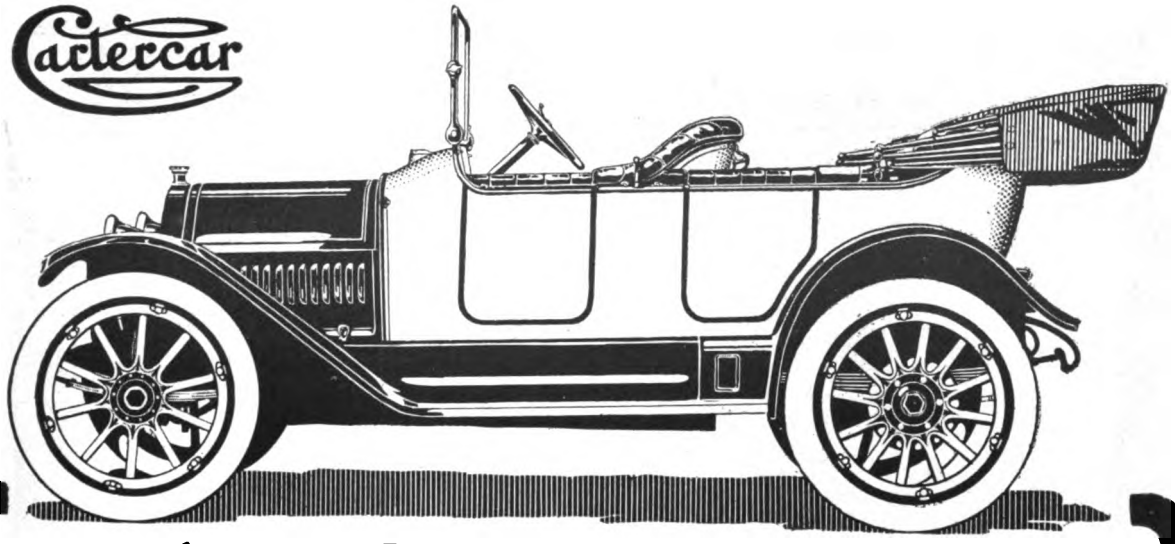
The Willys-Overland Co., Toledo, O.

$985 Completely Equipped—F. O. B. Toledo, Ohio



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Cartercar



A good car for owners—
A good car for dealers!

A dealer who can send out cars with a certain knowledge that those cars are going to make good—every time—is going to build up a prosperous and permanent business.

And this is exactly the reason why the Cartercar has so many unchanged agencies today. Every Cartercar owner becomes a part of the dealers' selling organization.

A Cartercar gives the owner full value for every dollar he invests. He finds it all that he can possibly ask for in his car. His wife can drive it—his entire family is safe in it.

This is the car with the gearless transmission—which without any gears at all—must be far more reliable than a complicated gear transmission.

You have unlimited speeds—power to climb steep hills—to go through deep mud and and sand—and it will give this service continually without any trouble whatever.

Right there is the big advantage of owning a Cartercar. You can give it hard wear, the hardest wear possible, and there is nothing to strain or break. Of course, nothing will break, when there is nothing to break.

And another feature of the Cartercar which places it far above the gear car is the elimination of jerks and jars in starting and changing speeds.

This means about twice the usual tire mileage—and you can see that it will reduce your upkeep expense on all parts.

The Cartercar does things. It may look similar to other cars as it stands on the salesroom floor, but when you get it out on the road, you immediately realize the great difference.

Once a Cartercar owner—always a Cartercar owner—means once a Cartercar dealer, always a Cartercar dealer.

If we are not represented in your territory we would be pleased to hear from you. Perhaps you are the man we want to handle the Cartercar. Write us today—this is the biggest season the Cartercar has ever had—and we are getting inquiries from all over the country—probably from right near you.

Cartercar Company

Pontiac, Michigan

Branches: New York Chicago Detroit Kansas City Atlanta

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Index To Advertisers

	Page
Abbott Motor Co.	91
American F. N. Company	77
Ames Shock Absorber	19
Anti-Rust Paint Co.	84
Apple Electric Co.	83
Approved Auto Specialties Co.	94
Austin Automobile Co.	88
Barrett Manufacturing Co.	92
Leach Co., T. C.	88
Borne, Scrymser Company	92
Bosch Magneto Company	93
Boyd, F. Shirley	96
Braender Rubber & Tire Co.	95
Bretz Company, The J. S.	93
Brown Company	93
Burn-Boston Battery	87
Cameron Mfg. Co.	96
Cartercar Company	15
Cataract Rubber Co.	85
Chelsea Clock Co.	12
Coes Wrench Company	8
Cole Motor Car Company	92
Cutter, Geo. A.	96
Dayton Rubber Mfg. Co.	82
Dean Electric Company	90
Dixon Crucible Co., Jos.	86
Eagle Oil & Supply Co.	96
Edwards Mfg. Co.	88
Empire Automobile Co.	9
Federation Amer. Motorcyclists.	77
Gaulois Tire Corp.	92
Geiszler Bros. Storage Bat. Co.	91
Goodyear Tire & Rubber Co.	91
Harris Oil Company, A. W.	86
Haynes Automobile Co.	2-3
Heinze Electric Co.	85
Henderson Motor Car Co.	84
Herreshoff Motor Co.	85
Herz & Co.	89
Hoffecker Company, The	92
Hotel Belleclaire	86
Indian Refining Co.	Cover
International Metal Polish Co.	16
Invincible Tire Co.	82
Jackson Automobile Co.	88
Johns-Manville Co., H. W.	82
J. M. Shock Absorber Co.	89
Jones Speedometer Co.	84
Keeton Motor Co.	83
King Motor Car Co.	85
Kissel Motor Car Company	85
Knox Automobile Company	93
Kolb Sales Co.	82
K-R-I-T Motor Car Co.	94
Lyons Atlas Co.	10-11
Marburg Bros.	82
McCue Co.	20
Mea Magneto	82
Mercer Automobile Company	95
Miami Cycle & Mfg. Co.	75
Michigan Motor Car Co.	84
Miller, Chas. E.	Cover
Moller Brothers Controller & Economizer Co.	83
Mosler & Co., A. R.	95
National Motor Vehicle Co.	84
New Departure Mfg. Co.	91
Nordyke & Marmon Co.	5-6-7
N. Y. & N. J. Lubricant Co.	17
Owen & Co., R. M.	89
Paige-Detroit Motor Car Co.	90
Peacock & Co., Clarence N.	19
Perfection Spring Co.	94
Pierce-Arrow Motor Car Co.	Cover
Pilot Car Sales Co.	94
Planhard Mfg. Co.	83
Pyrene Co. of N. E.	86
Randall-Faichney Co.	86
Remy Electric Company	88
Reo Motor Car Company	89
Royal Equipment Co.	91
Sager Company, J. H.	90
Shaler Co., C. A.	91
Splitdorf Electrical Co.	82
Springfield Metal Body Co.	4
Standard Co., The	84
Standard Oil Co.	21
Standard Welding Co.	85
Standard Woven Fabric Co.	96
Stutz Motor Car Co.	13
Sumner, George, Inc.	89
Union Wadding Co.	86
United States Tire Co.	85
Valvoline Oil Company	95
Waite Auto Supply Co.	82
Walpole Tire & Rubber Co.	84
Warner Speedometer Corp.	Cover
Weed Chain Tire Grip Co.	22
Willard Storage Battery Co.	1
Willys-Overland Company	14

FOR SALE—Guy Vaughn 30-60 Stearns in A No. 1 condition. Just been thoroughly overhauled and out of paint shop. Looks and runs like new. Full set of slip covers, Victoria top with special windshield, Klaxon, tools, etc. Very cheap for cash. Address P. O. Box 542, Bridgeport, Conn.

EVERY CAR OWNER SHOULD USE ELECTRIC POLISHING CLOTHS. Keep the new car from looking old and shabby and make the old car look like new. No. 1 cloth removes all spots and stains. No. 2 cloth gives a hard dry polish that will not gather dust. Saves half the time in washing. Price 50 cents a set by Parcel Post. Order now. A. & R. Co., Wallingford, Conn.



Thousands of Car Owners All Over the World Are Using Blue Ribbon Goods

BLUE RIBBON METAL POLISH is the original "CREAM" Metal Polish and it still leads the procession.

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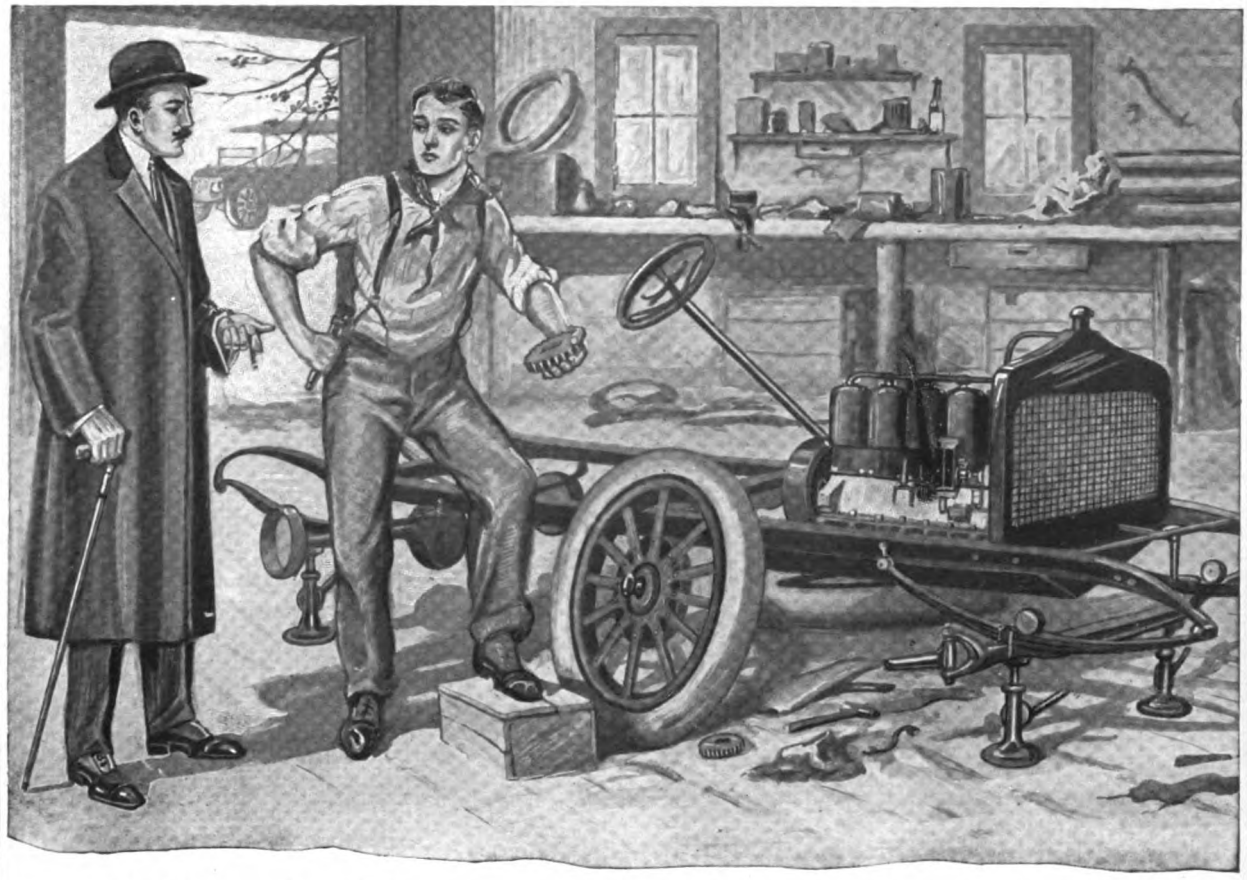
BLUE RIBBON RADIATOR LEAK-PROOF CEMENT is a quick and permanent remedy for leaks. Does not clog the circulating system; prevents scale and rust; preserves the metal and increases the cooling capacity.

All **BLUE RIBBON** products strictly high class and fully guaranteed. **BLUE RIBBON** moves quick for the dealer—works fast for the consumer. **Ask for sample, giving us name of Dealer or Jobber.**

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When the Repair man performs the Autopsy

he finds, nine times out of ten, that ***poor lubrication*** has caused all the costly havoc. Then he asks the simple question,



"Why don't you use

TRADE MARK REGISTERED IN NON-FLUID OIL UNITED STATES PATENT OFFICE ?"



and he tells in his honest way what he, as a mechanic, knows about the depredations of cheap lubricants.

Why don't you use NON-FLUID OIL?

Get the genuine in orange colored cans.

New York & New Jersey Lubricant Co.,

165 Broadway, New York

Chicago, 1430 Michigan Ave. **Philadelphia, 1431 Vine St.**

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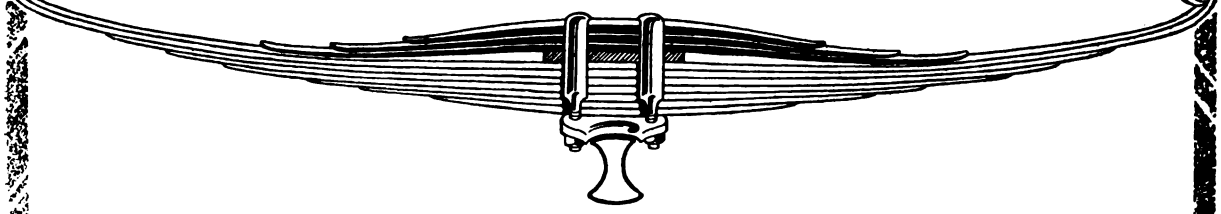


	Page
*Hoosier Tourists Enter Nevada	23
*Metz Team Wins Glidden Trophy	28
Winners in Alpine Tour	31
Cyclecars in Grand Prix	31
Erects Factory Addition	31
Invincible Puncture Proof Tires	31
*General News of the Industry—	
Parts Makers Convention	32
Purchases Maco Carburetor	32
Joins Lozier Staff	32
Wooler with Continental Motor	33
Strout's Enviable Record	33
Leaves Westinghouse Company	34
Removes to Connecticut	34
Partin-Palmer Combination	34
*New and Novel Accessories	36
*Touring the Moosehead Lake Region	39
*Lyons-Knight to Utilize Worm Drive	42
Advance Contest Notes	45
Convention of "Old Timers"	45
*Mechanical Notes for Owners—	
Maintaining Proper Spark Gap	46
Protecting the Carburetor	47
Home-Made Gas Condenser	47
Tank Filling Suggestion	47
Value of Hydrometer	48
Novel Use of Motor Starter	48
Care of Commutator	48
The Stutz at Tacoma	49
*New Fuller Transmission	49
Uniform Motoring Laws, Editorial	50
The American Invasion, Editorial	50
*Introducing the Cyclecar in America	51
*Features of New Model P Remy Magneto	55
*Correspondence with the Reader—	
Missing at Intermediate Speeds	57
Detachable Cylinder Heads	57
Patching Inner Tubes	58
Experiencing Oiling Trouble	58
Faulty Lubricator	59
Skipping Motor	59
Inflation of Tires	59
*With the Motoring Interests Abroad—	
Boillot Wins French Grand Prix	60
The American Invasion	60
The Industry in Japan	61
Overland in Philippines	61
Notes from Foreign Lands	61
*In the Commercial Vehicle Field—	
Marmon Delivery Wagon	62
New Sanford Model	62
Moore Delivery Wagon	64
*Knox Company Announces 1914 Line	65
Detroit's Road Congress	69
Many Hands Make Light Work	69
Motoring Laws and Their Enforcement—	
Uniform Traffic Regulations	70
Callan Law Constitutional	70
Wisconsin's New Law	70
Many Speed Traps	70
Legislative Briefs	71
J-M Fyro in Action	71
*The Repair Shop and the Garage—	
To Bend Tubing Without Breaking	72
Grinding in Petcocks	72
*New Tool Equipment and Machinery—	
Greenerd Arbor Presses	73
Luther Honing Attachment	73
Acklin Breather Oiler	73
*In the Realm of the Motorcyclists—	
Convention Opens in Denver	74
Kansas Short Grass Tour	74
Bosch Production Record	75
On the Transcontinental Journey	75
Merkel Restored His Health	75
International Touring Trial	75
French Grand Prix	76
Stolen Merkel Machine	76
New Affiliated Clubs	76
Harley-Davidson Delivery Car	76
Seeking Space at Shows	76
An Indian Night Rider	77
Mr. and Mrs. Gale at Denver	77
To Build Its Own Motors	77
Club Notes, Here and There	77
*News of the Manufacturer and Dealer	78
Coming Events	80
Miller's Special Catalogue	80
National in Fuel Test	80
American Cars on Foreign Roads	80
Exports and Imports	81
Annual Shan Kive	81
Midsummer Motor Show	81

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The
AMES SHOCK ABSORBER
AUTOMATIC



Snuggles along the top leaf of your car spring—spaced by a steel block—so that it prevents the recoil of your spring without affecting the resilience.

AMES SIMPLICITY

MEANS

Nothing to get out of order.
Adjustment only at installation.
No ratchets—discs or other wearing parts.

AMES EFFICIENCY

MEANS

No broken springs.
Smothered vibration.
Smooth riding.
Full spring play.
Equipment for both front and rear.

Send for convincing literature.

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Do You Want To Double Your Tire Mileage?

That's what you will do if you ride on wire wheels instead of on wooden wheels. There are many reasons why the car owner who is looking for the utmost in motor car construction should insist upon wire wheels—such as ease of riding, ease of steering, lengthening of the life of the car itself, etc.—but the prime essential of all these considerations, obviously, is the fact that wire wheels increase the life of the tire anywhere from 25 to 50% or more.

By actual tests conducted over a period of six months, a saving of 68.75% was shown by the use of wire wheels compared with wooden wheels under exactly similar conditions.

Wire wheels save tires because they are light at the periphery, thereby reducing the road pound at point of contact. Wire wheels also radiate external and internal frictional heat which is held in the wall of the tire by wooden wheels because of the non-heat conductivity of the wooden bands.

If you are interested in this all important subject, write us for further details.



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A Barrel of

Polarine

Ready to fill the handy Polarine can for your car. The easiest, cheapest way to use the best oil.

Polarine is the right oil for all motors. Polarine holds its body in the hottest cylinder—deposits little carbon—and puts an end to friction trouble.

Use Standard Oil Company's Gasoline

STANDARD OIL COMPANY
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Saved!

Weed Tire Chains enable you to safely make sharp turns and quick stops when a momentary loss of control means loss of life

The above picture illustrates one of the numerous situations in which you may be placed during bad road weather—when suddenly someone appears directly in your path and in a fraction of a second you must make a sharp turn and apply the brakes. It is then you require a firm unfailing grip on the road which can only be obtained by equipping all tires with

Weed Anti-Skid Chains

The Only Device that absolutely Prevents Skidding

No matter how expert and careful you are when driving on wet pavements and muddy roads, the *treacherous bare tires are a handicap that defeats your very best efforts to prevent a skid.*

The memory of one accident deters future enjoyment in the use of a car. Why run the risk of such accidents and why forfeit the pleasures of motoring forever after, when *safety can surely be yours by equipping all four tires with WEED CHAINS?*

WEED CHAINS cannot injure tires because "they creep." Easily put on in a jiffy without the use of a jack or other tools. Directions packed with every pair.

WEED CHAIN TIRE GRIP CO., New York

Manufactured in Canada by

DOMINION CHAIN CO., Limited—Head Office, Shaughnessy Bldg., Montreal, Canada

At all Dealers Selling Auto Supplies

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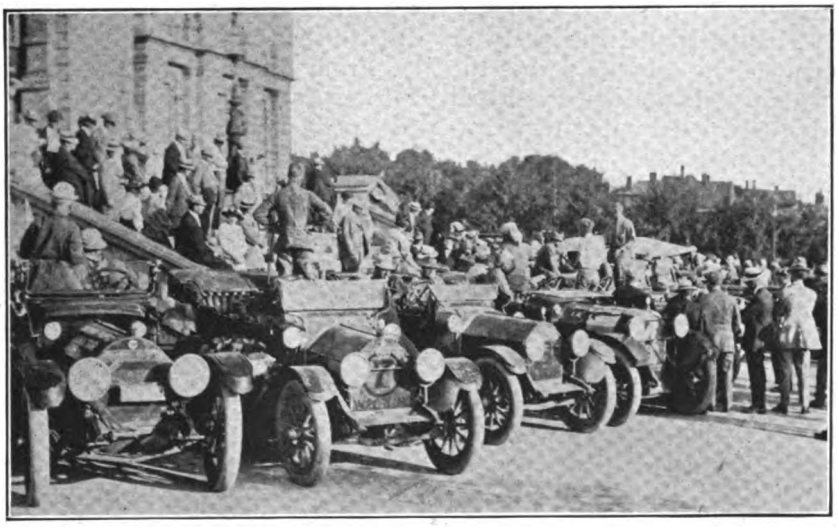
THE AUTOMOBILE JOURNAL

VOL. XXXV, No. 12 JULY 25, 1913 Price, $1.00 the Year

HOOSIER TOURISTS ENTER NEVADA.

Cloudburst in Utah Delays Party One Whole Day---New Trail Blazed from Price to Salt Lake City---Steep Grades Over the Continental Divide in Colorado Surmounted Without Any Serious Difficulty.

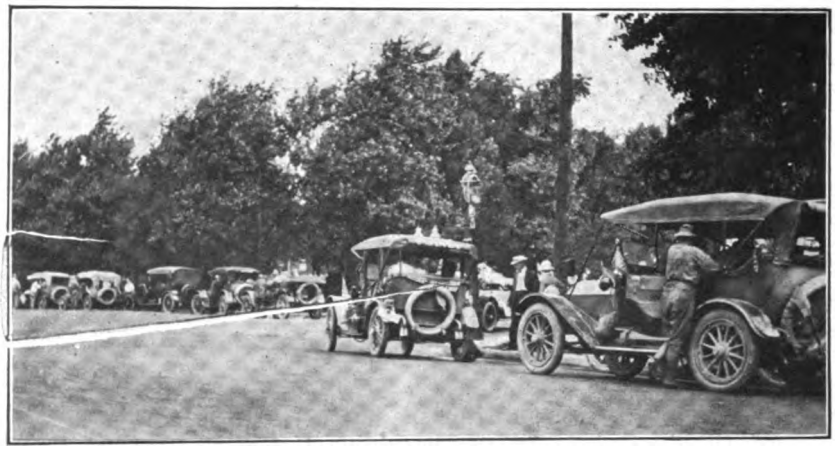
WHEN last heard from the representatives of the Indiana Automobile Manufacturers' Association, en route from Indianapolis to the Pacific Coast, had left Salt Lake City, Utah, and were about to enter that section of Nevada in which postoffices and telegraph stations are few and far between. Advices from Salt Lake City indicate that the tour has been an unqualified success in every particular, and although one whole day was lost in Utah, this will not affect the schedule materially. There seems no reason for believing that they will not reach San Francisco on time July. 27.



Cars on the Indiana Automobile Manufacturers' Association's Transcontinental Tour in Front of the State Capitol at Denver.

The five hours of rain, to which the tourists were subjected on their start from Indianapolis, July 1, was prophetic of that heavy downpour, or cloudburst, which greeted them between Thompsons and Green River, Utah. Seven cars were forced to return to Thompsons for the night, while others were reported stalled all along the way, to Green River. However the story is best told in chronological order. The heavy rain of that first day had its effect upon road conditions throughout the State of Illinois, but after leaving St. Louis, the two days in Missouri were devoid of special incident, insofar as the tour itself was concerned. Besides the flag presented to the pilot car by Lieut.-Gov. O'Neil of Indiana at the start, two more were acquired before reaching Kansas City—one being presented by Gov. Dunne of Il-

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Leaving St. Louis on the Morning of the Fourth of July, Empire 19 in the Foreground.

linois at Springfield and the other by Mayor Keil, on behalf of Gov. Major of Missouri, at St. Louis.

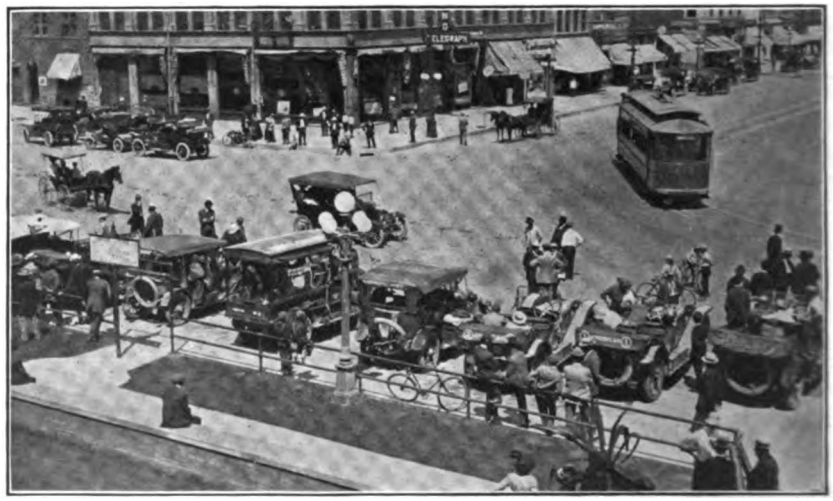
The Fourth of July was fittingly celebrated at Columbia, Mo., where the Columbia Club greeted the tourists with open house. C. E. Branston, a member of the Institute of Automobile Engineers of Great Britain, who remained behind at the close of the recent official visit of that organization to America, in order to take part in this tour, was invited to make a speech suitable for the occasion and did so. Of course, the proposed Lincoln ocean-to-ocean highway was the chief topic for discussion, as it has been at all such formal occasions throughout the entire journey. Sunday, July 6, was a day of rest in Kansas City.

Gov. Hodges of Kansas joined the party at Topeka and accompanied the tourists across the state, speaking in the interests of good roads and the Lincoln highway wherever opportunity afforded. Instead of stopping at Fort Riley, Kan., as originally planned, the night stop, July 7, was made at Junction City. Gov. Hodges occupied a seat in the Empire this day, which was still running on Indianapolis air. The first water was put in the radiator at Kansas City.

Still following the Golden Belt route, the tourists found the day's drive from Junction City to Ellis, Kan., one continuous climb. For that matter Junction City is 1300 feet higher in altitude than Kansas City, but Ellis adds still another 1000 feet. This fact is particularly worthy of note inasmuch as the Pathfinder entrant was running under a sealed bonnet, and although the day was the hottest thus far encountered, the hood was not lifted during the 180 miles. None of the cars found it necessary to make carburetor adjustments, in spite of the change in altitude, and Ray Harroun reported his Henderson, utilizing a Harroun kerosene carburetor, as still working satisfactorily. One feature of the day's journey was the request made by county commissioners at Kanopolis that members of the party address the people on the subject of good roads. At Hays, the local newspaper issued a special edition on the tour, copies of which were presented to the Hoosiers five miles out of town.

At Ellis, the first night was spent under the tents, carried strapped to the cars since leaving Indianapolis. During the night a terrific storm came up and the guards had been posted hardly in time to prevent some of the 75 campers receiving a severe drenching. Burlington, Col., was the next night stop, and here again the tents were brought into play. A delegation from the Denver Chamber of Commerce met the tourists at this point, in the interests of the Midland trail, bringing with them a number of cowboys, who took charge of the cooking tent during the stay in that city.

From Burlington the party went to Colorado Springs, stopping at noon in Limon. The people of Colorado Springs had prepared a pro-



Hoosier Tourists Parked in Front of the Antler Hotel Soon After Their Arrival in Colorado Springs.

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American and Empire Entrants About to Take the Ferry on the Way to Booneville, Mo.

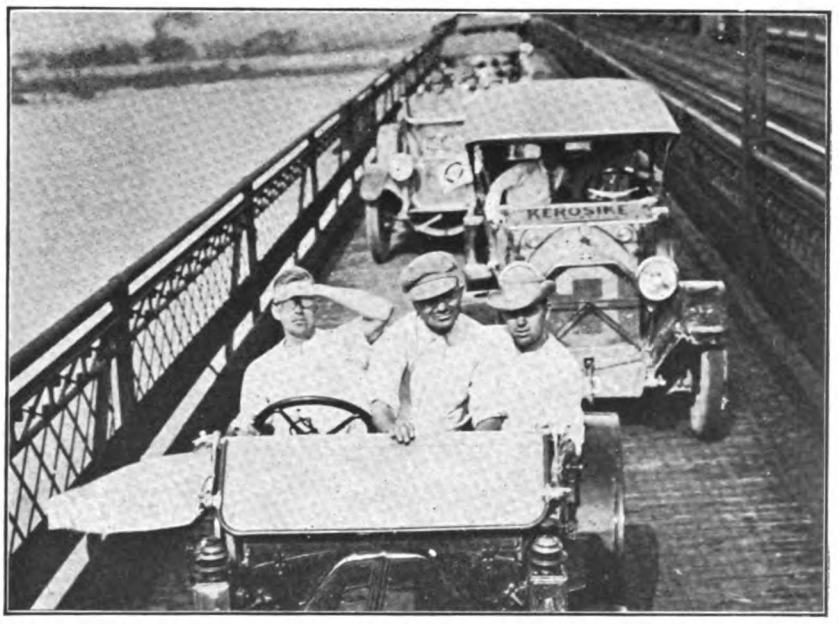
gramme that would have taxed the energies of the visitors during a longer stay, and much of it had to be neglected. Time was taken during the morning of July 11 to visit the Garden of the Gods, Crystal park and the Ute pass. This last named run was made in local cars, with the exception of Ray Harroun, who desired to test his kerosene carburetor in that altitude, which is said to be 11,000 feet. He reported that his machine showed better results than those equipped with gasoline vaporizers, due, as he expressed it, to the lower vaporization point of the fuel and the decreased atmospheric pressure.

The 69.2 miles between Colorado Springs and Denver was made during the afternoon, under an escort composed of members of the Denver Chamber of Commerce, the Denver Motor Club and the Colorado Automobile Club. On the steps of the capitol building, Gov. Ammons presented the tourists with the fifth flag, Gov. Hodges having left his when he bade the tourists farewell at the Kansas-Colorado line. The chief social event of the day was the luncheon tendered by the Midland Trail Association, at which the subject of good roads and the Lincoln highway were again the topics for discussion.

At Denver it was learned that the Fallon Sinks, near Fallon, Nev., were filled with water, due to the recent heavy rains, and that it would be necessary to change the original schedule somewhat. It was decided to go direct from Ely, Nev., to Tonopah, Goldfield, Bishop and Lake Tahoe, eliminating Austin, Reno and Carson City. The new route is a trifle longer than the other, but it was believed possible to make it in the three days allotted for this portion of the trip. Word also was received at this point from President Laurens Enos of the American Automobile Association and A. G. Batchelder, chairman of the A. A. A. executive committee, then with the so-called Glidden tour in Montana, that they would join the Hoosier party at Lake Tahoe.

Leaving Denver Sunday morning, July 13, the party soon appreciated that the hardest part of the task lay before it. To Golden, 14 miles of good gravel road was encountered and no difficulty was experienced. Just beyond Golden, the widening road, known locally as the "hogback," took the tourists up Mt. Vernon canyon. While the grade is about six per cent., the surface is of red sandstone and offered little trouble. Thirty miles out, at the top of Floyd hill, the water in the radiators was boiling, although the motometers showed a temperature of 185 degrees. For the first time it became necessary to make carburetor adjustments.

A fine example of road building was found on the opposite side of Floyd hill, and while the grades are from six to seven per cent. in places,



Crossing the Missouri River from Howard to Booneville—Henderson Kerosene Car in the Foreground.

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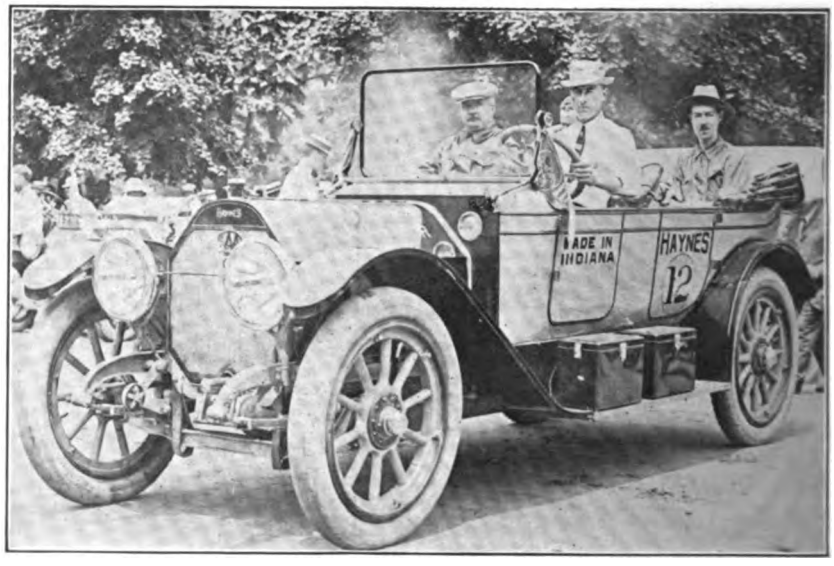
Pilot 20 Acting as Pacemaker from St. Louis to Columbus on the Fourth Day of the Tour.

all dangerous spots are well guarded with heavy cable. Idaho Springs was reached along a winding canyon road, and here the tourists were welcomed by a brass band. Then for 15 miles the way wound up and down along the river through the mining towns of Dumont, Lawson and Empire. Just beyond Empire is Berthoud pass, over which the Continental Divide was crossed. In four miles the cars climbed 3000 feet, the last 1000 feet being covered in one mile. Some of the grades are as high as 20 per cent., and the altitude affected the power of the motors very materially. Most of the cars were unable to make the grade with load and in several places the passengers were forced to aid. One machine climbed the pass on the reverse. The view from the top of the pass was such as to repay for the extra exertion. The ride down the other side was sufficient to offer tests quite as effective as the upward climb. Sharp turns, steep grades with a cliff on one side and a drop of thousands of feet on the other, narrow roads just wide enough for one car, with turnouts at frequent intervals, made a steady hand and good brakes decidedly essential, although the roadbed was in excellent condition. Then came Sulphur Springs, the night stop.

The 107 miles between Sulphur Springs and Glenwood Springs was through canyons practically all of the way. Much of the road work was new, and crews were at work as the tourists passed. A feature of the day's trip was the journey through Gore canyon, which presents views frequently compared with those to be found in the Alps.

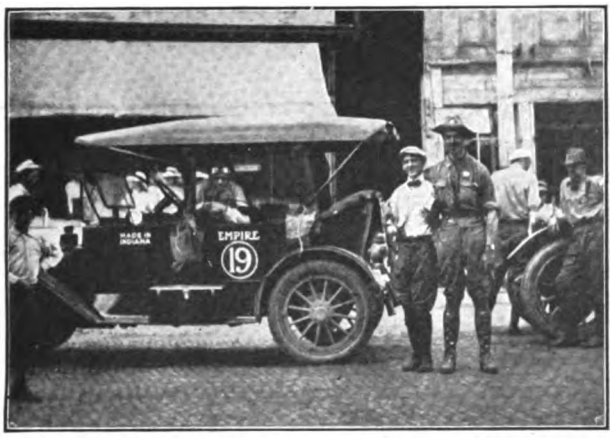
Next came the 110-mile run from Glenwood Springs to Grand Junction, through the canyon of the Grand, with its narrow roads along precipitous cliffs, convicts still working on them. Then, after several miles of desert country with no signs of life except coyotes and gophers, and with painted cliffs all around, the way lead into one of the greatest fruit raising countries in the world. From Palisades, in the midst of this fruit section, to Grand Junction, the route was a boulevard lined on both sides with orchards.

At Grand Junction, practically half of the entire journey, as originally laid out, and as amended at Denver, had been covered. The Continental Divide had been crossed, and some of the highest altitudes of the trip had been reached. All but one of the cars arrived on schedule time, the delinquent being the Brown internal gear driven truck, carrying tire equipment. That this machine had been able to accompany the pleasure cars over the steep grades and high altitudes was conceded to be a feat never before realized. It expected to join the tour a little later, although



Elwood Haynes, America's Pioneer Gasoline Car Manufacturer, Beside the Driver in the Haynes 12.

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Harlow Hyde, Empire Advertising Manager, and One of the British Engineers on the Tour.

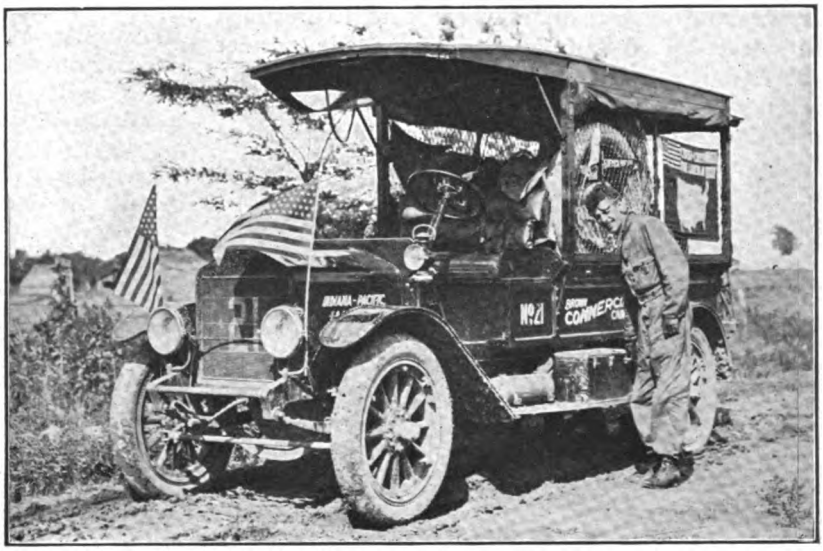
it was reported as having been delayed somewhere in the mountains.

Wednesday, July 16, the tourists left Grand Junction for Green River, Utah, on the way to Salt Lake City. All went well until Thompsons had been passed. Suddenly in the midst of the desert a local cloudburst turned the roads, such as they were, into deep mud. Some of the leaders had passed the danger point, but the storm caught the rear end of the column and a few of the machines that did get through were reported as stalled on the way to Green River. The Empire, Pathfinder, McFarlan, Pilot and Premier truck, the last named carrying tires, with two cars that had joined the party at Denver, decided it the better part of wisdom to return to Thompsons for the night. So far as could be learned there were no accidents, but the condition of the road was such as to make impracticable an attempt to reach Green River until morning.

The delay seriously affected the schedule during the remainder of the distance into Salt Lake City, but fortunately it had been arranged to spend a whole day in the Utah capital. All of the contestants succeeded in reaching Green River Thursday morning, after which it was decided to proceed as far as Price that day. At 6 Friday morning, the party left Price over the new road through the mountains. It transpired that the Hoosiers were the first motorists to make the trip over this road, which for five miles is high on the mountain side, very narrow, with many windings, and in several places decidedly steep. Travel was slow most of the time, but the last car arrived in Salt Lake City at 5 in the afternoon.

The cars making the trip are as follows: American 1 and 2, American Motors Company, Indianapolis; Henderson 3 and 4, Henderson Motor Car Company, Indianapolis; Stutz 5 and 6, Ideal Motor Car Company, Indianapolis; Marion 7 and 8, Marion Motor Car Company, Indianapolis; Premier 9 and 10, Premier Motor Manufacturing Company, Indianapolis; Haynes 12 and 13, Haynes Automobile Company, Kokomo; Pathfinder 14, Motor Car Manufacturing Company, Indianapolis; McFarlan 16, McFarlan Motor Car Company, Connersville; Apperson 17 and 18, Apperson Bros. Automobile Company, Kokomo; Empire 19, Empire Automobile Company, Indianapolis; Pilot 20 and 21, Pilot Motor Car Company, Richmond; Marmon 22, Nordyke & Marmon Company, Indianapolis; Brown tire truck, Brown Commercial Car Company, Peru; Premier tire truck, Premier Motor Manufacturing Company, Indianapolis.

The Miller Rubber Company, Akron, O., makes public the fact that the information previously given by it relative to Verbeck winning the Los Angeles-Sacramento road race in a Fiat car equipped with Miller tires, was incorrect. Verbeck uses Miller tires as regular equipment, as does Tetzlaff, and he intended to drive Miller shoes in the road race referred to. Owing to delay in transportation, however, he was compelled to drive the race with tires of another make.



Brown Tire Truck, One of the Conspicuous Factors on the Trip, Near Jonesburg, Mo.

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METZ TEAM WINS GLIDDEN TROPHY.

Small Cars Outclass Larger Machines in National Reliability Tour Across North Dakota and Montana—Chain Driven Locomobile Takes New A. A. A. Cup.



TO THE Metz team goes the honor of winning the famous Glidden trophy in the ninth national reliability tour of the American Automobile Association, which came to an end in Glacier national park, Montana, Saturday, July 19. The new A. A. A. trophy, which was substituted for the Glidden award in the touring car class this year, was won by a chain driven Locomobile, driven by Dr. J. D. Parks of Duluth, Minn. The Anderson trophy for runabouts, presented by the citizens of Anderson, S. C., in 1911, was awarded by lot, the decision resting between the three Metz cars, the two Hupmobiles and a K-R-I-T. The drawing was in favor of the Hupmobile No. 15, driven by C. Munzer. Hupmobile No. 14, driven by W. W. Munzer, retains permanent possession of the Minneapolis Daily News trophy, this having been won by a Hupmobile last year in the Minneapolis to Winnipeg tour.

The performance of the Metz team was most noteworthy. The three little 22.5 horsepower, friction driven cars from Waltham, Mass., went through the entire journey from Minneapolis to the Glacier national park without a mark. It was the only team of three cars to perform this feat. Two Hupmobiles also made perfect scores, but there were only two cars in the team. It may be stated that in all respects the smaller machines showed up to much better advantage than the larger in this test. And that it was a test worthy of the best efforts is borne out by the fact that the roads across North Dakota and Montana are far from being ideal in any respect.

RECORD OF GLIDDEN TROPHY.

Year	Route	Miles	Victor
1905	New York—Bretton Woods—New York	871	Pierce
1906	New York—Buffalo—Bretton Woods	1135	Pierce
1907	Cleveland—Chicago—New York	1570	*
1908	Buffalo—New England—New York	1670	†
1909	Detroit—Kansas City	2533	Pierce
1910	Cincinnati—Southwest—Chicago	2851	Chalmers
1911	New York—Jacksonville	1454	Maxwell
1913	Minneapolis—Glacier Park	1233	Metz

*Won by team representing Automobile Club of Buffalo, composed of two Pierce-Arrows, a Thomas and a Packard; †no award made. There was no tour in 1912.

Twenty-seven cars left Minneapolis, July 11, for the 1233.1-mile journey across the states of Minnesota, North Dakota and Montana to the gateway of Glacier national park. That is to say, there were 27 cars scheduled to leave. L. W. Hill's Packard, which had been listed as contestant No. 1, failed to appear at the start and followed the rest three hours later. It caught up with the remainder of the party in Alexandria. The official contestants are given herewith in tabulated form, and besides these there were a Packard, Moon, Ford, Chalmers and Premier as noncontestants, a Mitchell pilot car and the president's car, a Winton.

During a larger portion of the first two days the tourists were compelled to make their way in drenching rain. This did not have a tendency to improve the roads, which are none too good in the section covered by the tour, even under ideal weather conditions. It will be noted, from the accompanying score, which is made up from the information contained in the Glacier Park Blazer, a newspaper printed on the official train accompanying the tourists throughout the journey, that most of the penalties were awarded during these three days. As was true of the national tour in 1911, when the route lay from New York City to Jacksonville, Fla., penalties were for being late at controls only.

The first day's run was from Minneapolis to Alexandria, Minn., a distance of 144.4 miles, with noon control at St. Cloud. The pilot car made the 65 miles between Minneapolis and St. Cloud

UNOFFICIAL GLIDDEN TOUR SCORE.

Car and Driver	July....	11	12	14	15	16	17	18	19	Final
2	Premier, L. Fawkes	5	0	0	0	0	0	0	0	995
3	Stutz, Legg	0	0	0	0	0	*	..	..	....
4	Marmon, B. Fawkes	0	0	0	0	0	*	..	..	....
5	Metz, Cathcart	0	0	0	0	0	0	0	0	1000
6	Metz, McGann	0	0	0	0	0	0	0	0	1000
7	Metz, Metz	0	0	0	0	0	0	0	0	1000
8	K-R-I-T, Mulleavy	8	0	0	0	0	0	0	0	992
9	K-R-I-T, Hansen	70	0	0	0	0	0	0	0	930
10	K-R-I-T, Witt	0	0	0	0	0	0	0	0	1000
11	KisselKar, Smith	5	0	15	0	0	0	0	0	980
12	Velie, Erbes	4	14	0	0	0	0	0	0	982
14	Hupmobile, W. Munzer	0	0	0	0	0	0	0	0	1000
15	Hupmobile, C. Munzer	0	0	0	0	0	0	0	0	1000
16	Little, Stimson	87	19	0	0	0	0	0	0	894
18	Locomobile, Everett	306	19	35	0	*	..	..	..	....
19	Chalmers, Van Duzee	57	0	*	..	..	..	..	..	....
20	Locomobile, Parks	0	0	0	0	0	0	0	0	1000
21	Maxwell, Newlon	50	20	0	0	0	0	0	0	930

*Withdrawn.

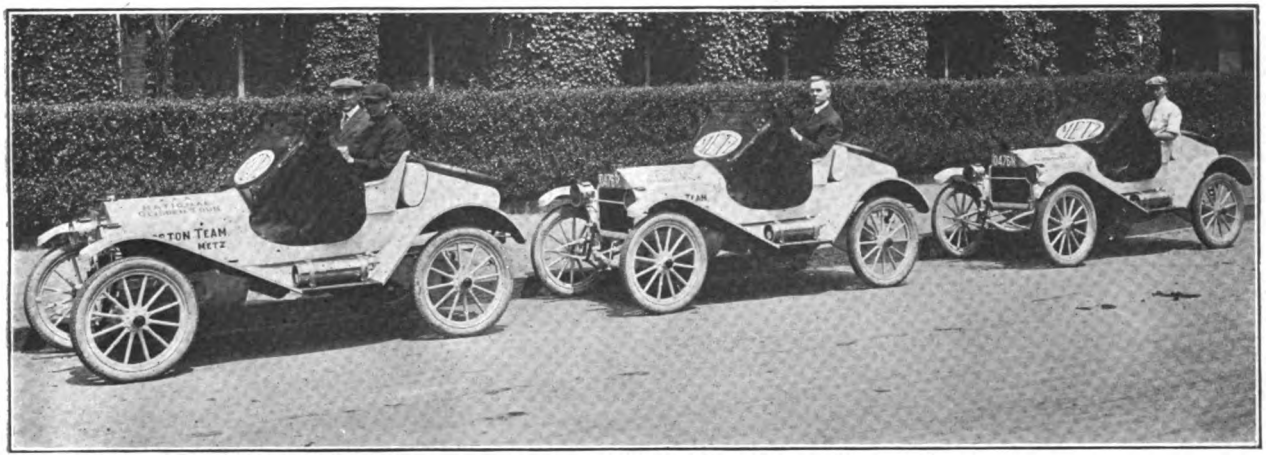
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in 3:05:00, and L. H. Fawkes in a Premier was the first contestant to arrive. About 13 miles east of Alexandria the pilot car and the Kissel-Kar entrant became ditched because of the heavy mud. The Stutz picked up the official flags and made the night control in advance of all others.

The second day took the tourists to Fargo, N. D., with noon stop at Fergus Falls, Minn. The distance for the day was 123.8 miles. Near Osakis, the enterprise of the Minnesota farmers was decidedly evident, several of them being ready with horses to pull machines from the swamp at $5 a pull. It was during this day that suggestion was made that one of the Metz machines be attached by a 40-foot rope to the pacemaker, so that there should be no delay in extricating it from the mud. At one point it looked as if one of the Munzer twins, in the Hupmobile team, would lose his perfect score, being halted for a time with a puncture. At night one lone point was credited against him, but upon checking up the watches of the party the figure was erased. The Marmon was the first to reach Fergus Falls, with the Stutz a close second. At Elizabeth, P. C. Frazee, in a 1909 Cadillac, volunteered to show the tourists a way to reach Fargo that would eliminate some of the mud, and guided the party to Moorhead.

Sunday was a day of rest, in Fargo, and the tourists appreciated the innovation. During the day the skies cleared and when the party left at 6:30 Monday morning it was with a feeling that much better time would be made under the changed conditions. But the roads to Devils Lake, 194.6 miles, with noon control at Grand Forks, were found to be in such condition that President Enos suggested substituting life buoys for confetti in marking the route. The Marmon brought the pacemaker's flag into Crookston, after several of the cars had been delayed, but from Crookston to Grand Forks there were no mishaps. Near Eldred, a horse that had been turned out to pasture along the roadside became frightened at the calvacade and ran down the highway ahead of the tourists, scattering the confetti to the four winds. At Grand Forks, Fred Bartholomew, in a Luverne, joined the party, intending to go only so far as the Montana line.

The run from Devils Lake to Minot, a distance of 135.6 miles, was covered under excellent touring conditions. The noon control was at Rugby. Beyond that town and through Towner, Donbeigh and Granville, the machines actually left a trail of dust behind them. At Rugby the tourists were met by a large delegation of local motorists and a brass band, and a large body of Minot owners was at Granville to escort the party over the last 10 miles of the day. At Halstad the tourists drove through an immense horseshoe.



The Team of Three Metz 22.5 Horsepower, Friction Driven Cars, Which Captured the Glidden Trophy in the Ninth National Reliability Run.

Much the same conditions prevailed on the sixth day, between Minot and Williston. The 136.8 miles, with noon control at Stanley, were covered practically without incident. The date was made somewhat notable by the arrival of L. W. Hill, president of the Great Northern Railway, who was largely responsible for the selection of this route for the 1913 tour and for the official train, carrying the hotel equipment for the tourists. It was made particularly evident this day that contests of this character have a special value to the territory covered by them. Practically every farmer's boy on the route was able to call off the names of the different machines, indicating familiarity with the distinguishing features of each. It was freely noted among the contestants that the boy of today is the buyer of

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automobiles tomorrow, and events of this character do much to bring the merits of the various cars to the attention of the public.

The seventh day took the tourists from Williston to Glasgow, Mont., a distance of 163.8 miles, with the Metz team bringing the pacemaker's flag into the noon control at Poplar, Mont. The steep hill about eight miles west of Williston was negotiated with ease, although the contestants had been freely warned as to its peculiarities, with winding turns at the bottom of some of its steepest portions. At Buford a brief stop was made to inspect the spot made historic by Custer's last charge. At the Fort Peck reservation the survivors of the tribe which massacred Custer welcomed the motorists, and entertained them for a time with Indian dances, horse races and a sham battle. With exception of the Marmon entrant, which was withdrawn, all cars came through the day with perfect scores to their credit.



The Metz Twins, the Misses Irene and Lillian, in One of the Glidden Trophy Metz Cars.

The run from Glasgow to Havre, 156.1 miles, with noon control at Malta, offered some decided innovations, in that the way led up hill and down dale with a number of dangerous places to be encountered. From a point 120 miles west of Glasgow to Harlem the roads were filled with stones, and great care in driving was necessary, as gulleys and ruts added their hazards as well. From that point into Malta the surface was good and fast time was possible. In the vicinity of Yantic a number of bad turns occupied the attention of the contestants until within five miles of Havre.

The last day's journey was much in the nature of a triumphal parade, for such cars as were still to be listed in the perfect score division. The Blackfeet Indians were encamped at the gateway to the park reservation as a committee of welcome. Early in the evening the Rocky mountain peaks were illuminated with Roman fire, and all told no previous national reliability tour of the American Automobile Association had a more spectacular finish.

The Metz is the product of the Metz Company, Waltham, Mass. It has a four-cylinder, water-cooled motor, cast en bloc, with bore of 3.75 inches and stroke of four. Lubrication is by the constant level splash system, the level being maintained by a pump. Cooling is by the thermo-syphon system. Ignition is by Bosch high-tension magneto. The carburetor is of the float feet automatic type. The clutch is a friction plate applied to the driving ring, the drive being by friction discs with chains running in oil. The springs are full elliptic all around. Two sets of brakes are fitted, internal expanding on rear wheel drums and external contracting on jack-shaft. The wheels are of the artillery type, fitted with 30 by three-inch tires. The driver is placed at the left with centre control levers.

Too much credit cannot be given the Metz team for winning this famous award, which for the past eight years has been a coveted possession to be displayed at the annual shows and on all other prominent occasions by the winner. The trophy was donated by Charles J. Glidden early in 1905, soon after the completion of the first national reliability tour. With two exceptions, it has been awarded annually since that time. An accompanying table gives the names of the cars which have held it. In 1908 three teams were tied in the final score and it was arranged to run off the tie at a later date. But one of the teams appeared and this refused to cross the starting line, so no award was made. There was no tour in 1912.

According to the Glacier Park Blazer, the Locomobile driven by Dr. Parks had a record of more than 100,000 miles before it entered the tour. No mention was made of the date of its production, but it was a chain driven model, and the Locomobile Company of America, Bridgeport, Conn., stopped making chain driven cars in 1909. At the beginning of the tour in Minneapolis, Dr. Parks said: "I'm going to show the old Bridgeport Lion the wonders of Glacier park. It has seen about everything else in the country." It appears, however, that it was to show some of the later day models a thing or two as well, bringing back the new A. A. A. trophy.

The Motometer Company, 1790 Broadway, New York City, has received the following cablegram from Boillot and Goux, winner and second place driver in the French Grand Prix: "Your motometers mounted on our cars have given us complete satisfaction."

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WINNERS IN ALPINE TOUR.

Rolls-Royce of English Make at the Head of Perfect Score Class in Austria.

Nine cars finished the recent 1654-mile Alpine test of the Royal Automobile Club of Austria with perfect scores. Five others were without penalization at the completion of the run, but suffered demerits in the technical examination. Cars representing eight nations competed.

Those which were perfect in all respects were: Rolls-Royce, C. C. Friese; Minerva-Knight, E. Guidenus; Horch, G. Paulmann; Laurin-Clement,, O. Heironimus; Benz, W. Delmar; Audi, Lange; Audi, A. Granmuller; Audi, L. Obruba; Raba, Sirutschek. The five which finished the road work without penalization were: Minerva-Knight, G. de Long; Horsch, Dr. Stross; Laurin-Clement, Count Kolowrat; Puch, Miss Helene Morarin; Fiat, M. Schneeweiss.

CYCLECARS IN GRAND PRIX.

Bedelia Wins in Event for That Class and Morgan in Side Car Division.

While the results in the French Grand Prix for automobiles is given elsewhere in this issue, it appears that subsequent to that event a race for cycle cars was run in two divisions over the same course, the distance being 145 miles. The cyclecars were divided between four-wheel and three-wheel machines, the latter being termed sidecars, although some of those entered, the winner for instance, were of a design more nearly resembling the so-called tricar.

In the regular cyclecar division, a Bedelia model, Bourbeau driving, won, covering the distance in 3:55:54, or at a speed of 41.2 miles an hour. Second place went to Camouel in a Sphinx, time, 4:05:11, and third to Rontelx in a Rontelx, time, 4:11:16. The side car division winner was McMinnies in a Morgan, the time being 3:53:09, or at a speed of 42.8 miles an hour.

ERECTS FACTORY ADDITION.

New Structure Will Triple Capacity of Ward Leonard Electric Company.

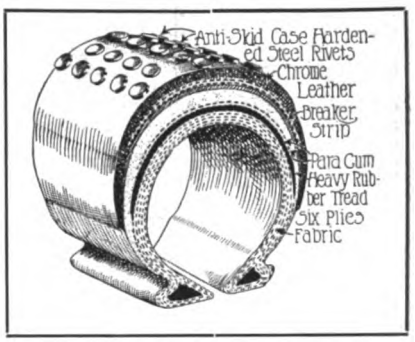
The Ward Leonard Electric Company, Bronxville, N. Y., has been so successful with electric lighting and starting equipment for automobiles and orders have increased to such an extent that it has been necessary to build an addition to its plant. This increase is to the northeast wing of the factory and work on it is rapidly nearing completion.

The new building will greatly facilitate the company in handling the additional business and will enable it to triple its present output. The present congestion in the installation department will be relieved.

INVINCIBLE PUNCTURE PROOF TIRES.

Old Shoes Rebuilt and Guaranteed Against Blow-Outs or Punctures.

Blow-outs and puncture are the natural outcome of the tire equipment, the latter being possible even with a new shoe. Usually the worn out casing is scrapped, obtaining a small sum. By the Invincible process, which includes completely rebuilding the old casing, it is held that not only is the tire made as good as new, but the maker gives a guarantee of 3000 miles service without a puncture or a blow-out.



Invincible Puncture Proof Tire.

An accompanying illustration indicates the process and it will be noted that in addition to the conventional plies of fabric and rubber tread, there is added a breaker strip to which is cemented pure Para gum. Applied to this construction is a layer of French chrome leather which is secured permanently by a special cementing process and vulcanized, making it integral with the regular shoe. At the point where the greatest stresses are experienced are other layers of special leather. The tread of the shoe is studded with case hardened steel rivets which provide non-skidding features and which are guaranteed not to break from the surface.

The maker states that heating is reduced to a minimum because the leather, fabric and rubber are cemented together, and that the leather is a non-conductor of heat. Punctures are prevented by the leather, which, as it will be noted practically envelopes the tread and side walls. The Invincible Tire Company, 53 Sabin street, Providence, R. I., issues a valuable booklet on tires, which will be mailed free to anyone interested, upon request.

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GENERAL NEWS OF THE INDUSTRY.

Important Convention of Parts Makers at Factory of Cole Company in Indianapolis---Centralized Sales Plan of Chicago House---Changes in Personnel.

A MEETING of many of the most representative men in the automobile industry was held in Indianapolis, Ind., July 17, to discuss what was termed the new standardized type of automobile. The convention was called at the request of President J. J. Cole of the Cole Motor Car Company, and its object, as outlined by him, was to ascertain how best to scientifically handle the problems of volume and overhead, with the idea in mind of increasing the quality of the motor car and at the same time reducing its cost to the user. The companies represented included the following:

Timken-Detroit Axle Company, Detroit; Northway Motor & Manufacturing Company, Detroit; Mayo Radiator Company, New Haven, Conn.; Gemmer Manufacturing Company, Detroit; Timken Roller Bearing Company, Canton, O.; Dayton Engineering Laboratories Company, Dayton, O.; Detroit Steel Products Company, Detroit; Spicer Universal Joint Manufacturing Company, Plainfield, N. J.; Hydraulic Pressed Steel Company, Cleveland, O.; Firestone Tire & Rubber Company, Akron, O.; Stewart-Warner Speedometer Corporation, Chicago; Stromberg Motor Devices Company, Chicago; Janney, Steinmetz & Co., Philadelphia, Penn.; Curtain Company, Jackson, Mich.; Taylor Tire Pump Company, Chicago.

Cole representatives were present from New York, Boston, Brooklyn, Newark, Sioux City, Spokane, Toronto, Winnipeg, Vancouver, Washington, El Paso, Butte, Baltimore, Atlanta, Birmingham, Mobile, Buffalo, Chicago, Cleveland, Dallas, Denver, Des Moines, Detroit, Jacksonville, St. Louis, Los Angeles, San Francisco, Kansas City, Louisville, Little Rock, Memphis, Minneapolis, Omaha, Philadelphia, Portland, Me.; Portland, Ore.; Seattle, San Antonio.

Homer McKee, director of sales and advertising for the Cole Company, presided at the meeting and in his opening remarks he defined the proposed Cole economic standardization as the science of employing the factors of volume and overhead for the purpose of increasing quality and decreasing cost. As applied to the motor car he said that standardization meant building exclusively of nothing but recognized standard units. A standard part is any part which has been built so well that it has become the standard whereby all similar parts are measured. The various concerns represented produce what Mr. McKee termed the best in their respective lines and he said that the Cole machine was the first to conceive the idea of placing these various parts into one, compact vehicle. He was certain the movement was an epoch making one and that when the details could be worked out to the satisfaction of all and each was working in harmony and conjunction with the others, the results would be beyond computing.

PURCHASES MACO CARBURETOR.

New Concern Will Continue Its Production in New Location.

The Gleason-Peters Air Pump Company, Brooklyn, N. Y., announces that it has purchased the business recently owned by the Motor Appliance Company of America, maker of the Maco carburetor.

The business has been transferred by the Gleason-Peters company to its present plant at 255-261 Classon avenue and the manufacture of the Maco will be continued. A large number of the carburetors have been used by motor car makers with satisfactory results and the Gleason-Peters company is contemplating a sales campaign of nation wide scope.

JOINS LOZIER STAFF.

Frank H. Smith Is Again Associated with Sales Manager Paul Smith.

Renewing an association of years' standing, Frank H. Smith, formerly of the Studebaker and Maxwell companies, has joined the sales staff of the Lozier Motor Company, Detroit, maker of Lozier cars, under Sales Manager Paul Smith. Frank Smith was formerly assistant to Paul Smith when the latter was sales manager of the Studebaker Corporation, and although the two men are not related, they were constantly being introduced as brothers.

Frank Smith is one of the most widely acquainted travelling salesmen in the automobile business and is thoroughly conversant with sales conditions all over the country. He also numbers many newspapermen among his friends owing to his connection with many automobile publicity events during the past five years. He will act as special travelling representative of the Lozier company, working from Detroit. His services will be largely in the nature of a connecting link between dealers and the home office.

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WOOLER WITH CONTINENTAL MOTOR.

Well Known British Engineer and Designer Remains Behind in This Country.

Ernest Wooler, until recently designer for the Rolls-Royce Company, Ltd., and Brazil Straker & Co., Ltd., England, and a member of the Institute of Automobile Engineers of Great Britain, one of the recent party of visiting British engineers, did not return to his home country, having taken a position with the Continental Motor Manufacturing Company, Detroit, maker of Continental motors.

Mr. Wooler was enthusiastic over the automobile industry in this country and its magnitude appealed strongly to him. The future of the business in America and the wider field to be found here were factors which induced him to remain. Mr. Wooler is an engineer of wide experience and his acquisition by the American industry is a distinct gain. He has designed some of the most expensive cars made, including the famous Crossley racing machine, and he is a driver of considerable reputation.

STROUT'S ENVIABLE RECORD.

Something About the Man Who Will Direct Haynes Sales Policy.

The Haynes Automobile Company, Kokomo, Ind., maker of Haynes cars, enjoys the distinction of having two men connected with its organization that were born in Portland. One is Elwood Haynes, builder of what is regarded as America's first gasoline car, who first saw the light of day in Portland, Ind., while the other is Sales Manager George H. Strout, whose birthplace is Portland, Me. Mr. Strout was recently manager of sales and advertising for the Cole Motor Car Company, Indianapolis, maker of Cole machines, but resigned to take a similar position with the Haynes factory.

His selection is regarded as a happy one, inasmuch as his genius for securing business is recognized throughout the industry. While with the Cole company his record as district sales manager, handling most of the territory between the Mississippi river and the Atlantic Coast, was unusually brilliant. Mr. Strout is himself thoroughly satisfied with what he accomplished in the interests of that car, a sentiment which is wholly reciprocated by the entire Cole organization, and which found expression through President J. J. Cole when he congratulated the Haynes Automobile Company upon securing the service of such an able executive, at a dinner tendered Mr. Strout previous to his leaving the Indianapolis concern.

Mr. Strout was born in Portland, Me., Dec. 26, 1870, and he was fitted for college at Boston. He graduated from Swarthmore College in Pennsylvania, and after teaching for one year at the Harvard preparatory schools in West Newton, Mass., he entered upon a business career. The bicycle business first interested him at Boston and two years later he went to New York City to become branch sales manager of the Monarch Cycle Manufacturing Company, Chicago. Then 25 years old, he became known in the East as one of the youngest executives in the country. With the advent of the American Bicycle Company in 1899 the Monarch company was included in the general plan of consolidation and Mr. Strout resigned. He went to the Alaskan gold fields, where he remained for two years. Returning, after adding substantially to his finances, he became junior member of the brokerage firm of Chilberg & Strout, New York City.



George H. Strout, Sales Manager, Haynes Automobile Company.

In 1903 he entered the motor car industry, forming the Western Automobile Company, St. Paul, Minn., a remunerative enterprise, which he sold in 1905. He then went to Hartford, Conn., where he took charge of the sales of the Columbia electric and gasoline cars, his record while there attracting the attention of manufacturers in the Middle West. He was in Indiana, being connected with the Apperson Bros. Automobile Company, Kokomo, from 1907 until 1911, when he went to New York City for a brief time in the interests of a Detroit truck concern, returning to Indiana to become identified with the Cole firm. During his four years with the Apperson concern he materially increased the output of the factory, with the assistance of of A. G. Seiberling, who was recently promoted to be general man-

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ager of the Haynes company, with which he became connected in October, 1912. Thus, with experience ripened, these two men are again together and their future activities cannot but react to the benefit and prosperity of the Haynes company.

LEAVES WESTINGHOUSE COMPANY.

H. G. Mills Becomes Manager of Detroit Branch of Electric Auto-Lite Company.

One of the most interesting announcements in the automobile world recently is that of the resignation of Horace C. Mills from his position as special representative for the automobile starting, lighting and ignition division of the Westinghouse Electric & Manufacturing Company, to become affiliated with the Electric Auto-Lite Company, Toledo, O. He will be manager of the Detroit branch, with headquarters in the Boyer building, and will be closely associated with C. O. Miniger, secretary and treasurer of the company. Together they will have charge of the sales and service throughout the country.

Mr. Mills has been identified with the automobile accessory trade for 15 years. He introduced the first vibrating spark coil for ignition purposes to automobile manufacturers, and in 1902 organized the Providence Spark Coil Company, Providence, R. I., becoming its first vice president. This company was instrumental in bringing about a universal adoption of this system by motor car makers until the vibrating coil was supplanted by the invention of the magneto.

REMOVES TO CONNECTICUT.

Cameron Manufacturing Company Purchases New Plant in West Haven.

It is announced that the entire plant of the Cameron Manufacturing Company, Beverly, Mass., maker of Cameron pleasure and commercial cars, will be removed to West Haven, Conn., where the factory formerly occupied by the Mathushek Piano Company has been purchased. The concern has been in Beverly for the past six years, but for some time it has been seeking a better location where financial and shipping conditions would result in improved manufacturing facilities.

The Cameron Company is incorporated under the laws of Connecticut with a capital of $1,000,000, of which $200,000 will be placed with New Haven men. The new factory provides about 75,000 square feet of floor space, and has been idle for about a year. It is planned to produce 1000 machines for 1914, and it is expected that the plant will employ about 250 men when in operation shortly after Aug. 1.

E. S. Cameron, the designer of the Cameron car, is well known in the motor car industry. He is said to be the first engineer to produce a steam car with a shaft drive. This was in 1898 and one of the machines built in that year is stated to be in service today and doing the work it was designed for 15 years ago. Frank S. Corlew is general sales manager of the company and conducted the negotiations for the concern's removal to West Haven.

PARTIN-PALMER COMBINATION.

Chicago Concern Enlarges Plans to Handle Product of Three Manufacturing Plants.

As a result of the constancy of C. C. Darnall's faith in central sales organization, the Partin Manufacturing Company, a large selling concern of Chicago, has combined with the Palmer Motor Car Company of Detroit, maker of Palmer cars, and the plans of the combination are of much interest to the automobile trade. The relation between the two companies will be the same as that of the manufacturing and sales departments of any well regulated business and unlimited capital is said to be behind the venture.

Mr. Darnall is one of the pioneers of the selling end of the motor car industry and as general sales manager of the Partin Manufacturing Company, which position he assumed in April, he will direct the sales of the output of three automobile factories, only one model being made in each. Mr. Darnall was general sales manager of the Crow Motor Car Company, Elkhart, Ind., for four years, leaving that concern to join the Partin company. For seven years previously he was general sales manager of a large selling organization in Chicago, with an extensive automobile department. During these connections he carried out successful selling campaigns.

Every detail of the business not directly connected with the production end will be removed from the various plants and the output of the three factories will be sold through the Chicago office. There is to be no conflict with respect to models, as each factory will produce a car that does not in any way come in competition with the product of the other plants.

At the head of the Palmer Motor Car Company is another pioneer in the industry, Randall

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A. Palmer, who organized the Cartercar Company of Pontiac, Mich., in 1905, and continued to direct the concern as general manager until he resigned in February, 1912. His success is familiar to those in the industry and as an engineer of recognized ability he has made a special study of automobile designing.

George H. Partin, who is responsible for the finances of the Chicago firm, is well known in Tennessee and the South as a very successful business man. He has been financially interested in the automobile industry for several years and intends to devote his entire time to the new enterprise. Associated with him is H. F. Graper, capitalist and banker of Lexington and Nashville, Tenn. In fact, the Partin Manufacturing Company, with general offices at 542-547 National Life building, Chicago, is a copartnership owned and controlled exclusively by Mr. Partin and Mr. Graper. In the Detroit company are William H. Lankin, J. H. Pratt and others. Mr. Lankin is president of the Palmer Motor Car Company and previous to his connection with that company he was proprietor of one of the largest hardware concerns in Michigan.

The line to be sold by the Partin Manufacturing Company consists of the following: Partin-Palmer, six-passenger touring car, with 115-inch wheelbase, 38 horsepower Mason motor, centre control, with left hand drive; Partin, six-passenger touring car, with 45 horsepower Rutenber motor, 120-inch wheelbase, electric lighting and motor starting system, etc.; Crown, cyclecar, with four-cylinder, 21 horsepower motor.



Some of the Men Who Will Administer the Affairs of the Partin-Palmer Sales Combination, the Headquarters of Which Are in Chicago.

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NEW AND NOVEL ACCESSORIES THAT APPEAL TO MOTORISTS

Underwriter Automatic Valve.

The Underwriter fire prevention automatic valve is manufactured by the Underwriter Valve Company, 620 Industrial Trust building, Providence, R. I. It is an ingenious device, comprising a small valve which is inserted in the fuel line, near the carburetor, etc., and in the event of a fire it automatically shuts off the supply of gasoline. In the case of a carburetor catching fire through a backfire, for example, the blaze would only continue until the fluid in the vaporizer became exhausted. The valve is made of bronze, copper and German silver and is held against closing by a fusible link, so designed as to melt at a temperature of 155 degrees Fahrenheit. It is held that the material is so sensitive that it can be fused by the flame of a match. The moment the link melts a spring closes the valve.

Triplex Spark Plug.

The Triplex spark plug, so termed because it provides three sparks instead of the one conventional flame, is made by the Chas. R. Bates Company, 35 Warren street, New York City. The central electrode is molded into the porcelain and diverted at the firing end .25 inch off centre; that is, with a one-inch porcelain face it would emerge .25 inch from the edge or shell. Separated from it by the usual .03125-inch gap is a T head pin. A second pin is provided and separated from the first named by a gap. The construction is such that the gaps form a straight line across the end of the porcelain to the contact pin. The current jumps from the first gap to the T head member, which is insulated, flows through it to the other side and jumps the second gap, and so on to the outside shell pin and to ground. It is held that the intensifying of the current makes for great efficiency and that complete combustion of any mixture is obtained.

Campbell Tell Tale.

The Campbell Manufacturing Company, 3715 Wentworth avenue, Chicago, is marketing the Campbell tell tale, which is an inexpensive and practical device for notifying the operator of the car when the tail light is extinguished. It is made either for kerosene, gas or electric units, and its simplicity is shown by the accompanying illustrations. The tell tale proper is constructed of a composition of metals which expands when in proximity to heat. When fitted to a kerosene lamp it is inserted as shown, and should the light be extinguished the metal arms contract, closing an electrical circuit and causing operation of a small, compact buzzer. It will be seen that the tell tale is an automatic switch, and but a single dry cell is needed. A cut-out plug is provided, a switch member, and this is utilized when lighting the lamp. But a few seconds are required to expand the metal of the tell tale. The latter is also adjustable. The installation and wiring of the electrical unit is simple and provision is made for a combination outfit; that is, the tell tale may be employed for both kerosene and electricity. It is not necessary to install a buzzer as the usual electric horn may be utilized to give warning of an extinguished light. The equipment comes complete, is compactly constructed and of high grade material. It not only effects economy in that fines are avoided, but makes for a factor of safety by preventing rear end collisions due to the rear signal being extinguished.

Motor Voice Horn.

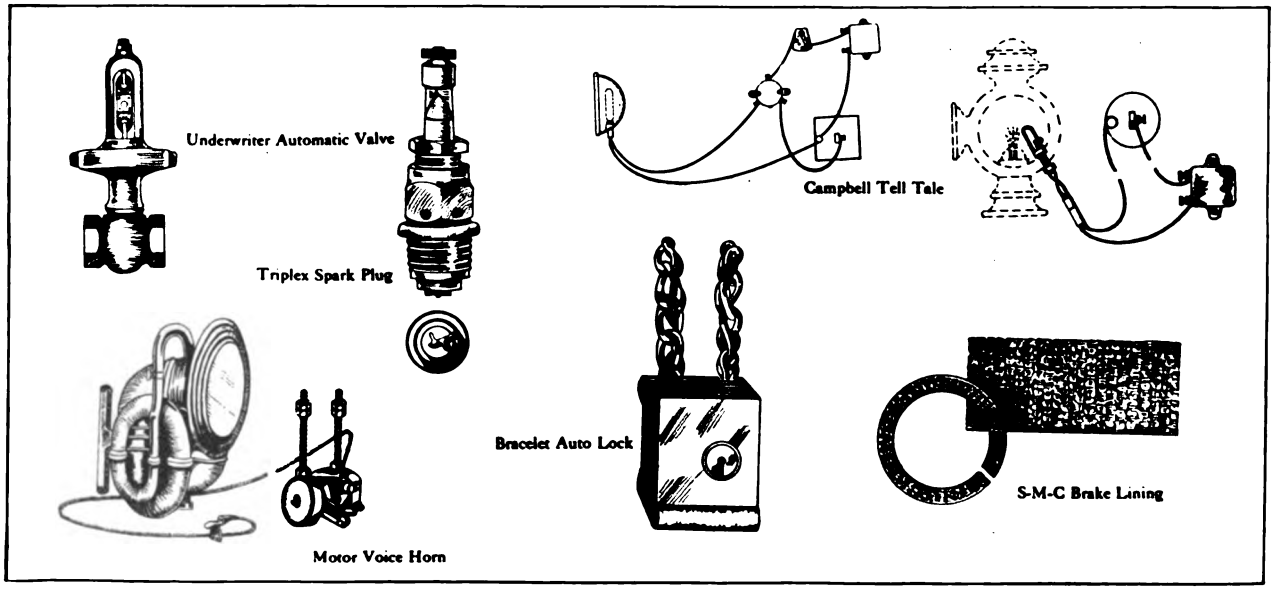
The Motor Car Equipment Company, 55 Warren street, New York City, is marketing the Motor Voice horn, which presents interesting features in that it is operated by a small air motor actuated by the flywheel of the engine, and that the signal cannot be operated by the small boy when the car is inoperative. Control of the air is by a push button type of clip on the steering wheel or other convenient place. Connection between the clip and air motor is by a Bowden cable enclosed in a braided metallic tube. The sound produced by the Motor Voice horn is said to be far reaching, but not at all disagreeable. It is durable, requires no attention after installation, and its upkeep is included in the first cost.

Bracket Auto Lock.

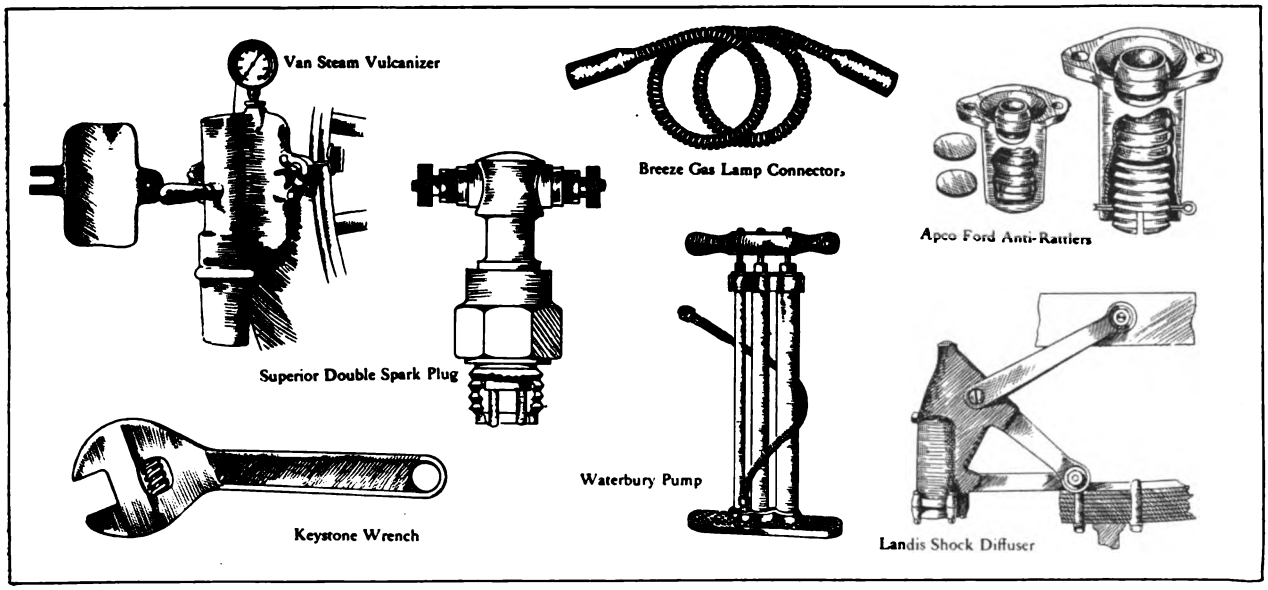
The Bracket Auto lock is the product of the Bracelet Auto Lock Company, 32 North Clark street, Chicago, and its design is such that it may be employed to lock the throttle and spark levers, or both, the steering wheel, or all three. It is a universal lock in that it will fit any make of motor car and comprises a Yale lock body attached to which are two chains. These cannot be broken after being secured to the part without so seriously damaging it as to prevent operation of the machine. All keys are different. The Bracelet Auto lock is constructed in different sizes to meet the requirements of different machines. The Bracelet Auto Lock Company has an attractive proposition for dealers.

S-M-C Brake Lining.

The Staybestos Manufacturing Company, Germantown, Philadelphia, is producing S-M-C brake lining, which is constructed from the highest quality asbestos and resistance wire, both fireproof and durable materials. It is compactly woven and scientifically treated in such manner as to provide the greatest efficiency and maximum service. It is held by the maker that S-M-C when in contact with metal will lock the wheels of the car instantly if desired. It is not affected by heat, water, oils or gasoline, and is guaranteed. It is produced in forms for friction or transmission clutches and these are made



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in a large variety of styles and sizes. The brake lining comes in conventional widths and thicknesses. Special forms are constructed to order.

Van Steam Vulcanizer.

The perfecting of small, portable vulcanizers has resulted in a large number of motorists completing successfully repairs to inner tubes and cut casings. Vanderpool Bros., 723 West Mulberry street, Springfield, O., is marketing the Van portable steam vulcanizer adapted especially for the owner's use. It is designed for service on casings and tubes, and when the former are to be repaired it is not necessary to remove them from the rim. Steam is generated with an alcohol lamp attached to the lower part of the instrument, and the pressure is regulated by turning the lamp, thereby closing an air vent. This holds the steam at the required working pressure. Illuminating gas can be utilized if desired, a tube connection being provided. The Van can also be employed with any steam plant by utilizing a hose or pipe. The equipment is very complete.

Superior Double Spark Plug.

The advantage of utilizing two sparks in a cylinder is well known. The Superior Motor Specialty Company, 44 North Fourth street, Philadelphia, is marketing the Superior double spark plug, which permits of dual sparks in the cylinder without the installation of the dual, double type of magneto, etc. When two simultaneous sparks are desired one side of the Superior is connected by a single wire to the regular single plug, and the lead from the source of current supply attached to the other side of the Superior. The double plug may also be utilized for two independent sets of ignition and when provision is made for only one set of plugs, by being so wired that one side may be employed for the magneto and the other for the battery. There are a number of combinations possible with the Superior.

Breeze Gas Lamp Connector.

When rubber tubing is utilized to connect the acetylene headlights with the main line, it deteriorates through exposure to the air, unless protected by a suitable insulation. This results in inefficiency and loss of acetylene. The Breeze Carburetor Company, Newark, N. J., is marketing the Breeze lamp connectors, constructed of flexible metal hose which is held to be leak proof, as well as indestructible. This is obtained through a special packing. The connectors are made in any desired lengths, finished in polished brass, nickel, black enamel or woven, and with rubber or metal tips for making connections. They are moderately priced.

Apco Ford Anti-Rattlers.

The Auto Parts Company, Providence, R. I., maker of Ford specialties and accessories, is offering a new device known as the Apco Ford Anti-Rattler. They are made in two styles, one with a screw adjustment and the other with a disc. They are utilized to eliminate the rattle caused by wear of the front axle radius rod ball bearing, which is constructed without means for adjustment. The construction of both types is shown in the accompanying illustration and it will be noted that the use of hardened discs provides means for taking up wear from time to time. The screw design makes for great convenience as fine adjustments may be made, the operation involving the removal of a cotter pin and rotating the screw plug until a slot in it registers with the housing member. A coil spring provides for a cushioning effect, eliminating vibration as well as undue wear, and it presses a hardened cup shaped cone against the ball proper. Both types are moderately priced and guaranteed.

Keystone Wrench.

The Providence Auto Equipment Company, Providence, R. I., is marketing the Keystone wrench, which is of the adjustable type. It is a steel forging and is polished all over with the exception of the webbing. The jaws and other components are carefully hardened and it is held that the wrench will operate successfully on square or hexagon nuts and bolts. It is made in six, eight, 10 and 12-inch lengths, having openings varying from .75 to 1.3125 inches.

Waterbury Three-Cylinder Pump.

The Noera Manufacturing Company, Waterbury, Conn., is producing the Waterbury three-cylinder tire pump, which presents practical features in that it can be taken apart by simply removing the three retaining plugs on top of the cylinders. The latter are constructed of highly polished brass, with heavy base, and 22 inches of five-ply rubber tubing and a high grade connection are also included. Both sides of the handle are provided with nut protecting plates. Special attention is paid to the plunger washers and leather valves, and these are held to give maximum service with a minimum of attention. It is claimed by the maker that the Waterbury is one of the most powerful pumps on the market and that it will inflate a tire quickly with a minimum of effort because of the triple cylinders. Each pump is tested to 300 pounds pressure before shipment.

Landis Shock Diffuser.

The Landis Shock Diffuser, made by the Landis Engineering & Manufacturing Company, Waynesboro, Penn., differs from conventional types in that it is non-adjustable and embodies the desirable qualities obtained by air, liquid and springs in shock absorbers. It is mounted between the frame and the spring and compression and recoil of the latter are so compensated for that there is held to be no resistance to the action of the spring nor is its resiliency affected. In brief, the Landis comprises a liquid containing housing in which there is a piston and rod, the latter being provided with suitable linkage. The movement of a cylinder is limited

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and the use of valves or openings regulates the flow of oil, the liquid flowing freely or otherwise according to the movement of the spring. An air chamber is also incorporated within the piston rod, it providing resiliency at the beginning of the hydraulic resistance and preventing a shock incident to sudden violent pressure on the oil.

Six Little Yankees.

Six Little Yankees is the product of the Six Little Yankees Company, Philadelphia, and is a carbon remover put up in the form of pellets. It is held that by their use not only is carbon removed, but is prevented from accumulating in the cylinders, and that the process does not interfere with the service of the car or require any work other than the removal of the spark plugs and placing six of the pellet like members in the cylinders and over the piston. This is done when the motor is hot. It is claimed that but five minutes is required for the pellets to dissolve. Each cylinder is treated separately and by using a small amount of kerosene in the usual manner it is held that carbon and soot are displaced.

Peerless Black Japan.

Peerless extra fine black japan is manufactured by the Columbus Varnish Company, Columbus, O., and is produced especially for enamelling lamps, radiators, fenders, etc. It is tough, elastic and durable, and one coat will cover brass, nickel or iron. It is held that it will not crack or peel and is not affected by changes in temperature. No priming coat is required, all that is necessary being to have the surface of the object clean. It is stated that it will dry hard in 10 hours and that a high gloss finish is obtained. It comes in pints, quarts, half-gallon and gallon cans. The Waite Auto Supply Company, Providence, R. I., is Rhode Island distributor.

Braender Non-Skid Tire.

The Braender non-skid tire is the product of the Braender Rubber & Tire Company, Rutherford, N. J., and is made by the single cure, wrapped tread process, from the highest grade Para rubber and the best combed Sea Island fabric. The single cure differs from others in that the mold protrudes only one-third of the distance from the beads, the maker maintaining that this permits the cloth wrapper to compress the tire proper without buckling. The Braender is manufactured in plain and non-skid treads and the company points out that the durability and efficiency of its product is exemplified by the performance of the shoes on Ralph Mulford's Mercedes car in the recent Indianapolis race. It will be remembered that the 500 miles was completed without a change of casings.

Ideal Atomizing Primer.

The Ideal atomizing primer is manufactured by the Interstate Auto Accessory Company, 2124 East Washington street, Indianapolis. It comprises a small container mounted on the dash and leading from the device to the intake manifold is a copper tube. The primer is filled with gasoline, and by actuating the plunger handle a sufficient amount of properly mixed fuel and air is forced to the intake pipe, making it a simple matter to start the engine. The primer is easily installed and is designed to be utilized with the Ideal speeder which was described in these columns recently.

Atlantic Vertical Timer Bracket.

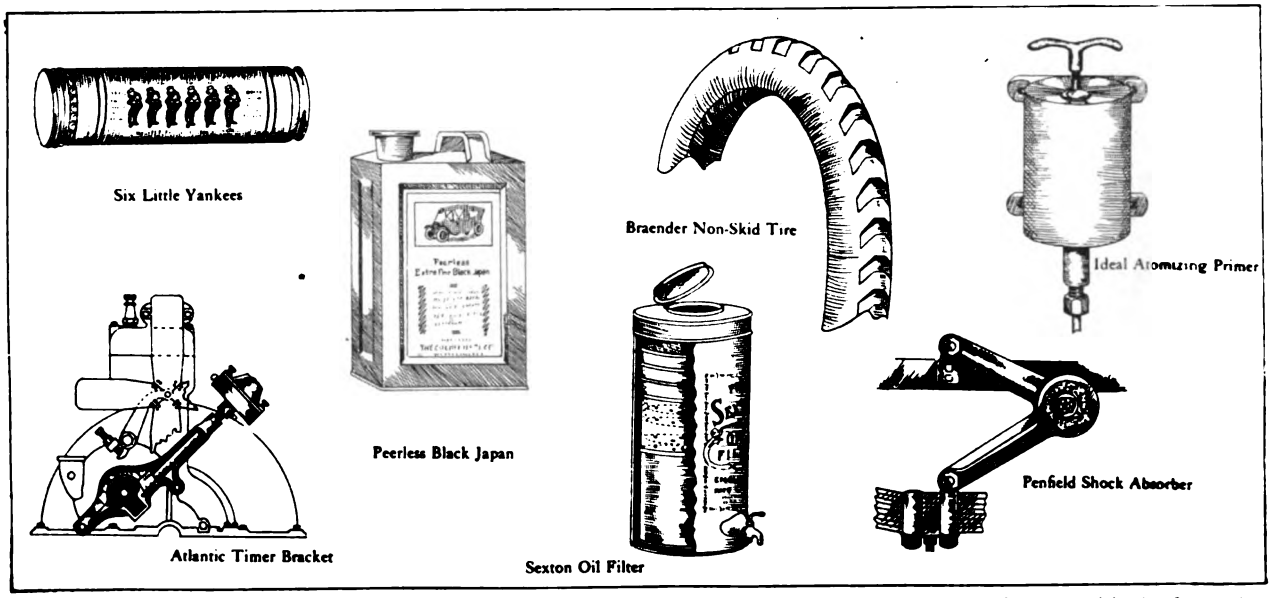
The Atlantic vertical timer bracket is manufactured by the Atlantic Machine Company, 963 Atlantic avenue, Brooklyn, N. Y. It is designed especially for model T Ford automobiles and its installation makes for convenience in that the commutator is easily accessible through its vertical position. The design comprises a complete bracket, spiral gears, timer shaft and commutator. As will be noted by the accompanying illustration, the attaching of the Atlantic is a simple matter, involving the removal of the regular timer, slipping on a gear and locking the bracket by means of two cap screws. The device is so constructed that it may be fitted by the most inexperienced as the work does not involve any knowledge of timing, etc. It is pointed out that it may be installed in a few minutes and that there are no alterations to be made, each part being accurately machined to insure an easy fit.

Sexton Oil Filter.

It is considered good practise to change the lubricant in the crankcase of a motor and when this is done the old oil is usually thrown away. If the lubricant is allowed to remain in service too long the carbon, etc., acts as an abrasive, causing undue wear of the motor components. The Sexton Can Company, 2 Hartford street, Boston, is manufacturing the Sexton oil filter, which is a sturdily constructed vessel 10 inches in diameter and 20 high, although different sizes are made to meet individual requirements. The can is provided with a hinged top and a series of filtering members, also a faucet for removing the filtered oil.

Penfield Shock Absorber.

The Penfield shock absorber is the product of the Penfield Shock Absorber Manufacturing Company, Meriden, Conn. It comprises a triple circular coil compensating spring, the ends meeting on an adjustable stop which has a wider face than the spring driving plunger, allowing a free centre. The centre bolt member is utilized only to hold the case and cap together. Provision is made for lubrication. The case and cover are of semi-steel. The triple spring is 14 inches long and on a five-inch movement of the car will compress one inch. It is held that the tension of the spring will not alter in service and that the free centre movement provides smooth riding qualities. It is also pointed out that no adjustment is required after installation. The Penfield is made to fit the weight of car specified, the tension of the springs being adjusted accordingly, the proper tension being held by an adjustable stop.



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TOURING THE MOOSEHEAD LAKE REGION.

Itinerary Also Includes Stop at Old Orchard, Portions of the Rangeley District and Some New Roads in the Heart of the White Mountains.

UNTIL a few years ago the ways leading into the wooded sections of Maine were little more than trails in many instances. The influence of the automobile has been just sufficient to change these trails into passable roads, without detracting from the pristine wildness of the sections through which they wind their way. This is particularly true of the Moosehead and Rangeley Lake regions, into which the accompanying itinerary leads the tourist.

Leaving Boston, the first day, the route takes the so-called short line to Newburyport and Portsmouth, and while the roads are not quite as ideal as those which skirt the North Shore, they are largely of macadam and good time can be made. The remainder of the distance into Old Orchard is over ground which is somewhat new to the present day tourist. Previous to 1907, when a disastrous fire visited this well known watering place, it was conceded to be one of the prettiest beaches in the country. Within the past two years the automobile has helped it to regain its old time popularity.

Old Orchard comes into view long before it is reached, because of the long shore line which must be skirted. The beach itself extends from Saco river to Pine Point at the mouth of the Scarboro river, a distance of about 10 miles, with a breadth of 300 feet at low tide. The sand is very hard and smooth and affords an admirable driveway, as has been evidenced by the successful automobile races conducted thereon in 1911 and 1912. Because of the absence of the undertow, surf bathing is held to be perfectly safe. Near the hotels is a beautiful forest park of 30 acres, with pleasant paths, arbors and rustic adornments, while at Foxwell's brook is a picturesque waterfall 60 feet high. The beach derives its name from an old apple orchard, the last tree in which died before the Revolution.

The second day finds the tourist in Portland for the beginning of the trip across the state into the Moosehead lake region. Brunswick was first settled as Pejepscot in 1628 and was three times destroyed by the Anasagunticooks before the present name was given it in 1737. It is the seat of Bowdoin College, and if time permits the Bowdoin gallery of paintings should be visited by all means. The falls of the Androscoggin at the head of tide water also are worthy of interest.

The immense ice houses on the banks of the Kennebec at Gardiner will attract attention, and it may be mentioned that the view from the Common, which contains five acres and is situated on Church hill, 125 feet above the river, is superb. Hallowell is noted for its quarries of white and light gray granite. Augusta is the capital of the state and contains much of interest. The night stop is Waterville, the seat of Colby College, founded in 1813. The city is built along rambling streets on a broad plain above the river, near the Taconic falls, and has some very handsome residences.

The remainder of the distance to Moosehead lake is over ways reconstructed for the most part for the use of motorists, and a splendid new garage has been erected at Greenville Junction, where the steamer meets the tourist for the journey to Mt. Kineo. Moosehead lake is famed in prose and poetry for its immense size and its scenic loveliness. It is the largest and best fishing ground in America. Deer and moose abound in great numbers in the vicinity. The lake itself is 40 miles long and from two to 18 miles wide. It contains many bays and beautiful islands, which add to the charm and fascination of the scenery.



View of Moosehead Lake from the Base of Mt. Kineo.

The surrounding hills are lofty and are covered with deep forests, while here and there a mountain towers above the green of the level woods, the whole forming a rare panorama of which the eye never tires. Grandest of all these is the famous Mt. Kineo, whose precipitous face looms up nearly 1000 feet above the surface of the lake, and whose western slope runs off into a level green-clad peninsula.

The route from Moosehead to Rangeley is through the Maine woods a greater portion of the way. The Rangeley lakes are five in

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Tuckerman Ravine in White Mountains.



Tip-Top House on Mount Washington.

number, and have a total area of about 90 miles. All are interconnected by narrows and streams, making a continuous waterway of 56 miles. The Rangeleys are the source of the Androscoggin, which has its rise in Lake Umbagog, and emerges from the forest to find its way to the sea after turning scores of mill wheels. The farthest east is Lake Oquossoc, conceded to be the gem of the entire chain and most often referred to as Rangeley. Its elevation is 2000 feet above sea level. Across the outlet is Bald Head, a mountain easy to climb, and an ideal spot from which to watch the sunrise. Mooselucmaguntic is the largest of the five. Separated but slightly from this and really a portion of the big lake is Cupsuptic. Then come Molechunkamunk and Wolokennebacook. The waters of all these are as clear as crystal and so large are the fish taken from them, it is an unwritten law that trout of less than three pounds shall be returned to their native element.

The fifth day takes the tourist into the White mountains, with night stop at Jefferson, N. H. The view of these peaks over the route selected is one of sublime grandeur, and it is maintained that the finest panorama of the Presidential range is to be found at Jefferson. It is held by some that this exceeds the view at Bethlehem, inasmuch as it is seen from one of the highest ridges of the entire district.

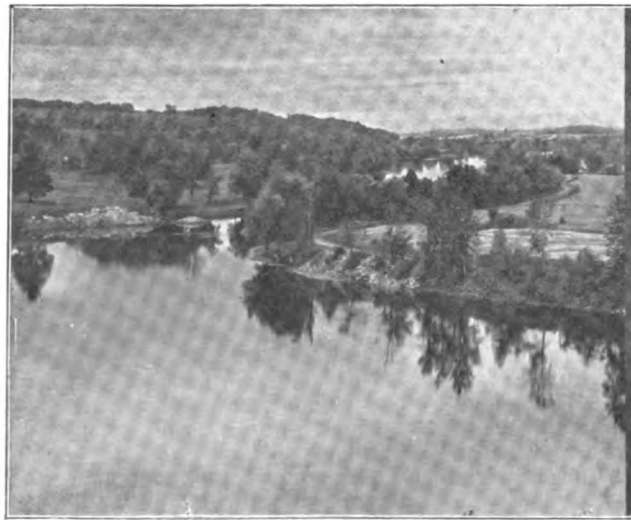
The return to Portsmouth is down the east side of the mountains over better known ways. While it is possible to utilize the outward route from this point into Boston, it is anticipated that the tourist will care to visit other scenes, and the route selected combines much of beauty and interest. The roads throughout this section are quite as good as well.

ITINERARY NO. 9.

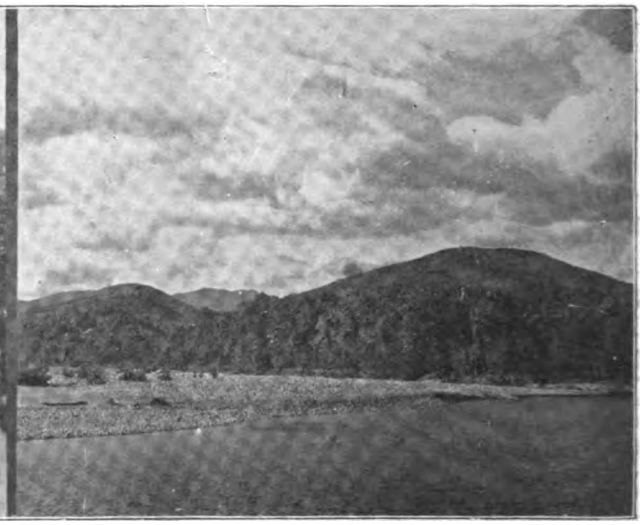
Night Stops—Boston, Mass.; Old Orchard, Waterville, Moosehead Lake and Rangeley, Me.; Jefferson and Portsmouth, N. H. Seven Days, 766.6 Miles.

Boston-Old Orchard, 109.1 Miles.

	Miles to	Total Miles Out	Return
Boston	0.0	0.0	109.1
Charlestown	1.7	1.7	107.4
Chelsea	1.8	3.5	105.6
Lynn	7.0	10.5	98.6
Salem	6.0	16.5	92.6
Beverly	1.5	18.0	91.1
South Hamilton	5.5	23.5	85.6
Ipswich	5.8	29.3	79.8
Rowley	3.6	32.9	76.2
Newburyport	8.0	40.9	68.2
Salisbury, N. H.	2.6	43.5	65.6
Hampton	7.5	51.0	58.1
Rye Beach	6.0	57.0	52.1
Portsmouth	9.3	66.3	42.8
Kittery, Me.	0.9	67.2	41.9
York Center	6.8	74.0	35.1



Nashua River in the Vicinity of Nashua, N. H.



Saco River and Thorn Mountain, Jackson, N. H.

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York Village	0.9	74.9	34.2
York Harbor	0.5	75.4	33.7
York Beach	3.0	78.4	30.7
Ogunquit	6.5	84.9	24.2
Wells	3.5	88.4	20.7
Kennebunk	5.2	93.6	15.5
Biddeford	8.1	101.7	7.4
Saco	1.9	103.6	5.5
Old Orchard	5.5	109.1	0.0

Old Orchard-Waterville, 98.7 Miles.

	Miles to	Total Miles Out	Return
Old Orchard.....	0.0	0.0	98.7
Pine Point	4.0	4.0	94.7
Dunstan	5.5	9.5	89.2
Oak Hill	3.0	12.5	86.2
Portland	5.9	18.4	80.3
Falmouth Foreside	6.1	24.5	74.2
Cumberland	2.7	27.2	71.5
Yarmouth	2.8	30.0	68.7
Freeport	5.9	35.9	62.8
Hillside	4.9	40.8	57.9
Brunswick	3.9	44.7	54.0
Topsham	1.8	46.5	52.2
Bowdoinham	6.8	53.3	45.4
East Bowdoinham	3.8	57.1	41.6
Richmond	4.4	61.5	37.2
Gardiner	11.3	72.8	25.9
Farmingdale	1.5	74.3	24.4
Hallowell	3.0	77.3	21.4
Augusta	2.0	79.3	19.4
Vassalboro	11.9	91.2	7.5
Winslow	6.6	97.8	0.9
Waterville	0.9	98.7	0.0

Waterville-Moosehead Lake, 87.4 Miles.

	Miles to	Total Miles Out	Return
Waterville	0.0	0.0	87.4
Fairfield	3.2	3.2	84.2
Benton	2.5	5.7	81.7
Clinton	4.3	10.0	77.4
Burnham Junction	5.5	15.5	71.9
Pittsfield	7.5	23.0	64.4
Newport	7.3	30.3	57.1
Corinna	6.6	36.9	50.5
Dexter	8.4	45.3	42.1
Hazelton Corners	4.2	49.5	37.9
Silver Mills.....	1.0	50.5	36.9
Sangerville	8.4	58.9	28.5
Guilford	1.4	60.3	27.1
Abbott Village..	3.0	63.3	24.1
Abbott	2.5	65.8	21.6
Monson Junction.	0.9	66.7	20.7
Monson	5.2	71.9	15.5
Shirley Corner..	6.4	78.3	9.1
Greenville	7.7	86.0	1.4
Greenville Junction	1.4	87.4	0.0

Moosehead Lake-Rangeley, 135.6 Miles.

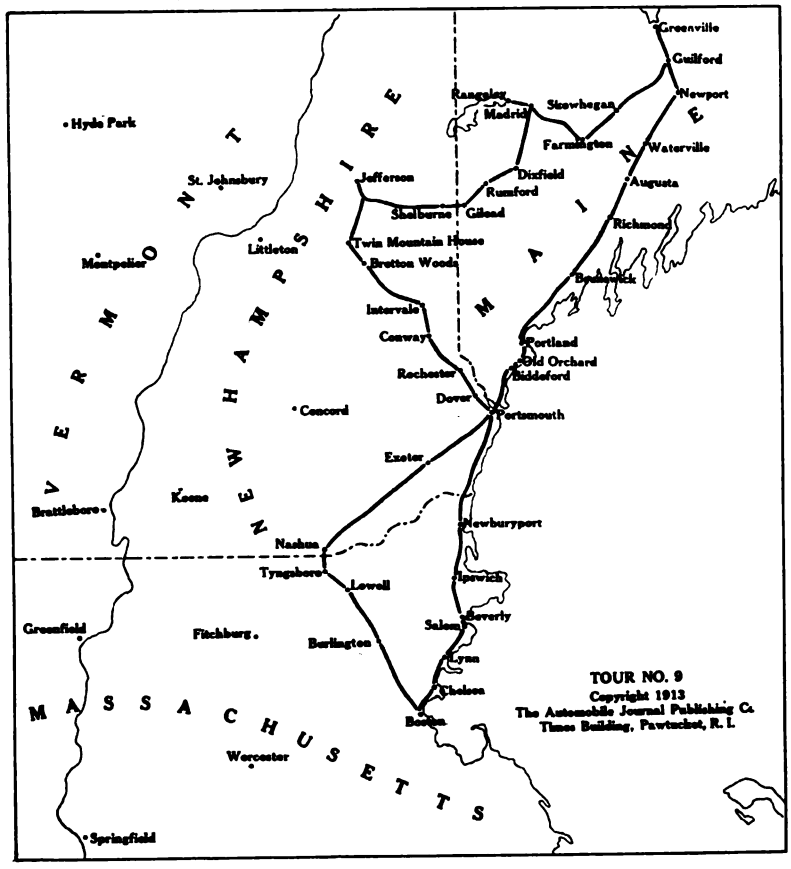
	Miles to	Total Miles Out	Return
Greenville Junction	0.0	0.0	135.6
Greenville	1.4	1.4	134.2
Shirley Corner...	7.7	9.1	126.5
Monson	6.4	15.5	120.1
Monson Junction	5.2	20.7	114.9
Abbott	0.9	21.6	114.0
Abbott Village..	2.5	24.1	111.5
Guilford	3.0	27.1	108.5
Parkman	5.0	32.1	103.5
Cambridge	6.8	38.9	96.7
Harmony	5.2	44.1	91.5
Athens	8.8	52.9	82.7
North Cornville.	2.0	54.9	80.7
Skowhegan 10.5		65.4	70.2
Norridgewock ..	5.5	70.9	64.7
Mercer	7.7	78.6	57.0
New Sharon	6.2	84.8	50.8
Farmington Falls	4.0	88.8	46.8
Farmington	5.3	94.1	41.5
Fairbanks	3.0	97.1	38.5
Strong	8.3	105.4	30.2
Phillips	7.8	113.2	22.4
Madrid	6.5	119.7	15.9
Rangeley 15.9		135.6	0.0

Rangeley-Jefferson, 114.5 Miles.

	Miles to	Total Miles Out	Return
Rangeley	0.0	0.0	114.5
Madrid 15.9		15.9	98.6
Webb 14.6		30.5	84.0
Weld	3.0	33.5	81.0
Dixfield 13.4		46.9	67.6
Mexico	4.8	51.7	62.8
Rumford	0.9	52.6	61.9
Rumford Center.	5.7	58.3	56.2
Rumford Point..	4.0	62.3	52.2
Hanover	1.8	64.1	50.4
Newry	5.3	69.4	45.1
Bethel	6.2	75.6	38.9
West Bethel	3.5	79.1	35.4
Gilead	6.0	85.1	29.4
Shelburne, N. H.	6.0	91.1	23.4
Gorham	6.0	97.1	17.4
Randolph	6.6	103.7	10.8
Jefferson Highlands	6.0	109.7	4.8
Jefferson	4.8	114.5	0.0

Jefferson-Portsmouth, 131.2 Miles.

	Miles to	Total Miles Out	Return
Jefferson	0.0	0.0	131.2
Cherry Mountain	3.7	3.7	127.5
Twin Mountain House	8.8	12.5	118.7
Bretton Woods..	6.1	18.6	112.6
Crawford House.	3.3	21.9	109.3
Bemis	8.8	30.7	100.5
Bartlett	5.0	35.7	95.5
Glen	6.4	42.1	89.1
Intervale	4.0	46.1	85.1
North Conway...	2.0	48.1	83.1
Conway	5.4	53.5	77.7
Iona	4.4	57.9	73.3
Pequaket	3.0	60.9	70.3
Chocura	3.5	64.4	66.8
West Ossipee	4.3	68.7	62.5
Lakewood	2.9	71.6	59.6
Center Ossipee..	3.2	74.8	56.4
Ossipee	5.4	80.2	51.0
Wakefield	9.5	89.7	41.5
Union	5.9	95.6	35.6
Milton	6.5	102.1	29.1
Rochester	8.3	110.4	20.8
Dover	9.0	119.4	11.8
Dover Point	6.5	125.9	5.3
Portsmouth	5.3	131.2	0.0



Portsmouth-Boston, 90.1 Miles.

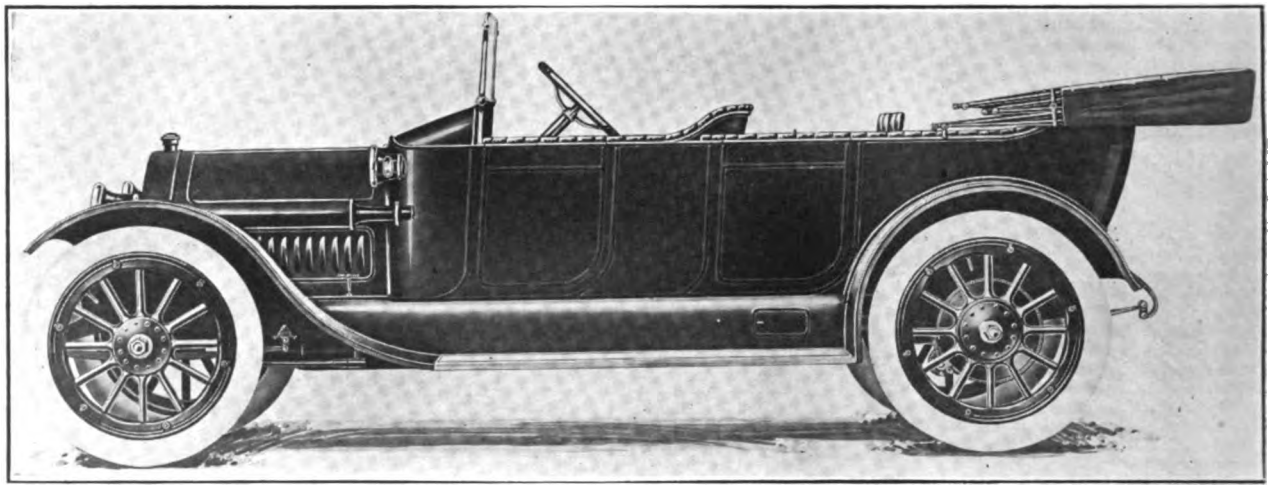
	Miles to	Total Miles Out	Return
Portsmouth	0.0	0.0	90.1
Greenland	5.5	5.5	84.6
Stratham	5.0	10.5	79.6
Exeter	3.7	14.2	75.9
Kingston	6.5	20.7	69.4
Sandown	7.5	28.2	61.9
West Hampstead	3.0	31.2	58.9
East Derry	3.7	34.9	55.2
Derry	1.3	36.2	53.9
West Derry	1.2	37.4	52.7
Nashua 12.0		49.4	40.7
Tyngsboro, Mass.	6.6	56.0	34.1
Lowell	7.9	63.9	26.2
Billerica	6.2	70.1	20.0
Burlington	5.5	75.6	14.5
Arlington	7.4	83.0	7.1
Cambridge	3.5	86.5	3.6
Boston	3.6	90.1	0.0

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LYONS-KNIGHT TO UTILIZE WORM DRIVE.

THE Lyons-Atlas Company, Indianapolis, Ind., purchaser of the plant of the Atlas Engine Works of that city, maker of the Atlas-Knight gasoline and Diesel oil engines, announces particulars of a complete series of Lyons-Knight pleasure cars, a feature of which is a worm drive, and deliveries of which have already commenced. It is stated that the plant has facilities for the production of 50,000 cars annually, and that the company is backed by ample capital to increase this output if desired. Commercial vehicles will also be produced.

The pleasure chassis will be known as the model K, to which are fitted four body types, a five and a seven-passenger touring, a sedan and a berline. The equipment is very complete, including electric lighting and motor starting, and attention has been paid to those details which make for ease of operation and comfort of the passengers.



Lyons-Knight Model K, a Seven-Passenger Touring Car, Having a Worm Driven Rear Axle—The Complete Series Includes a Five-Passenger Touring, Sedan and Berline.

The Lyons-Knight motor embodies all of the latest improvements of the Knight engine, including the best features of European practise, and differs from previous designs in that the sleeve travel has been increased, thicker walls utilized and larger fillets and stronger lugs employed. The oiling system also has been improved, no splash being utilized, the lubricant being positively pumped to all bearings, etc. The piston and sleeve surfaces are lubricated by means of an adjustable pressure regulator in the oil circuit directly connected with the throttle lever, insuring a supply proportionate to motor speeds and eliminating smoking.

The bore of the four-cylinder motor is 4.5 inches and stroke 5.5, and although rated at 32.4 horsepower by the S. A. E. formula, it develops 50 in a brake test at 1200 revolutions. It is held that its maximum is 70 horsepower. It is also pointed out that its efficiency increases with service as the sleeves become highly polished, reducing friction and improving compression. The crankshaft, eccentric shaft and connecting rods are of chrome nickel steel, heat treated, and the crankshaft rotates in five large bearings with adjustable bronze bushings, babbit lined. Provision is made for adjustment by shims of varying thickness. The crankpin bearings are similarly adjustable.

The cylinders, pistons, sleeves and heads are all cast in the foundry of the company and are of a special mixture of cast iron. The crankcase, chain case and cylinder caps are of aluminum, and all other external surfaces are either black enamel or heavily nickel plated. The heads of the cylinders, which are cast in pairs, are covered with a polished aluminum cap, enclosing the spark plugs, wires, etc., and hard rubber buttons are incorporated for testing the plugs without removing them. The design of the inlet ports and their location is such that a very short manifold is possible, reducing opportunity of condensation of the mixture to a minimum. The exhaust manifold is also well designed, being three inches in diameter at the exhaust pipe connection. Carburetion is by a double-jet vaporizer, especially designed for the Knight motor and automatic regulation of the auxiliary air insures maximum efficiency and economy of fuel. The carburetor

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is hot water jacketed and hot air is supplied by a flexible tube. Control of the mixture is by a lever on the steering column.

Cooling is by a centrifugal pump and cellular radiator of ample capacity, insuring proper cooling under the most severe conditions of service. The fan is a one-piece aluminum casting driven from the crankshaft by a silent chain, and an adjustable idler maintains the proper chain tension, as well as of those actuating the magneto and eccentric shafts. The chains are enclosed in an aluminum case and lubricated by a constant stream of oil from the main oil pump. The oil reservoir is formed by a sub-base underneath the crankcase and an intermediate air space is provided, maintaining the lubricant in a cooled condition. A force feed plunger pump operated by one of the sleeve eccentric rods, takes the oil from the reservoir and forces it through the motor. The lubricant is filtered before it returns to the sump.

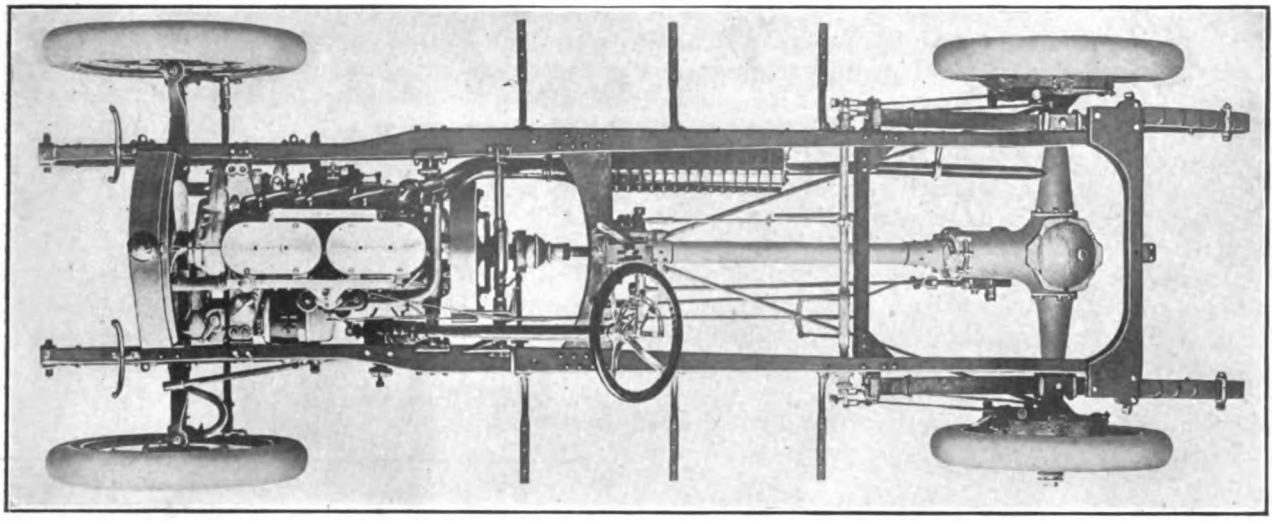
Ignition is by a dual, high-tension, water proof magneto, and it is stated that the car can be operated with it on the direct drive at a speed of five miles an hour. The lighting and motor starting system is the Northeast, a combined unit, located on the left hand side of the power plant.

The clutch is of the three-plate type, enclosed in the flywheel, and the centre steel floating member is very large in diameter, also thin and very light to provide maximum friction surface with minimum weight. It is engaged by being gradually compressed between two outside plates through the action of three powerful toggle joints. The centre plate is faced with Raybestos. The transmission is of the selective type embodied in the rear axle, eliminating strain on the universal joints, two of which are utilized. The usual three speeds forward and a reverse are provided, the direct drive being geared at 3.85:1.

The rear axle is of the full floating type with a special bronze housing. The extensions on which the wheels are mounted are tapered seamless drawn steel tubings. The driving shafts, differential and transmission gears are of a special alloy steel, heat treated and hardened, and the transmission and worm shafts are mounted on annular ball bearings. Timken roller bearings are utilized in the differential and rear wheels. A three-inch torsion tube encloses the drive shaft and is rigidly connected to the rear axle housing and terminates forward in a large hollow steel ball and socket joint, secured to the centre cross member.

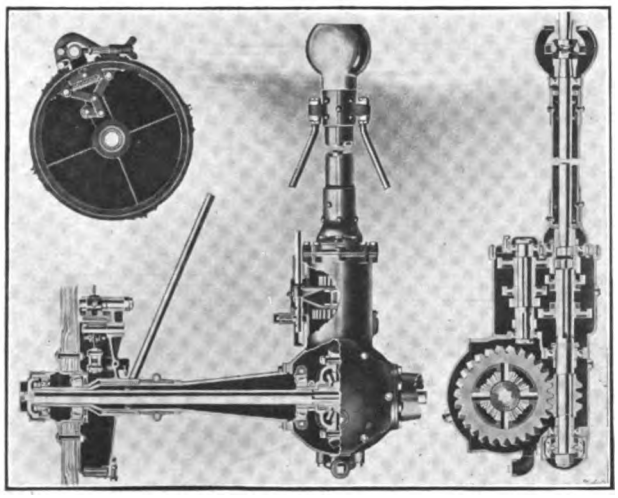
The worm gear drive has been adopted by the company because of its success abroad. It is held to be absolutely silent under all conditions of service and to make for maximum efficiency in that the load is distributed over several large teeth. The ground clearance under the worm is nine inches, but as the case or housing is round and inclines upward it is stated that obstacles 12 inches high may be surmounted without damage to the construction, which is sturdy.

The chassis and wheelbases of the model K are all similar, with the exception of the rear springs, which are made heavier on the six and seven-passenger types. These bodies are eight inches longer and consequently somewhat heavier than the four and five-passenger designs. The wheelbase is 130 inches regardless of body type, with tread standard, 56 inches.



Top View of the Lyons-Knight Model K Chassis, Indicating Accessibility and Sturdy Components.

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Showing the Worm Drive and Transmission as a Unit, Also the Construction of the Liberal Sized Brakes.

The front axle is the latest Timken, having a drop forged I beam centre section. The hubs and steering heads are equipped with Timken adjustable roller bearings. The front springs are semi-elliptic, 38 inches long and 2.2 wide, and being designed very flat are claimed to hold the front axle parallel with the rear. The rear springs are three-quarter elliptic, 54 inches long by 2.5 wide, and are made as are the front members from a special alloy steel. They are swivelled on the axle and shackled at both ends, and do not take any of the drive. Compression grease cups lubricate all shackle bearings, etc., and the shackles are constructed in one piece, have extra wide bearings and are fitted with lugs to prevent reversing. All spring bolts are hardened and ground, and the end of the springs are bronze bushed. The frame is of pressed steel, with a channel section five inches deep and four wide in the centre. A six-inch drop at the rear makes for a low centre of gravity, as well as ample road clearance.

Two sets of large brakes are fitted, both acting on the rear wheels. The service members are of the external contracting type, 2.5-inch face, lined with Raybestos, and the leverage obtained is very powerful. The emergency brakes are of the internal expanding type, being split steel rings 2.5 inches wide, faced with Raybestos. They provide maximum efficiency with the car operating in either direction. Both sets are easily adjusted without tools and equalizers are fitted.

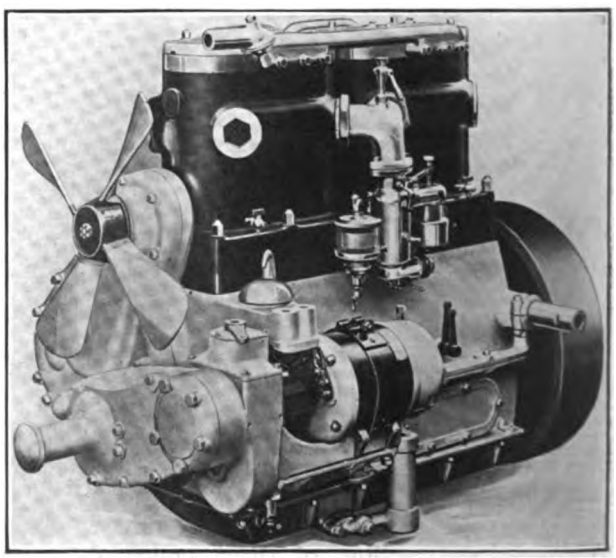
The steering gear is of the irreversible type and the column is set at a comfortable angle and surmounted by an 18-inch corrugated hard rubber wheel. Additional stability is secured by the use of a supplementary bracket midway of the column and attached to the dash. The shafts in the steering gear housing are of steel, hardened and ground, and all bearings are bronze bushed. All steering linkage bearings have hardened and ground bushings and studs.

The driver is located at the left with centre control. The gear shift lever is very short and convenient to the driver, and works in an H slot with a minimum movement. The spark and throttle levers are mounted on the top of the steering wheel. The usual accelerator is included. Mounted on the dash are the shut-off fuel and reserve gasoline valves, the lighting switch and motor starter control. The speedometer, clock, gasoline and oil pressure gauges, are mounted flush and these members are lighted by a dash lamp.

The fuel tank has a capacity of 22 gallons and two are held in reserve. It is mounted in the upper part of the dash over the toeboard, providing a short, direct gravity feed and insuring the use of the entire contents of the container even when surmounting steep grades.

Demountable, quick detachable rims are standard equipment, and the tires are extra large, being 37 by five inches both front and rear. Wood wheels are furnished as regular equipment, although wire may be obtained if desired. The equipment includes a hydraulic shock absorber, which is attached to the worm gear casing from the centre of the rear frame member, reducing side sway to a minimum as well as absorbing road shocks.

The body designs of the Lyons-Knight are noticeable for their neat and attractive lines. They



Motor of the Lyons-Knight Presents an Unusually Neat Appearance, Being Compact and Having Spark Plugs, Etc., Encased by Removable Caps.

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are of sheet aluminum, a light and rugged construction and a material taking a very fine finish. All body types are very roomy and have high sides, while the upholstery is high grade in every particular, deep, soft Turkish cushions being employed. The rear seats of the five and seven-passenger bodies are 52 inches wide and the best hand buffed leather and black horse hair are employed for upholstering. The berline and sedan bodies are exclusive in design and appearance, and are finished and painted to order. Entrance to the front seat is possible on either side of the five and seven-passenger types.

The standard colors are dark blue and brewster green with black upholstering. The top is a Golde, which can be raised or lowered by one person, and the material is genuine black pantasote. The windshield is made in the factory of the company, one of its own designs, and has two adjustable plate sections, a wide one above and a narrow member below. The lower part of the top plate swings out, providing a rain vision, while the other section forms an adjustable ventilator.

The equipment includes in addition to the top, dust cover, windshield, a Warner speedometer and clock, combination tire holders, trunk rack in the rear, two extra demountable rims, coat and foot rails, cocoa matting for the tonneau, complete tire and tool kits, electric trouble lamp, electric horn and a large storage battery. All metal trimmings are either black enamel or nickel plate. The storage battery and tools are carried under the front seat and the running boards present a clean appearance.

ADVANCE CONTEST NOTES.

New Long Distance Road Race—Plans for Meets in Various Places.

Using the borderland route passing through Canutillo, Tex.; Lanark, Deming and Lordsburg, N. M.; Rodeo, Douglas, Bisbee, Huachura, Vail, Tucson, Florence and Mesa, Ariz., arrangements have been made for a 531-mile road race from El Paso, Tex., to Phoenix, Ariz., during the Arizona state fair in November. The race is scheduled for Nov. 4-5, at the same time as the San Diego-Phoenix and Los Angeles-Phoenix road races. This is the first time an event of this character has been attempted between El Paso and Phoenix, although the other contests named have been held in previous years.

It is announced that Ralph Mulford will drive a Peugeot car in several of the events scheduled for the beach meet at Galveston, Tex., July 28-30, and it is expected that a second machine of this make will be driven by Arthur Ferguson. The chief event of the meet is to be a 4.5-hour continuation race, to be run in three sections on three different days, the prizes aggregating $5000.

Three road races, two of which probably will be run simultaneously, have been listed for the 1913 Santa Monica meet, over the course in Santa Monica, Cal., Aug. 9. The first is for cars of 230 inches or less, the distance being 101 miles; the second for cars of 231-450 inches, 202 miles, and the third for a free-for-all for 303 miles.

It has practically been decided by the Savannah Automobile Club, Savannah, Ga., to limit the number of entries in this year's Vanderbilt Cup and Grand Prize events to 12 cars each. The Grand Prize will be a free-for-all, while the machines in the Vanderbilt Cup event will be limited to 450 inches.

The Chicago Motor Club expects at least 35 entries for the fourth annual Elgin road races, Aug. 29-30. There are to be two events. That of the first day will be for cars of 300 inches and under, the distance being 305 miles, for the Chicago Automobile trophy, formerly the Cobe cup. The second day will witness the 305-mile race for the Elgin National trophy, the cars being limited to 450 inches.

CONVENTION OF "OLD TIMERS."

Reminiscent Banquet Tendered Assistant Superintendent of Rambler Organization.

Forty-eight employees of the Thomas B. Jeffery Company, Kenosha, Wis., maker of Cross Country Rambler cars, whose terms of service with the company aggregate 887 years, made up a party of old time bicycle men and pioneers in the sale of automobiles which was banqueted by the company recently. The affair was given in honor of Assistant Superintendent M. Mattson, who severed his direct connection with the Jeffery organization July 1 after serving 23 years, to become a farmer and Jeffery dealer in south central Texas.

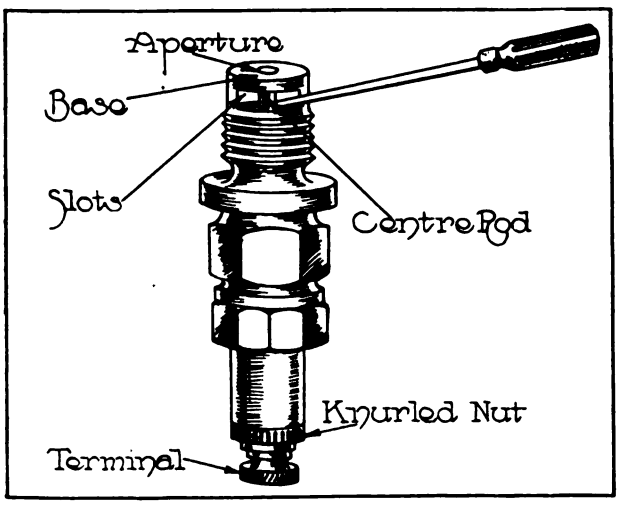
The record of the employees follows: 29 years, two; 28 years, one; 27 years, one; 24 years, two; 23 years, four; 22 years, five; 20 years, three; 19 years, two; 18 years, eight; 17 years, four; 16 years, one; 15 years, four; 14 years, two; 13 years, two; 12 years, seven. A feature of the evening was the recital of the many unpublished acts of kindness and charity performed by the late Thomas B. Jeffery.

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MECHANICAL NOTES FOR OWNERS.

Importance of Maintaining Proper Spark Gap—Using Motor Starter to Locate a Knock—Inexpensive Gas Condenser.

MANY times the failure of the motor to develop its maximum efficiency may be traced to the ignition. By this is not meant that the magneto or other source of current supply is at fault, for magneto troubles may be said to be rare in these days of high quality production, but it is surprising the lack of attention given the spark plugs by the owner. Although the car manufacturer usually provides a type or design best adapted to the motor and while the problem of proper plugs and location is now receiving the attention it deserves, in the event of a plug being broken, a new one is usually selected by the owner without any thought as to its especial adaptability to the cylinders of his automobile.



Illustrating Method of Adjusting Gap of Mosler Closed End Type of Spark Plug by Inserting Blade of Screw Driver in Slots.

In replacing a damaged plug with a new one, care should be taken to purchase one having the same length of base. A shorter or longer base may result in locating the sparking points in a pocket where dead gas accumulates, or exposing the points to undue heat. These finer points of ignition are usually overlooked by the motorist, resulting in a lack of motor efficiency that would otherwise be obtained by the use of proper spark plugs.

The adjustment or maintenance of the gap is an important factor and the care and attention given the plug will depend upon its design and that of the motor. If ordinary spark plugs are employed with a magneto the intensity of the current will ultimately burn the electrodes, widening the gap and resulting in inefficiency. Too large a gap is likely to cause missing at low speeds.

No hard or fast rule may be laid down as to the gap to be maintained as the makers of magnetos differ. Some recommend .015625 inch, while others advise between this measurement and .03125 inch. As the majority of magneto manufacturers supply a wrench for setting the break of the contact points, the tool could be employed for setting the plug gap, provided it is approximately the same.

With the open end type of spark plug it is a simple matter to correct any increase or decrease of the gap. The enlargement of the space may be due to other than burning, as in displacing a plug from the valve cap the points may come in contact with the cylinder or wrench, bending them and increasing the gap. Sometimes it is necessary to disassemble the plug to remove carbon deposits and in the reassembly care should be taken to set the gaps of all plugs exactly alike.

The setting of the electrodes of the Mosler closed end type of plug, made by A. R. Mosler & Co., Mt. Vernon, N. Y., is as easily accomplished as with the open end designs, but many motorists do not understand the operation. The position of the centre rod or electrode with reference to the aperture in the base is regulated vertically by removing the terminal and loosening the knurled nut securing the electrode in position. By rotating the electrode to the right, its point is brought into closer contact with the inner edge of the opening in the base. Turning the centre rod to the left increases the distance. Altering the position of the electrode, however, is seldom necessary, it being set accurately at the factory.

The point of the centre rod should be adjusted so that it is exactly in the centre of the aperture. If the rod has become bent through accident or the plug has been taken apart, it is a simple matter to readjust it. The method is shown in an accompanying illustration and is similar to that utilized in the Mosler factory. Insert the blade of a small screw driver in one of the large openings of the base as shown in the sketch and by exert-

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ing a gentle pressure the position of the centre rod may be altered as desired. The screw driver blade serves as a lever and the shell of the plug as the fulcrum.

PROTECTING THE CARBURETOR.

Owing to the fact that the aperture of the spraying nozzle of a carburetor is very small, the passage of the gasoline is easily restricted by the presence of foreign elements. The modern carburetor is more or less protected when installed on new cars, by the utilization of a tube or pipe conveying heat from the exhaust pipe or manifold. On old types of motors and where the piping arrangement is not employed, more or less dirt is drawn into the carburetor. With the valve tappet guides badly worn more or less lubricant works out, covering the carburetor and eventually interfering with its proper operation.

A device for protecting the vaporizer from the oil is shown in an accompanying illustration. It comprises a sheet of heavy tin sufficiently large to permit of bending into the shape presented in the sketch, and wide enough to protect the carburetor from the flying lubricant. The device is secured at its lower end to the bolts retaining the lower crankcase to the upper, and is held firmly to the intake pipe above the carburetor by cutting a slot. By making small projections as shown in the drawing, these may be clamped to the pipe by wire. Of course the design would have to be altered to meet the requirements of different motors, but the size of the tin needed could be ascertained easily by making a pattern from cardboard.

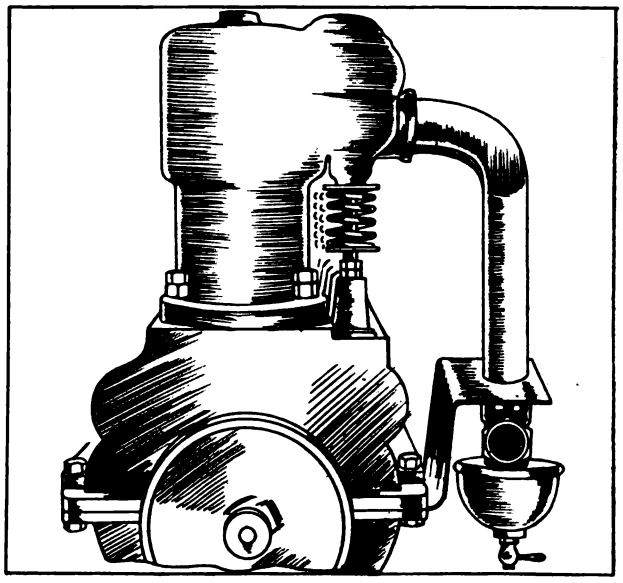
HOME MADE GAS CONDENSER.

Although electric lighting has succeeded acetylene to a great extent, there are many machines equipped with the latter system and including a generator. Certain designs give trouble owing to more or less moisture collecting in the tubing leading from the generator to the lamps, resulting in clogging the burners and impairing the efficiency of the lights. There are a number of filters or condensers marketed which collect or trap the water and while they are inexpensive, the following contribution from a reader will prove of interest to those owners who prefer to construct accessories for their cars.

Am contributing a suggestion for making a filter for a generator which may be of service for those who are experiencing trouble with their lighting system. The generator that came with my Ford car gave me considerable trouble in that water would collect in the tube at the lowest point of the line, and unless the pipe was cleaned at frequent intervals, the lights would act very unsatisfactorily. The water appeared to stop up the burners and the trouble always occurred when the lights were most needed and when it was not always convenient to clean out the burners and the pipes.

I am enclosing a sketch of the filter I constructed, and it cost but a few cents and was easily made. Having a T coupling and an old gas petcock on hand, I bought a piece of brass tubing sufficiently large to insert one end of the coupling and the petcock as shown in the drawing. It was not a drive fit, but by using plenty of solder I was able to make a good tight fit. I placed the filter at the lowest point of the line between the generator and the lamps by cutting the rubber pipe and slipping the ends over the free ends of the coupling. The petcock and coupling hang vertically because of their weight, and all moisture collects in the lower section of the coupling. It is a simple matter to remove any water that may accumulate by opening the petcock.

The suggestion of the reader could be improved by utilizing a couple of clamps for securing the filter to the underside of the running board or other convenient place. These could be made from strips of brass or heavy tin, and by drilling holes for screws. In constructing a condenser similar to the one described, the section of the coupling to which the petcock is attached should be an inch or more in length to provide a suitable retaining capacity.



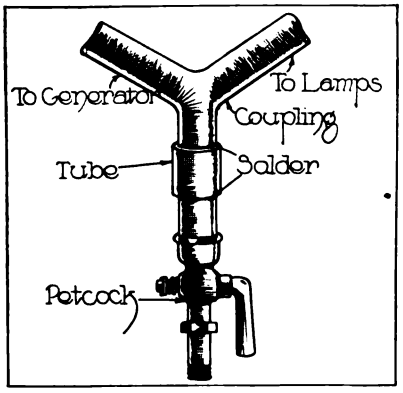
Method of Fitting Pan or Shield to Protect the Carburetor from Lubricant Thrown Out by Old Motors.

TANK FILLING SUGGESTION.

The converting of touring cars into roadsters usually means the fitting of a new fuel tank, and although it is possible to purchase a container ready made, some motorists have one constructed to conform to the design of the machine and to obtain a certain capacity. A rebuilt car having a special tank and filler device was noted recently by the writer. In mounting the tank it was car-

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ried very close to the back of the seats, and as the filler member was small, considerable trouble had been experienced by the owner when replenishing the supply of fuel. This was due to the fact that the average funnel utilized at supply stations and garages was too large to provide a suitable vent and when pouring gasoline a large quantity of the fluid was wasted by the displaced air. The method of remedying the trouble is shown in an accompanying drawing, it consisting of fitting a large sized petcock in the container. In renewing the supply of fuel this petcock is opened, providing a suitable vent for the escape of the air.



An Inexpensive Gas Condenser.

VALUE OF HYDROMETER.

The replacing of the gas lighting system with electricity does not necessarily mean that the motorist is relieved from responsibility or care of the newer method of illumination. There are many owners of new cars who believe that the only work connected with the electrical system is that of turning a button. This is an error as the storage battery requires attention; that is, if maximum service is to be expected. This applies to the dynamo as well as straight battery system.

Although the purchaser of a new car is given an instruction book dealing with the care of the lighting system, it generally is misplaced or the suggestions unheeded, and is not thought of until some trouble develops. Storage batteries will give efficient service if cared for properly. A motorist makes it a point to see that he has plenty of fuel and oil, but is apt to neglect other details equally as important.

Every user of a car equipped with an electric lighting system should employ a hydrometer for testing the electrolyte of the cells and this should be done at least once a week. The instruments are not expensive and provide accurate means for noting the condition of the fluid, which is an important factor. All readings should be taken before adding distilled water in case the level of the electrolyte is below normal.

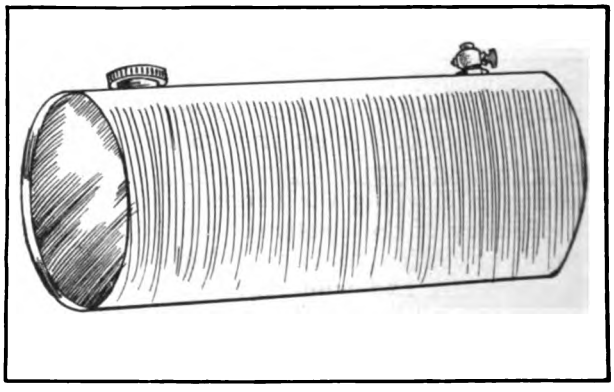
Hydrometers denote the specific gravity and are valuable in that they check the performance of the dynamo or generator, indicating whether or not it is performing its work of charging the batteries properly. When a battery is fully charged the specific gravity should read between 1.280 and 1.300 as indicated on the hydrometer, and it should be approximately the same in all cells.

NOVEL USE OF MOTOR STARTER.

An owner of a machine equipped with an electric motor starter was annoyed by a slight knock. Being familiar with the gasoline motor through having owned several cars, he removed the side inspection plates and tested the bearings, etc., for lost motion, but all were tight and in proper order. The knock was located in a novel manner. As it was not feasible to operate the engine under its own power with the lower crankcase removed, the owner evolved the plan of utilizing the motor starter. Removing the crankcase and lying under the motor, he had a friend operate the starter, and the knock was speedily located. It was caused by the big end of the hinged connecting rod touching the side of the crankcase. The rod was reversed and the mysterious knock disappeared.

CARE OF THE COMMUTATOR.

Although the magneto has succeeded the battery, commutator and coil ignition system to a great extent, there are many cars fitted with the latter. Some machines are equipped with a low-tension magneto-generator having a timer and


Showing How Vent for Escape of Air from Fuel Tank May Be Utilized to Advantage.

coil, such as the model T Ford for example. As the commutator is an important factor in the ignition system, breaking as it does the primary

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current, it should be cleaned and lubricated from time to time.

If it is very accessible it is a simple matter to remove the cover and wash out all dirt and old lubricant with gasoline, after which the working parts should be oiled, although some favor vaseline. If the timer cover cannot be displaced without considerable trouble, it may be washed by utilizing an oil can filled with gasoline and squirting the fuel through the lubrication opening.

If the car has seen considerable service it will be well to examine the timer bearings, fibre and contact blocks to note if they are worn. If the blocks are uneven the roller will have a tendency to jump, creating a poor contact, as well as affecting the operation of the motor. It is a simple matter to remove the fibre ring, take it to a machine shop and have it trued up.

THE STUTZ AT TACOMA.

Wins All Three Principal Events and Comes in Second in the Inter-City as Well.

While announcement was made in the Seventh Annual Touring Number that Earl Cooper in a Stutz had taken two of the principal events in the meet at Tacoma, Wash., July 5-7, additional information shows that Stutz cars took all three and finished in second place in the Inter-City race as well. In the contest for the Potlach trophy, the first day, Cooper lowered Tetzlaff's record for the course, made in 1912. The place cars in the three big events follow:

Car	Driver	Time
Potlach Trophy, 220 Miles.		
Stutz	Cooper	2:49:32.0
Keeton	Burman	3:10:28.0
Nyberg	H. Endicott	*
Inter-City, 102 Miles.		
Stutz	Parsons	1:33:53.8
Stutz	Cameron	1:36:36.8
Hudson	Hanson	1:51:16.0
Montamarathon, 250 Miles.		
Stutz	Cooper	3:32:08.2
Flat	Lewis	3:35:00.0
Tulsa	Hughes	*

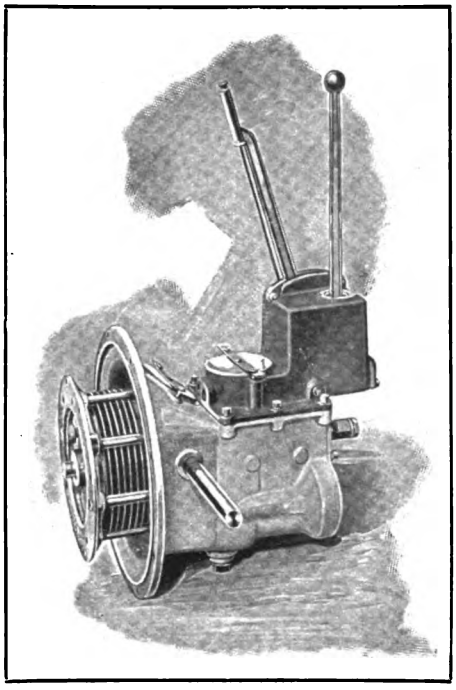
*Flagged before race was finished.

NEW FULLER TRANSMISSION.

Fuller & Sons Manufacturing Company, Announces New Unit Power Plant.

The Fuller & Sons Manufacturing Company, Kalamazoo, Mich., announces a new unit power plant which will be known as the 1914 model T U, and which is designed for service for motors of from 25 to 40 horsepower. It has the same shafts and gears as are utilized in the sub-frame and cross member types made by this concern, with modifications necessary for a unit construction. Any type of standard ball bearings is fitted. Raybestos discs operate against hardened and ground saw blade steel members in the clutch construction. A ball throw-out is employed and it is held that the clutch brake works to a nicety. Two large handholes with detachable covers are provided for inspection and for renewing the supply of lubricant.

The ball and socket centre control is mounted in either a forward or rear position, the levers extending up through the floor of the car in a small square, box shaped protection of the cover, making for easy installation, as well as preventing the entrance of elements or hot air into the driver's compartment. Right or left hand drive is offered with centre or outside control. Six different pedal positions are possible, three on each side, providing a wide range of location. The gears have .875-inch face and are constructed of an alloy steel, carefully heat treated and ground. The splines are milled integral from the solid bar. The reverse idler gear is extra large, rotating on a solid steel roller bearing well retained. An aluminum alloy is utilized for the case, which is held to be sound proof. The transmission clutch and control are stated to be extremely light and the best of workmanship and material is incorporated. Those parts subject to the greatest stresses are made with a large factor of safety. The transmission is designed for standard four or six-cylinder motors. The gear changing lever is of the rocking ball type, having a short movement.



New Fuller Unit Type of Transmission.

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UNIFORM MOTORING LAWS.

Upon the first thought it would appear that the movement in favor of uniform motoring laws inaugurated by New Jersey was doomed to failure because of the lack of interest displayed by the various commonwealths to which appeals were made. However, when it is remembered that previous attempts to interest state officials in the subject have resulted in absolute refusal to consider the proposition, it is readily seen that much progress has been made in this instance.

The New Jersey proposition had for its object the appointment of commissioners, under authority from the legislatures of the various states, who were to confer in an effort to draft a bill which could be enacted in the several commonwealths. All of the New England and Middle Atlantic States were invited to take part in this conference. Maine, New York and Delaware responded, but the others took no action.

Perhaps it requires the viewpoint of an optimist to foresee any permanent results from this situation. Certainly, the outlook is somewhat discouraging, in view of the attempt that has been made to interest the public in the desirability of uniform laws of this character. The only possible suggestion that can be made is that the public—and particularly the motorist—has not succeeded in making clear its desires to its representatives in the legislatures to which the proposition was presented. The success of the movement depends in no small measure upon the activity of motorists, and they should lose no opportunity for arousing public opinion in favor of uniform motoring laws.

THE AMERICAN INVASION.

While at first European motor car manufacturers were not inclined to consider the so-called American invasion in a serious light, the matter has been undergoing a decided change within the past year or more. The recent conference in Geneva, Switzerland, at which it is stated manufacturers were present representing Great Britain, France, Germany, Austria and Belgium, indicates in no uncertain terms the importance in which the subject is now held.

It will be noted that from the first the objection has been directed against the machines which are sold abroad at figures placing them in the so-called low price class. The result of the conference, at which it may be assumed the makers represented were in the possession of information dealing with the construction methods employed in this country, was such that it was definitely determined that there was no way of meeting this competition. And it was decided that the only argument that could be advanced was the superior excellence of the European product.

From an American viewpoint the decision of the Geneva conference is decidedly interesting. It virtually is an admission that the manufacturing facilities abroad are unable to cope with the situation. Unless there is to be disposition to resort to unfair competition or some more drastic method, the American market abroad appears to be firmly established.

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INTRODUCING THE CYCLECAR IN AMERICA.

Growth of This Branch of the Industry Abroad Since the Appearance of the Original Bedelia Model---An Attempt to Define the Distinctive Features of the Type.

WHAT is a cyclecar? The term has come into being in America only within the past few months. Already some half dozen concerns have been organized for the production of cyclecars, and several others are to be announced shortly, if rumor is to be believed. Obviously, the industry in America must become accustomed to the new word, and the motoring public is desirous of considering the subject intelligently.

Engineers will disagree upon the precise definition to be applied to the new vehicle. With some, at least, the word implies a four-wheel car built on the simplest motorcycle lines. But the word may be held to have originated in England, where it was at first applied to the motorcycle fitted with three wheels and carrying a passenger between the two forward wheels, usually termed a tricar in this country. However, this application appears to have fallen into disuse since the appearance of the newer four-wheel cyclecars.

The initial cyclecar, in its present designation, undoubtedly was the Bedelia, built by M. Barbeau of Paris, France, in 1910. This was in effect a small automobile driven by a motorcycle motor. Its weight was less than 400 pounds, its length about 100 inches, its width 36 inches and its height 36. It was made to accommodate two persons, the passenger being seated in front, while the driver was located over the rear axle. The twin-cylinder motorcycle engine was just behind the front axle and a chain connected the motor sprocket with a sprocket on a counershaft crosswise of the car underneath the passenger seat. Belts ran from pulleys at the ends of the countershaft to pulleys on the rear wheels. Clutch action was obtained by drawing the rear axle forward by means of a hand lever at the right of the driver, this lever adjusting the tension of the belt and at the same time drawing the rear belt pulleys against the brake shoes. Steering was by means of a wire spoked hand wheel which turned the whole front axle through a drum on its shaft and a steel cable connection through pulleys.

This car was entered in a 138-mile road race and was regarded by all as a freak construction. It surprised its inventor by averaging 38 miles an hour, and later made 55 miles an hour on the track. The result was a perfect avalanche of "Bedelia" cars, particularly in England. The term cyclecar was not made to apply until some time later.

There are today something over 100 concerns in Great Britain engaged in the production of cyclecars and almost as many in Continental Europe. However, there are cyclecars and cyclecars, by which is meant that there appears to be no well defined type by which it is possible to determine exactly how the term should be made to apply. For example, the French cyclecar is built for speed and without much regard for appearance in many instances, while the British product more often resembles the small motor car of America. With some the motorcycle motor has been retained and with others the engine is spe-



Perspective of Economycar, Indicating Arrangement of Components and Seating Accommodations.

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Front View of Carnation Tandem Design, Indicating Streamline Effect.

cially designed and might be considered suitable for regulation automobile use.

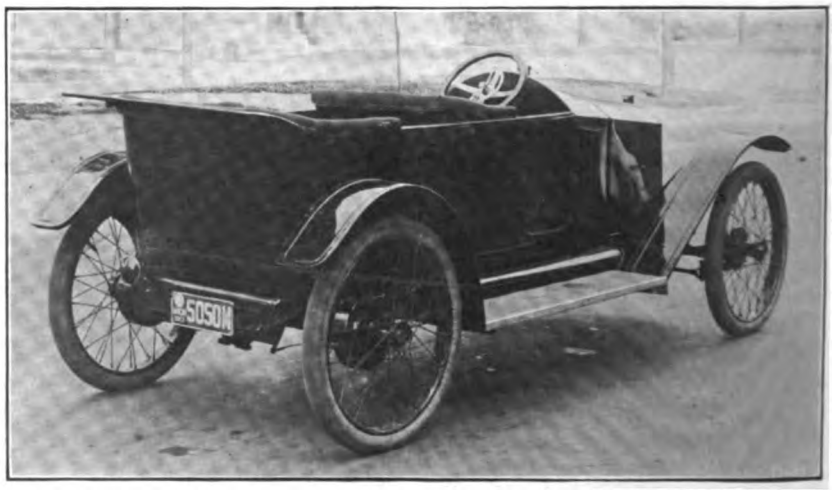
Thus it will be seen that it is somewhat difficult to evolve a definition which adequately describes the cyclecar. It is equally difficult to assign its place in the industry. Either it is an evolution from the motorcycle or it is the result of an attempt to place the advantages of the automobile within reach of the man of limited means. Excepting the more pretentious English vehicles of this class, the main objects sought by the designer appear to be simplicity, low first cost and minimum upkeep expense.

From the above information it will be understood that the cyclecar has enjoyed its greatest popularity in Great Britain. This is particularly true if the British definition of the term is to be accepted. There are two reasons. In the first place the British manufacturers have not been engaged in the production of low priced automobiles, and as a result many Englishmen were deterred from possessing a car. This also is held to have had a direct influence upon the wide use of motorcycles, tricars and sidecars in the British Isles. The other reason is to be found in the character of English roads, which permit of using a machine of any tread.

And while the first "Bedelia" cars in England were patterned very largely after M. Barbeau's example, the British demand for artistic body designs soon produced its effect. The situation has undergone constant change, until some of the cyclecars produced at present sell for as high as $1000, although they still retain the narrow tread, a feature of no inconsiderable moment, when it is remembered that the machine may be taken through a common door and housed in a shed or cellar, thus avoiding the necessity for special garage facilities. It will be understood that many of the old "Bedelia" cars are still being produced under the new name, but the point which it is desired to make is that the more pretentious cyclecars in England really take the place of the low and medium priced automobiles in this country.

In France and other portions of Continental Europe the average price for cyclecars does not exceed $350 or $375. The design follows more closely the Bedelia model, although attempt has been made to eliminate everything possible and create a speedy machine. The tandem seats are still retained in a large majority of cases, while in England the tendency is strongly in favor of two seats side by side.

Just as the sidecar had obtained a wide vogue in Great Britain and abroad before any consistent attempt was made to introduce it in America, history has repeated itself with the cyclecar. Before the arrival of the sidecar it was freely predicted, even by some motorcycle manufacturers, that it would not be found practical for American roads. It was maintained that while the passengers thus carried might traverse macadam ways with comparative ease, quite another story would be told whenever it should become necessary to take to the highways and byways off the beaten path. The sidecar is hardly more than a year old in America, but its increasing popularity would seem to indicate that the difficulties of



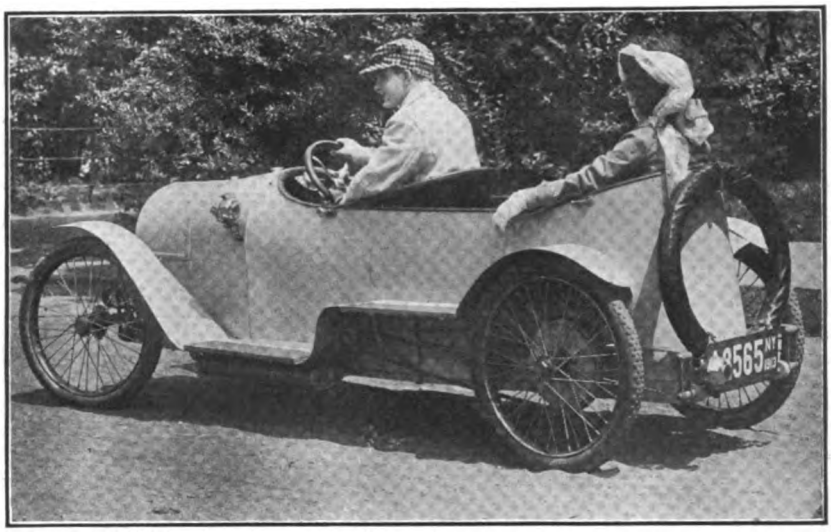
Three-Quarter View of Carnation, Showing Side Doors and General Arrangement of Tandem Seats.

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negotiating American roads were by no means so insurmountable as had been supposed.

There are American motorcycle and automobile manufacturers who have declared that in their opinion the cyclecar has no place in the industry in America. The contentions have been based upon some of the same arguments that were used against the sidecar. It is held that the type of cyclecar built abroad is not suited for satisfactory use on American roads, and that an attempt to construct cyclecars which would stand up under the conditions presented must invite competition from the low priced automobile.

While something must depend upon the spring suspension and other components, the main objection to the cyclecar appears thus far to have been based upon the narrow tread. This undoubtedly arises from an attempt to compare road conditions here and in England. It may be admitted that English roads are ideal in this respect, and the same thing holds true of the main highways of Continental Europe. But in France, where the first cyclecars were produced, there are plenty of lesser turnpikes with ruts worn by traffic which, while perhaps not as bad as some of those in America, offer plenty of opportunity to test the practicability of this type of vehicle. The 36-inch tread was adopted by M. Barbeau, and continued by other French designers, with this fact in mind. The decision was reached only after a careful study of the situation, in which it was found that the usual width of road ruts in France was such that there remained a space of 42 inches between the wheel tracks—sufficient to permit of the use of a 36-inch tread and a three-inch tire.



The Smaller of the Two Twombly Models Presents Simple and Attractive Lines.

It is not to be presumed that American designers and manufacturers have entered this field without studying all the conditions. The problems presented are those for the engineer. The American public can be relied upon to give the new type of vehicle a fair trial. The advantages claimed for it are such as to make the innovation worthy of consideration.

Attention already has been drawn to the possibility of housing the machine without special garage facilities. Among the other features advocated are: Simplicity, involving the use of a minimum number of parts, although this depends upon the type of cyclecar produced; low centre of gravity, making for stability; streamline construction, reducing wind resistance to a minimum, and low maintenance expense. Of course, the first cost is an important factor, but it is expected that the entire construction will result in greatly increased fuel and tire mileage, thereby affecting the two most important items in the maintenance account. Sidecar statistics are available, from which it is possible to arrive at the conclusion that two persons can travel in this manner over ordinary country roads with a fuel cost of two cents a mile. With four tires, instead of two or three, it may be expected that the tire expense will be proportionately larger, but it is contended that the distribution of weight and other factors tend to reduce this item as well.

What effect the advent of the cyclecar will have upon the motorcycle and pleasure car branches of the industry is entirely problematical. It is possible that it may present results similar to those which have been cited in England. Accompanying illustrations indicate what is being offered among the original cyclecar productions in this country.

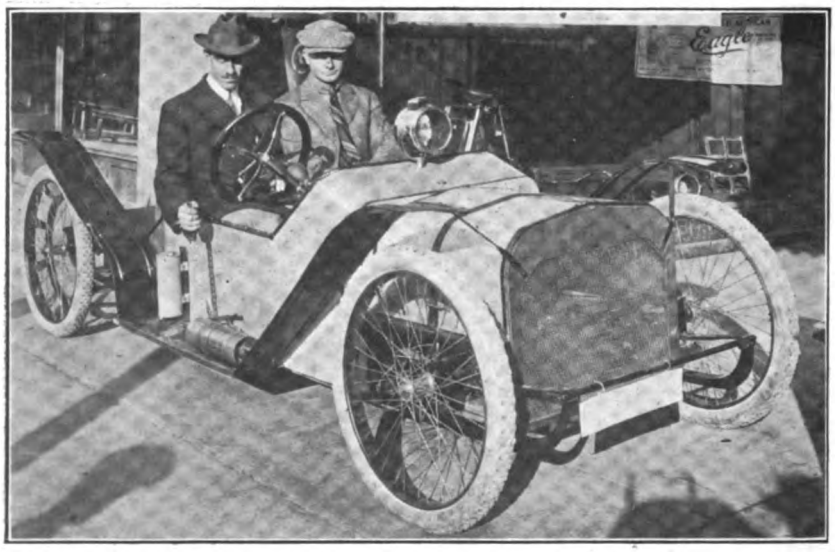
The Carnation is the product of the American Voiterette Company of Detroit. The concern is capitalized for $500,000 and is composed of men identified with the Keeton Motor Company, maker of the Keeton automobile. The car weighs 710 pounds, has a 44-inch tread and 100-inch wheelbase, and is equipped with a four-cylinder engine, with 3.25-inch bore and 3.75-inch stroke, giving a rating under the S. A. E. formula of 22.5 horsepower. The transmission affords three forward speeds and reverse. Drive is from the centre, with right hand shift.

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Wire wheels, with 30 by three-inch tires are fitted.

There are to be three models, that shown being the first produced by the company. This has seats of the French type, arranged tandem with sloping backs, and upholstered in Bedford cord. Unlike the French design, however, the driver is placed in front. The body is deep and roomy and the hood slants toward the front. The radiator is an adaptation of the V type, and a round windshield is provided directly in front of the driver. The usual equipment of a light car, including electric lighting, is furnished. The entire construction is low and the machine is said to have a speed of about 50 miles an hour.

The other two models will be a touring car for four people and a roadster for two, seated side by side. The details concerning these have not been made public as yet, although it is assumed that the chassis will be practically the same.



The California Design Follows English Plan of Placing Occupants Side by Side.

The Economycar is made by the Economycar Company, Indianapolis, Ind. The machine weighs 393 pounds, fully equipped, and has a tread of 36 inches and wheelbase of 106. The engine is a two-cylinder, 8-10 horsepower unit of the motorcycle type. The drive is by silent chain and V belts, such as are used on motorcycles. The motor, which is air-cooled and located under a Vauxhall type hood, will start from the seat. Ignition is by Bosch high-tension magneto, and a Schebler carburetor is used. The gasoline tank is in the cowl dash, and feed is by gravity. It is said that the gasoline consumption is 40 miles to the gallon and that a speed of about 40 miles an hour can be obtained.

Two body types will be built, one for passengers and the other for use as a delivery wagon. The passenger car is termed a roadster for two, with seats arranged tandem, and ample seating capacity and plenty of leg room in front. There is a very sharp V shaped hood blending with the streamline of the body, which is 23.5 inches wide. The steering post is placed in the centre of the car and the front axle is pivoted, making for a short turning radius and for easy handling in congested traffic. Wire wheels with 28 by three-inch tires are fitted and the equipment includes one large headlight mounted in front on the steering pivot.

The California is made by the California Cycle Car Company, 818 South Main street, Los Angeles, Cal. The weight is 450 pounds, tread 44 inches and wheelbase 102. The motor is a 10 horsepower, air-cooled, two-cylinder unit, with bore of 3.375 inches and stroke of 3.875. It is maintained that this engine was designed and constructed expressly for cyclecar service. It has mechanically operated, overhead valves; 12-inch cooling fan, insuring a constant draft of air across the cylinders; a specially designed automatic oiler driven from the engine shaft, and large outside flywheel. Starting is by crank at the forward end.

The transmission to the countershaft is by friction drive. From the countershaft two heavy V belts transmit the power to the rear wheels. The belt tension is adjusted at will by the use of a convenient side lever, which throws the rear axle forward or back and also applies the emergency brake at the rear wheels. Steering is by hand wheel, which carries the spark and throttle levers, while the clutch and service brake are operated by the feet.

The frame is of angle iron, reinforced by hard wood sills. The underslung construction is employed, giving a road clearance of nine inches. The wheels are of wire, fitted with 29 by 2.75-inch tires, although three-inch tires will be fitted for the difference in the cost. The equipment includes side lights, tail light, horn, etc.

The Twombly is to be produced in two models by the Twombly Motors Company, 258 West 69th street, New York City, of which W. Irving

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Twombly, well known as a designer, is vice president. Both of these will follow French practise in that the bodies will be designed to accommodate two persons, seated tandem, but with the driver in front. The upholstery is in red leather and the standard color is French gray with nickel trimmings.

The Twombly model B, an illustration of which appears herewith, has a wheelbase of 96 inches and tread of 38. The motor is a two-cylinder, air-cooled Twombly, V type, rated at 10 horsepower. The cylinder ports are opened and closed by means of piston valves, a construction which is held to make for silent operation. Ignition is by Bosch magneto. Power is delivered to a differential countershaft by friction transmission, and thence to the rear wheels by side chain. Wire wheels are used, 28 inches in diameter, shod with three-inch tires, and the road clearance is nine inches. The gasoline consumption is claimed to be from 40 to 50 miles to the gallon and the speed about 40 miles an hour.

The Twombly model A is similar in appearance, although it has a wheelbase of 102 inches. The tread and road clearance are the same as with the smaller machine, 38 and nine inches, respectively. The motor is a four-cylinder, water-cooled unit rated at 15 horsepower, with cylinders cast en bloc and utilizing the same type of piston valves as the other. The transmission is selective, affording three forward speeds and reverse, and drive to the rear axle, in which is incorporated the usual differential, is by shaft.

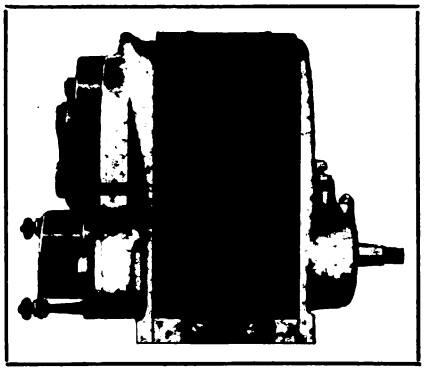
It will be seen, by these brief descriptions, that there already is a wide difference of opinion among American designers as to the proper definition of a cyclecar. While some are fitted with doors, others follow more closely the Bedelia model by being constructed with sides so low as to permit of stepping into the seats from the curb. There even is lack of uniformity regarding the seating accommodations, one machine having been announced to provide for four persons. The prices range from $350 to $500.

FEATURES OF NEW MODEL P REMY MAGNETO.

ANNOUNCEMENT is made by the Remy Electric Company, Anderson, Ind., well known maker of ignition and lighting instruments, of a new high-tension magneto which is to be known as the model P. The new instrument is of the wire wound armature type, producing a dynamic spark of great intensity with a distinct flame characteristic. The design is in no way radical or freakish, embodying as it does standard proven practise, and was carefully developed by the Remy engineers. Refinements of design and improvements for greater efficiency have been incorporated wherever possible, these being based on the 15 years' experience in the manufacture of ignition apparatus.

The new magneto is held to be absolutely water and dust proof. The end bearing plates are carefully and accurately machined to fit the magnets and the distributor is also similarly machined to fit the gearcase. A special packing is utilized in all joints to exclude water, oil, dust, etc. The distributor terminals are of water proof design and at the same time provide a reliable method of securing the high-tension cables. The circuit breaker is thoroughly protected by a cover of Bakelite, a heat resisting material of high dielectric strength, which is held to be decidedly superior to hard rubber or composition material, it being pointed out by the company that it is stronger, tougher and will not warp or crack, being non-hygroscopic.

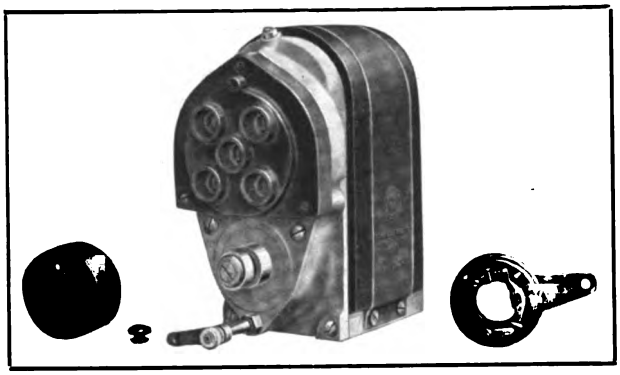
The armature heads are of special bronze and the drive shaft is of a high grade steel cast into the armature head, providing a very rugged construction. The coupling end of the shaft is tapered, keywayed and threaded to S. A. E. standards. The armature winding is of cotton covered, enamelled wire, heavily impregnated with Bakelite, rendering it impervious to heat and moisture. The armature shaft revolves on special magneto type ball bearings protected from foreign elements by felt washers.



New Model P Remy Magneto.

The circuit breaker of the new magneto has been improved over previous designs and is held to be exceedingly fast as well as positive in its action. It may readily be removed by the hands for inspection and its simplicity is apparent by the accompanying illustration showing the mechanism disassembled. It is claimed by the company that adjustments are unnecessary under normal operating conditions. The circuit breaker

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Circuit Breaker and Housing Dismantled to Show Simplicity of Construction.

is constructed of a high grade chrome nickel steel, hardened in pyrometer equipped furnaces, ground to size and tested accurately for synchronism and degree of hardness. The timing lever may be attached to either side of the magneto as the circuit breaker and its housing are reversible. The timing range is ample, 35 degrees, and by carefully proportioning the magneto and coil it is held that practically the same intensity of spark is obtained at full retard as at the maximum advance.

The terminals of the spark plug cables are located in the face of the Bakelite distributor and are water proof as previously pointed out. Provision is made for easy timing of the instrument, an ingenious device known as a timing button being incorporated in the distributor. This permits bringing the circuit breaker into its proper position, as well as locating the proper terminal of the magneto. It also eliminates opportunity of connecting the wrong leads, a feature which will appeal to those who care for their own cars.

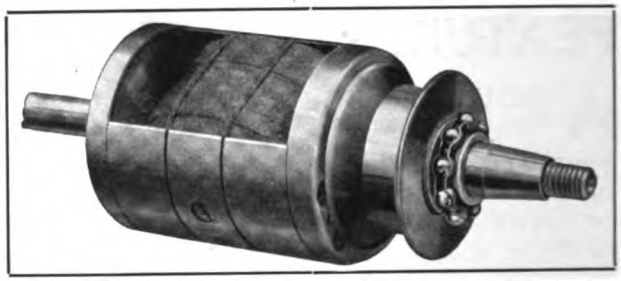


Illustrating Compactness of Coil Which Is Integral with Switch—The Latter Is Provided with a Locking Device.

The distributor gears are accurately cut, 24 pitch teeth being utilized. The large gear actuating the distributor proper is of bronze, while the smaller member on the armature shaft is of cloth and steel, a design insuring quiet operation. The distributor brush holder is of Bakelite and is rigidly mounted upon the brass distributor.

The magnets are constructed from a high grade tungsten steel especially heat treated and hardened. The condenser and case form the top plate or cover over the armature, and the condenser is well protected by being imbedded in a heat solidifying compound. In addition to being made moisture proof in this manner a Bakelite cover is utilized.

The coil employed with the new magneto differs from those previously fitted by the company, and the new design is not only held to be more decidedly efficient, but its neatness and compactness will be noted by an accompanying illustration. The switch is built integral with the coil and provides means for securing it to



Heat and Moisture Proof Armature Revolving on Special Type of Ball Bearings.

the dash, the switch face only appearing on the driver's side. The switch has the usual three conventional positions, these including "Magneto," "Off" and "Battery". A locking device is also incorporated, preventing use of the car by others than those intended. The coil is wound of cotton covered, enamelled wire, insulated by the Bakelite process. In order to securely anchor the coil winding within the fibre case it is imbedded in a compound of extremely high melting point, which is not affected by extreme cold.

As Bakelite is freely utilized in the construction of its magnetos, etc., the Remy Electric Company has installed special machinery for the production and use of this material. The company claims it has the largest plant of its kind in the world and produces from raw material practically everything incorporated in the construction of its various automobile electric equipment. The plant includes well equipped machine and assembing rooms, Bakelite and impregnating departments, brass foundry, forge shops, etc.

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CORRESPONDENCE WITH THE READER.

Missing at Intermediate Speeds.

(1615)—I am driving a Cadillac car having a Schebler carburetor and Delco ignition. The motor starts easily and runs well at low speeds, but when the throttle is opened, say to about 15 or 20 miles an hour, the engine skips before taking hold and running evenly. The ignition appears to be all right. What causes the trouble?

CADILLAC.

Central Falls, R. I., June 28.

Assuming that the ignition is in proper order it would appear that the trouble is due to an incorrect setting of the carburetor on the intermediate or second speed, as it is termed. The mixture is presumably rich and this may be ascertained by noting the color and odor of the exhaust. Complete instructions for setting the carburetor will be found elsewhere in this issue.

Detachable Cylinder Heads.

(1616)—What are the advantages, if any, of the detachable type of cylinder heads? How are the Knox cylinders constructed? When a chain drive is utilized for driving the camshaft, how are the valves timed when it becomes necessary to remove the chain; that is, assuming that the chain is taken off and the camshaft has been turned? What methods are employed for taking up wear of the silent chain drive? J. H. M.

Lamar, Mo., July 13.

Detachable cylinder heads are a distinct advantage in that they make for convenience in cleaning out carbon deposits, as well as facilitate the work of grinding in the valves. At Fig. 1 is shown the single-cylinder Knox design with the cylinder completely assembled and disassembled. It will be noted that the head is easily removable, being retained by four studs, and that it requires but a few minutes to displace the retaining nuts and take off the head. This enables easy cleaning of the carbon on the top of the piston, also the removal of any deposits in the head proper.

As the head is removable it is a simple matter to grind the valves in on the bench or in any other convenient place. This saves considerable exertion, as well as bending over the power plant. It is also maintained that the valve in the head type greatly increases the power and efficiency of the motor.

Regarding the timing of valves when the camshaft is driven by a silent chain, the removal of the latter and the changing of the position of the shaft in relation to that of the crankshaft would involve the same method as with that of the gear drive; that is, the camshaft would have to be set in relation to the crankshaft so that the cams would start to lift the valves in accordance with the timing diagram of the motor.

With the flywheel marked as generally is the case, it would be a simple matter to ascertain the opening point of the intake or exhaust valve of the first cylinder, for example, and replace the chain or utilize the timing device usually provided for the work. At Fig. 2 is shown the silent chain drive used on a Knox motor, and it will be seen that two chains are employed, one for driving the camshaft and the other for actuating the magneto shaft. Both are driven from a sprocket on the crankshaft. The timing of the camshaft is accomplished by means of a vernier coupling, shown in the illustration, while the magneto coupling is fitted with a notched connection. These constructions permit of very accurate setting.

Silent types of chains operate in a bath of lubricant, and the use of wide members and coarse pitch provides an ample factor of safety as well as wear. It has been demonstrated abroad, where the silent chain has been in vogue for some time, that it will run for several thousands of miles without showing any appreciable wear.

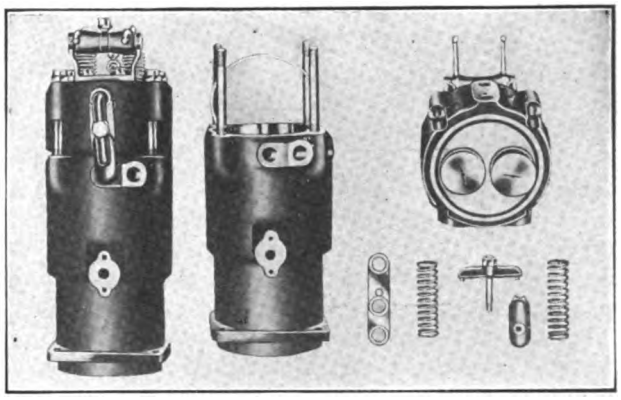


Fig. 1—Showing the Construction of the Knox Type of Detachable Cylinder Heads, Making for Accessibility and Convenience.

It is held by some makers that no adjustment is required with silent chain drive, as it will mesh properly with the chain wheel teeth whether it fits tightly around the chain wheels or whether the chain teeth engage only the outer ends of the wheel teeth.

The subject of chain drive and its adjustment is treated in a booklet published by Hans Renold, Ltd., of Manchester, England, and two methods of compensating for wear, etc., are reproduced at Fig. 3. At A is presented the method adopted by the manufacturer of the Gregoire car. Here two eccentric bushings are employed, one within the other. Assuming that both bushings have the same eccentricity, moving them equal angular distances in opposite directions will

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cause the magneto axis to be moved in a straight line, which will be horizontal if the eccentrics are properly set in the first place.

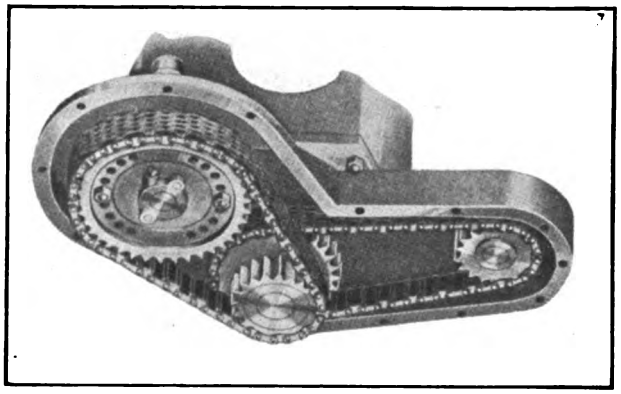


Fig. 2—Vernier Coupling for Timing of Knox Camshaft, Also Notched Connection Employed with Magneto Drive.

The idler wheel method is also utilized, one of this type, that fitted to Belsize motors, being shown at B. This is better employed with roller than the silent chain types. The idler wheel is pressed against the roller chain by means of a spring. The idler may also be moved by an eccentric. Sliding bearings are also used, and this form makes for simplicity. When employed for driving the magneto the bracket retaining the latter is normally locked in position by three holding-down bolts riveted through the casing and passing through slots in the head of the bracket. This end of the bracket also includes the bearing for the magneto shaft. An adjustment screw is provided, it passing through metal which is divided along the length of the screw by a saw cut right through. Consequently when the nut of the adjacent clamping bolt is screwed down the surrounding metal is pinched on the screw member, locking it. Loosening a nut frees the screw, which, in being screwed in, bears against the rigid bolt, drawing the bearing and magneto bracket outward together.

Patching Inner Tubes.

(1617)—Am not an experienced motorist, having purchased a car recently, but have had my troubles in the shape of punctures. A tire repairing kit came with the machine and although I believe I followed directions in using it, have been unable to get a patch to stick. They work loose, especially when driving on a hot day. Is it the fault of the cement or the method of application? I note an advertisement in your paper about a vulcanizer that is automatic and can be used by anyone. Will you please give me the benefit of your experience in using such a vulcanizer? NEW OWNER.

Glen Ridge, N. J., July 14.

It is contended by some authorities on tires that it is difficult to apply a patch with cement and have it hold when subjected to the heat developed by the car driven at excessive high speeds. On the other hand, the writer has patched inner tubes with plain patches and cement and obtained satisfactory results. In one instance a tube repaired in this manner has been in service three seasons without the patches leaking.

In patching it is important that both the surface of the tube and that of the patch be perfectly clean, and better results are obtained if the surfaces are roughened. A first class cement is imperative and it should be allowed to dry until in a state known as "tacky." After applying the patch the section repaired should be placed in a press. One can be made of two blocks of wood and a clamp. The usual cause of a patch not holding is that sufficient time is not allowed for the cement to dry.

While tubes may be repaired as above described, the better method is vulcanization. Formerly the motorist was obliged to rely upon the tire repairman, as vulcanizing outfits involved the expenditure of a considerable sum of money, as well as a knowledge of the use of the apparatus. There are, however, a number of inexpensive vulcanizers marketed that are automatic in their action and with which the owner can complete repairs. The majority employ gasoline as fuel, the operation involving no other work than clamping the vulcanizer over the puncture, which is treated with a rubber preparation, and the fuel ignited. There are a large number of owners who utilize these vulcanizers, enabling repairs to be completed on the road as well as in the garage, and at the cost of a few cents for each operation. The subject of vulcanizers was discussed in the July 10 issue of The Automobile Journal and several types were illustrated.

Experiencing Oiling Trouble.

(1618)—I am and have been experiencing for some time considerable trouble with oil in my 1910 Ford. I find it almost impossible to carry the amount of oil to insure safety, and in view of this fact am writing you if the Pederson oiling system would in your opinion help me in my difficulty. This system consists of a pump at-

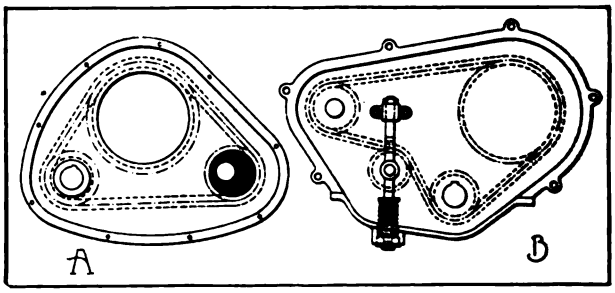


Fig. 3—Adjusting Silent Chain Drive: A, Eccentric Bushings Employed on Gregoire Motor; B, Idler Utilized with Roller Chain on Belsize Engine.

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tached to the timer shaft, a sight feed on the dash with an adjustment, and a reservoir which holds a gallon of oil. W. B.

Bristol, R. I., July 15.

The oiling device referred to was designed especially by the company for the make of car in question, and the writer understands that it has been fitted with success by a number of Ford owners. As it is possible to regulate the amount of oil being fed to the crankcase, and as the speed of the pump proper is proportionate to that of the motor, there is no reason why, if the feed is adjusted properly, the system should not provide satisfactory results. The maker of the device will forward details of the system on request.

Faulty Lubricator.

(1619)—Am experiencing trouble with the oiler on my car. I believe it is an Essex, as I noted one illustrated in a catalogue which appears very much the same. A pipe leads from the exhaust manifold to the oiler, and a large pipe carries the oil to a glass sight feed on the dash. The oil stopped dropping the other day and although I opened up the feeds, no oil dropped. What is the cause and how can it be repaired? SUBSCRIBER.

Lyons, Ia., July 16.

There are three principal causes for failure of the system to operate properly. First, a leak between the exhaust pipe or other tubes, pressure pipe clogged, or the check valve stuck. In the system referred to the pressure of the exhaust gases are led to the oil reservoir by a pipe and the pressure causes the lubricant to be forced out through the main oil pipe leading to the sight feed members. Here it is regulated by a needle form of valve. The usual cause of trouble with the system is the employment of too much oil; that is, too large a quantity is fed to the cylinders, resulting in carbon and soot, which not only clog up the pressure pipe, but the check valve. The latter is employed to allow the pressure to enter the reservoir, but not to escape. The valve may be cleaned easily by removing the nut member. It may be of the ball or cone type. Be very thorough in cleaning the part. It is also an excellent idea to remove the feed pipe from the exhaust and clean this. It will usually be found to be more or less clogged with soot, this depending on conditions.

All connections should be tested for leaks and set up snugly. This will not be necessary unless the system fails to operate properly after cleaning the pipe and valve. In testing for leaks, the motor should be run and by squirting oil on the connections any loss of compression will be noted by the bubbles given off. If leaks exist around the glasses, care should be taken in tightening these members, as they are easily broken. It is possible that the filler cap of the reservoir may not seat properly, in which event it may be remedied by making a new leather washer. The system gives good results, but when considerable oil is utilized the check valve will require some attention.

Skipping Motor.

(1620)—Am troubled with my motor skipping when on the magneto and when the car is running on the high at very slow speds. It does not miss when on the batteries. Is the magneto at fault and if so what is the trouble? W. H. G.

Columbus, O., July 17.

The fact that the motor operates properly on the batteries and misses on the magneto would indicate that the gaps of the plugs were not set correctly. As the type of magneto or ignition system was not mentioned it is difficult to give other than what might be general causes. If the magneto is of the dual type; that is, the current from the batteries is distributed from the magneto, and but one set of plugs is employed, the gap trouble referred to is possible. The gap should be set in accordance with the instructions of the maker of the magneto. If the plugs are ordinary members and have been used for a considerable period, it is possible that the points are burned away, increasing the gap. This subject is treated elsewhere in this issue. It should be remembered that a smaller gap is required with the magneto supplying current, particularly at low motor speeds.

Inflation of Tires.

(1621)—I read an article on the inflation of tires in your book and do not agree with the author of the story when he states that tires should be pumped up as hard in the summer as in the winter. All motorists know that a tire gets harder after a run on a hot day and that there is a gain in the pressure. I make it a practise to blow my tires up within 10 pounds of the pressure recommended by the maker, and I am obtaining more than the 3500 miles guaranteed by the maker.

OLD MOTORIST.

Boston, Mass., July 19.

The article referred to by the reader was based on the recommendations of prominent tire manufacturers whose experience cannot be questioned. The fact that one obtains durability with a set of tires inflated to less pressure than that recommended by the maker may be due to the car being light, over tired or easy on shoes. The nature of the roads traversed and rate of speed are also factors to be considered.

The writer has had considerable experience with tires and has found that decidedly more mileage was obtained with tires pumped to pressure than under. In one instance two new shoes were fitted to the rear wheels, the right hand casing being properly inflated, while the left was 15 pounds less. Although the right hand wheel is held to be subjected to more stresses, considerable more mileage was obtained and under equal conditions of service.

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WITH THE MOTORING INTERESTS ABROAD.

Georges Boillot Wins French Grand Prix for the Second Consecutive Time with Peugeot Car—Foreign Manufacturers Confer Respecting American Invasion.

GEORGES BOILLOT, in a Peugeot car, won the French Grand Prix the second consecutive time July 12, covering the 569 miles in 7:53:56. Jules Goux, winner of the third annual 500-mile race on the Indianapolis motor speedway, was second, also with the Peugeot, his time being 7:56:22. Chassagne, driving an English Sunbeam was third.

No American cars or drivers were entered this year. In 1912 the race was for 956 miles, and occupied two days, one-half of the distance being covered each day. Boillot's time was 13:58:02. The late David L. Bruce-Brown, in a Fiat, was in the lead at the close of the first day, but he was disqualified during the second day for taking on gasoline outside of the regular pit. In point of time Bruce-Brown finished the contest in third place. Wagner in a Fiat was second and third award was given to Rigal of England in a Sunbeam.



Georges Boillot and Peugeot Car with Which He Won French Grand Prix for the Second Consecutive Time.

It will be seen that Boillot's speed this year was 70.78 miles an hour, as compared with 68.45 in 1912. The world's road race record is held by Teddy Tetzlaff, who won the Santa Monica event of May 4, 1912, with a Fiat, at an average speed of 78.5 miles an hour. This is of interest in view of the superiority claimed for French roads.

Five countries were represented in this year's Grand Prix, these and the makes of cars for each being as follows: France, Peugeot, Delage, Schneider; England, Sunbeam; Germany, Opel, Mathis; Italy, Itala; Belgium, Excelsior.

THE AMERICAN INVASION.

European Manufacturers Hold Important Conference in Switzerland.

That the so-called American invasion is giving European motor car manufacturers no little concern is still further demonstrated by the recent conference of makers representing Great Britain, France, Germany, Austria and Belgium in Geneva, Switzerland. The meeting also served to reveal the organization of the Union of International Automobile Constructors, with which it would appear that the American manufacturer was hardly expected to become identified.

The main topic of discussion at the conference was the invasion of the European market by the low priced American automobile, and while it was at first suggested that measures should be adopted to check this movement, it finally was decided that in the excellence of the European products lay the only reply that could be made. It was explained, after the meeting, that no competition in low priced machines was proposed, for the reason that none was found to be possible.

In this connection, it is of interest to note that Russian bankers have come to the assistance of American importers by inaugurating an automobile department, which is to be handled in the same manner as has been the implement business. The large banks in Russia are represented by numerous branch houses throughout the empire, and it is through these that the dealer is able to do business without coming in direct touch with the producer. It is understood that several American manufacturers are making arrangements with Russian banks for the handling of their product.

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THE INDUSTRY IN JAPAN.

American Machines Much in Demand, but Cars May Be Produced There.

With the widening and improvement of roads and bridges in Japan, the importation of automobiles continues to increase. A large number of foreigners in that country buy motor cars, the nationality of the purchaser determining, as a rule, the make of machine. Many of the more wealthy Japanese are also making use of automobiles, and this, together with the tourist trade, has resulted in a proposition to enter the manufacturing end of the industry. Already various parts are being produced.

Of a total value of $445,406 placed on automobiles and parts thereof imported into Japan during 1912, the United States contributed over 50 per cent., the returns by countries being: United States, $251,678; Great Britain, $108,911; Germany, $31,093; others, $53,724.

OVERLAND IN PHILIPPINES.

Automobile Has Played an Important Part in the Development of the Islands.

The people of the Philippines have seen some remarkable innovations since the United States wrested the control of the islands from Spain in 1898, and undertook the task of preparing the inhabitants for self-government. Habits and customs that dated back for centuries have been changed or abolished. The entire mode of living has undergone a transformation. Children who formerly received their education from the jungles now pursue their studies in modern American schools presided over by American teachers. And the introduction of the automobile has played its part in this development.

An accompanying illustration shows a number of Filipino young people enjoying a drive on a Luzon highway in an Overland car, made by the Willys-Overland Company, Toledo, O. The photograph is particularly interesting in its comparison of the modern with the ancient, the latter being represented by the flimsy bamboo huts with roofs thatched with grass, exactly the same in material and architecture as those built hundreds of years ago. However, the picture is not as uncommon to the residents of the Philippines as to Americans who have never visited the islands, and automobile dealers in Manila state that motor cars are now almost as numerous as bullock carts in Luzon and are rapidly becoming the popular pleasure vehicle of the whole country.

NOTES FROM FOREIGN LANDS.

The total value of imports of automobiles and parts into the South African Union increased from $1,800,493 in 1911 to $2,812,467 in 1912. America made a good showing, the figures advancng from $208,130 to $700,800. About 240 American machines were sold during the year in the Transvaal, and there is said to be an unusual demand for cars selling at $1000 to $2500.

Carlos de Salamanca, driving an English Rolls-Royce, won the 192-mile Spanish Grand Prix, over the Guadarrama mountain course in Spain, last month, his time for the distance being 3:34:12. Marquis de Aulencia with a Lorraine-Dietrich was second in 3:37:04, and C. Eric Platford with a second Rolls-Royce was third in 3:39:56. Out of a total entry of 20 cars 17 started and 11 finished.

Owing to the lack of entries, only two makes of cars having been represented thus far, the Belgium Grand Prix has been postponed until Aug. 24-25, and the date for receiving entries has been extended to July 31. It is understood that the course will be changed somewhat, so as



Party of Filipino Young People Enjoying Roads of Luzon in Overland Car.

to permit of using roads which can be rendered dust proof and free from the possibilities of danger.

It has been definitely decided to hold the 1913 Paris Salon Oct. 17-27, instead of during the month of December as formerly. This action is being variously interpreted in Great Britain, where the annual Olympia show will be held in November. The most generally accepted view, however, is to be found in the suggestion that the French manufacturers hope to restore the former prestige of the Salon by holding it well in advance of the exhibitions in other countries.

According to Consul-General Charles A. Holder, Christiania, Norway, there is a large and active demand for motor fittings, at present supplied by England, United States and Germany, in the order named. A few are made in Norway, but their high price makes the sales limited. Several dealers state that they would be glad to buy American fittings, as they consider them superior to those of any other country, but no manufacturer seems interested in this market and none has taken the trouble to investigate its possibilities. Those most in demand are grease cups, oil cups, oilers, unions, pipe fittings, couplings, check valves, water outlets and exhausts and priming cups.

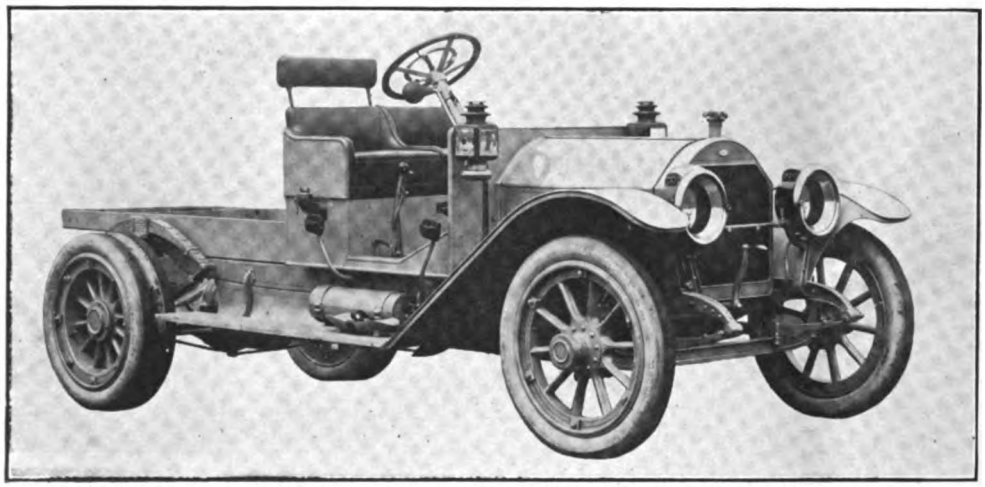
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IN THE COMMERCIAL VEHICLE FIELD.

Constructional Details of the Marmon Delivery Wagon---New Model Placed in the Market by Sanford Company---Features of Moore Two-Cycle Engine.

HAVING been engaged in the production of pleasure cars for years and in machine manufacturing for three generations, it is but natural to assume that the Nordyke & Marmon Company, Indianapois, Ind., would not have entered the commercial vehicle field with its 1500-pound Marmon delivery wagon until it was prepared to demonstrate that it was well adapted for the purposes for which it was intended. The design follows standard practise insofar as the principles are concerned, and the proportions of the various components and the workmanship are quite in keeping with the product of this concern.

The motor is typical of Marmon design and construction, but differs from that used in the pleasure cars of this name in that it has a bore of four inches and stroke of five inches, the horsepower rating being 25.6 under the S. A. E. formula. It is of the T head, four-cylinder, water-cooled type. The water jacket is large and the valves and ports are designed to insure sufficient charges of fuel and complete scavenging of cylinders. The crankcase is a barrel form without supporting arms, which is held to make for accessibility and permit work and attention with minimum labor on the water pump, magneto, carburetor, oil pump and connections.



Marmon 1500-Pound Delivery Wagon with Open Express Body Equipment.

The lubrication is positive and has been tested for years in Marmon cars. Ignition is by a high-tension magneto and battery, a dual system using one set of plugs over the intake valves. The carburetor is of the automatic float feed type and may be adjusted from the dash. The motor is governed by the automatic control of a valve in the fuel intake to a speed of 20 miles an hour.

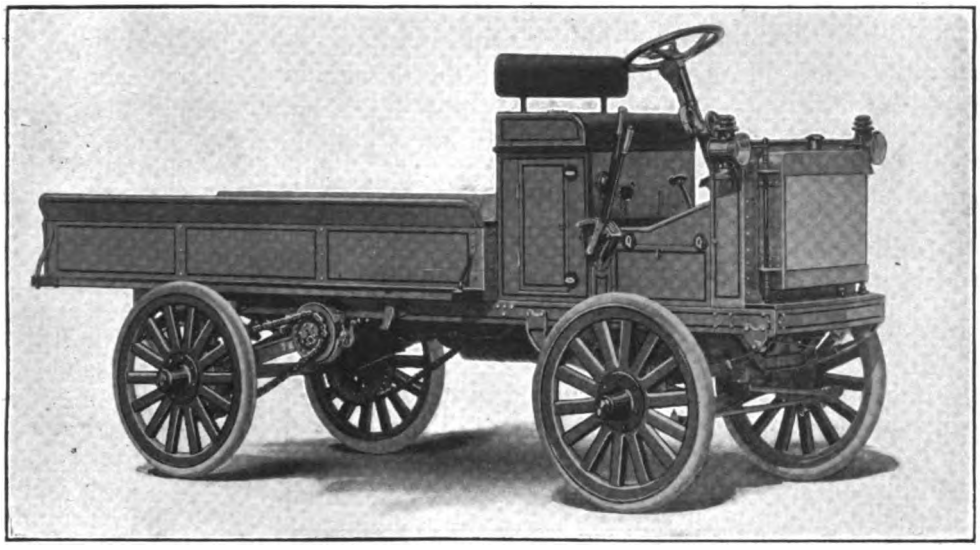
The clutch is a cone with the wide face covered with asbestos fabric, and with a series of springs beneath the facing to prevent harsh engagement. The transmission is selective, affording three forward speeds and reverse, and is assembled with the differential. The rear axe is a full floating construction with a pressed steel trussed housing, this being the Marmon standard design, the wheels being carried on the ends of the housing and driven by shafts bolted to the outer flanges of the wheel hubs. The front axle is a forged steel I section. The frame is a pressed steel channel section with heavy cross frame members, well reinforced with gussets. The forward springs are semi-elliptic and the rear full elliptic. The brakes are an expanding type, operating within pressed steel drums on the rear wheels. The wheels are of wood artillery type, 34 inches in diameter, and are shod with 34 by four-inch pneumatic tires. An option of solid tires, or single or dual members at the rear, is permitted. The driver is placed at the right, with control at the right.

NEW SANFORD MODEL.

Delivery Wagon of 3000 Pounds Capacity Added to Well Known Line.

Developed to meet a demand for a machine of larger carrying capacity than the older model K, the Sanford model L delivery wagon of 3000 pounds capacity, has been brought out by the Sanford Motor Truck Company, Syracuse, N. Y.

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Sanford Model L Delivery Wagon with Capacity of 3000 Pounds.

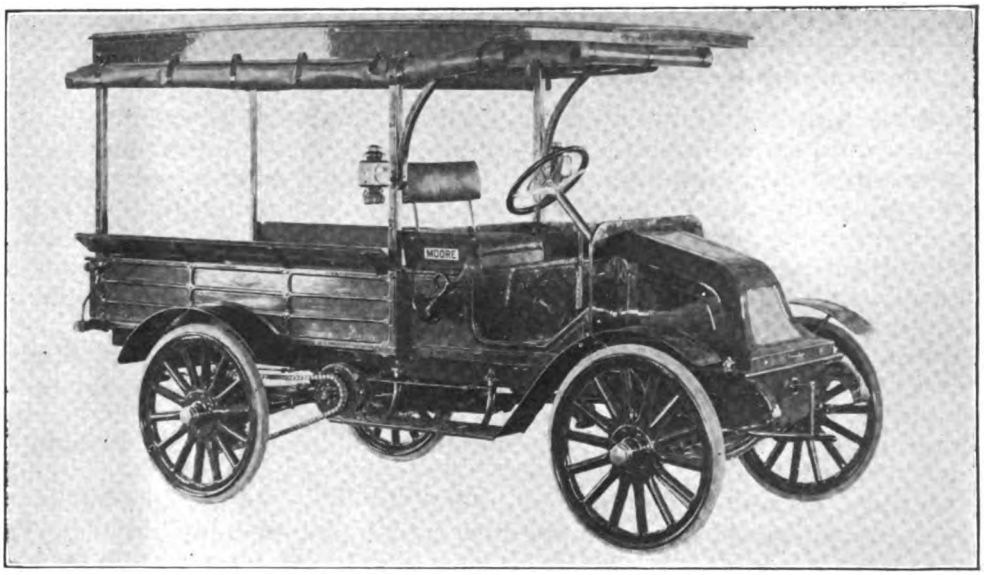
The model K is a 2000-pound wagon and the new machine is identical with it, aside from the proportions.

The power plant is a unit, the motor, clutch and transmission being assembled together. The engine is a four-cycle, four-cylinder, water-cooled L head type, with the cylinders cast in pairs. The bore is four inches and the stroke 4.5, giving a rating of 25.6 horsepower under the S. A. E. formula. The valves are on the left side, and the stems, tappets and guides are protected by cover plates that may be removed readily for inspection or adjustment. Lubrication is by combined force feed and splash, oil being drawn from a two-gallon reservoir in the base of the crankcase by a pump driven off the camshaft, and being filtered before it is circulated. Ignition is by a high-tension magneto. The carburetor is an automatic float feed type and the motor is fitted with a governor.

A large extension at the rear of the engine case houses the flywheel and clutch, and to this is bolted the housing for the transmission gearset. The clutch is a multiple disc, 16 crucible steel plates, hardened, tempered and ground. The transmission is selective, affording three forward speeds and reverse, the shafts being of large diameter and mounted on annular ball bearings. An interlocking device prevents the use of more than one set of gears at a time. The drive is to the jackshaft by shaft, and thence by chains to the rear wheels.

The frame is of steel channel section, and is supported by semi-elliptic springs all around. The rear axle is of heavy rectangular section and the forward member an I section. The service brake shoes operate with contracting bands on drums on the jackshaft and the emergency members are external contracting on rear wheel drums. The wheels are 36 inches in diameter and are fitted with 3.5-inch tires in front and four-inch at the rear. The driver is at the right with right hand speed changing and emergency levers.

All Sanford wagons are the development of nine years' experience, those engaged in their production having been associated with some of the oldest concerns in the automobile industry.



Moore Delivery Wagon, Capacity 1600 Pounds, with Standard Express Body.

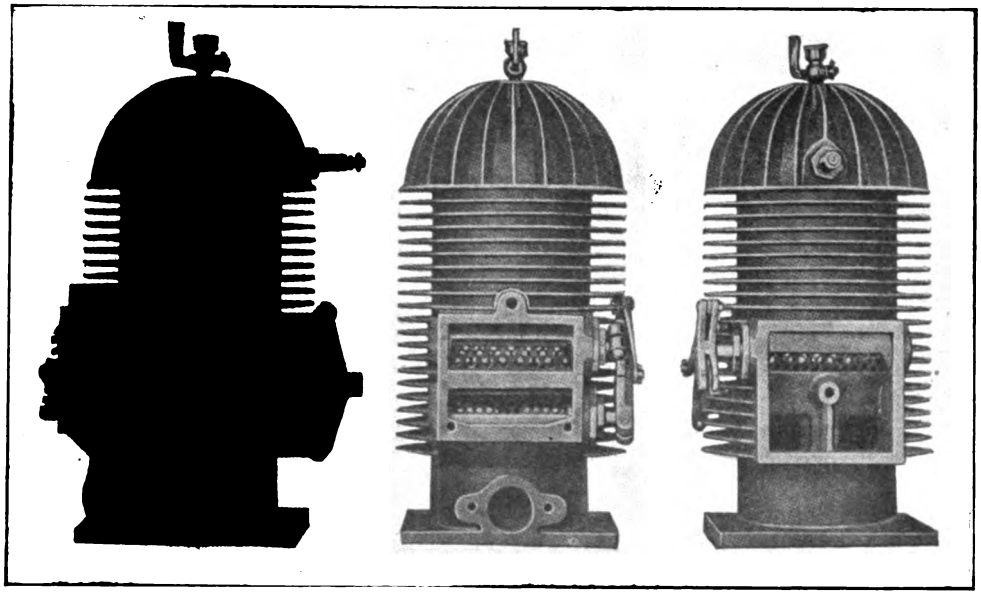
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MOORE DELIVERY WAGON.

Special Feature Is Three-Cylinder, Two-Cycle, Air-Cooled Motor.

Utilizing what appears to be conventional design, with the motor in front under a French type hood, the 1600-pound Moore delivery wagon, made by the Palmer-Moore Company, Syracuse, N. Y., demonstrates that appearances are deceptive. The car is decidedly distinctive in the use of a three-cylinder, two-cycle, air-cooled engine of entirely original design. The wagon is the first to be produced by this concern, but other sizes will be built as soon as manufacturing plans can be completed.

It is maintained that the Moore motor differs from all others of the two-cycle type in that it has a control by rotary port shutters to give variable speed. The cylinders are the three-port type, and each port has three rows of holes staggered in arrangement, the holes of the intake being smaller than those of the exhaust. Each port has a rotary shutter, so fitted that any series of holes may be covered or uncovered. For instance, the shutter may be placed so as to vary the fuel supplied from one extreme to the other, and as this shutter is moved the shutters of the exhaust port and by-pass are varied similarly, each shutter registering the same with reference to position. Because of the three rows of holes in each port the motor is said to have three speeds by change of fuel supply, these being the low, intermediate and high.



Rotary Port Shutters of Moore Two-Cycle Engine, Showing Operating Mechanism.

It is claimed that the speed may be regulated in this manner so as to eliminate possibility of irregular firing or back firing at low speeds, and to insure against loss of power at high speeds. The valves are operated by gear segments and bell cranks connected with a lever carried on the steering wheel, and the gear segments are made so that they will mesh in one position only. The shutters are installed with cover plates that may be removed easily for inspection or work.

The bore and stroke are the same, four inches, and the cylinders are cast with the heads integral with the combustion chamber in a half-spherical form. The head has wide longitudinal fins that converge at the top and unite with a horizontal fin, and below this is a series of fins that extends nearly to the bottom of the cylinder. Each member is cast separately and they have heavy base flanges. Lubrication is by oil mixed with the fuel in the proportion of one quart to five gallons of gasoline. The carburetor is of special construction, there being a fixed adjustment. Ignition is by Bosch high-tension magneto.

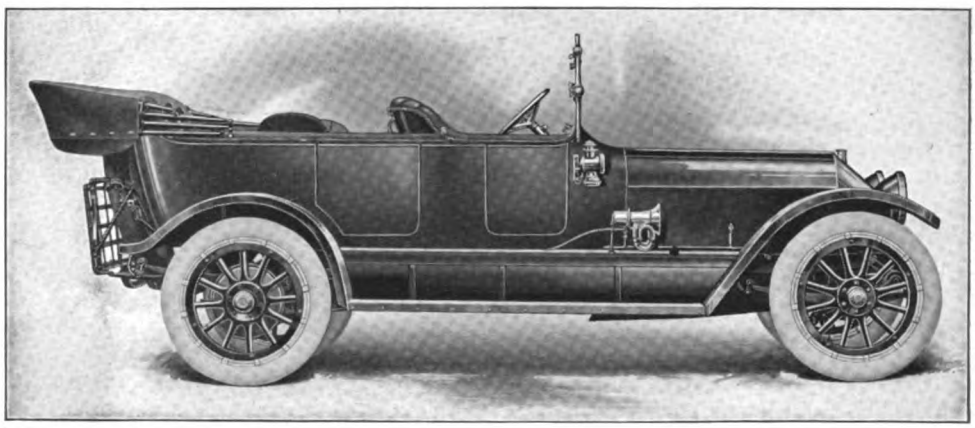
The clutch is a multiple disc. The drive is through a shaft having two universal joints carried in a self-aligning annular ball bearing mounted in a centre cross frame member. The transmission is planetary, affording one speed forward and reverse, there being an interlocking device so that it is impossible to engage either without disengaging the ratio in use. The jackshaft is a special type and is so mounted with the gearset as to be suspended at three points. Drive to the rear wheels is by side chains.

The frame is a pressed steel channel section with large cross members. Springs are semi-elliptic all around. The axles are drop forged from vanadium steel, and are I sections. The brakes operate on 10-inch drums on the jackshaft and rear wheel hubs. Both sets are equalized and are easily adjustable. The wheels are artillery type, fitted with 36 by 2.5-inch tires in front and 36 by three-inch rear. The driver is at the right.

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KNOX COMPANY ANNOUNCES 1914 LINE.

FOR 1914 the Knox Automobile Company, Springfield, Mass., one of the oldest motor car manufacturers in the country, finds it necessary to make only minor improvements and refinements in the four chassis which will be continued. All of these will be produced in a large number of body type, each with fore doors, even the limousine and berline having the driver enclosed. In addition to the types previously offered is the Prince Henry or streamline design, which will be constructed in four, six and seven-passenger capacities for the Knox Little Six chassis only. The company has discarded the acetylene motor starter, and will equip its entire product with the Esterline electric lighting dynamo and motor starter. A wide variety of finish in standard colors is offered, including natural wood grain, which is listed as slightly extra, and the factory is equipped to paint cars in special colors if desired. In thus allowing the buyer a width of preference the Knox company is but following its policy of previous years in giving what the public wants, instead of endeavoring to force some particular type, size or feature upon it.



New Prince Henry or Stream Line Type of Body Which Will Be Fitted to 1914 Knox Little Six Chassis in Four, Five and Seven-Passenger Capacities.

The 1914 product will comprise two four-cylinder chassis, known as models 44 and 45, with wheelbases of 122 and 126 inches respectively. Model 46, the Little Six, is rated at 46 horsepower, while model 66 is equipped with a six-cylinder, 60 horsepower motor. Both sixes have a wheelbase of 134 inches. The body designs include two, three and four-passenger raceabout, torpedo, touring, limousine and berline.

The unit power plant with flexible three point suspension is continued as well as the detachable cylinder heads with valves in the head and the latter are enclosed on the Little Six. The cylinders of the four-cylinder models are cast separately, those of models 46 and 66 being in pairs.

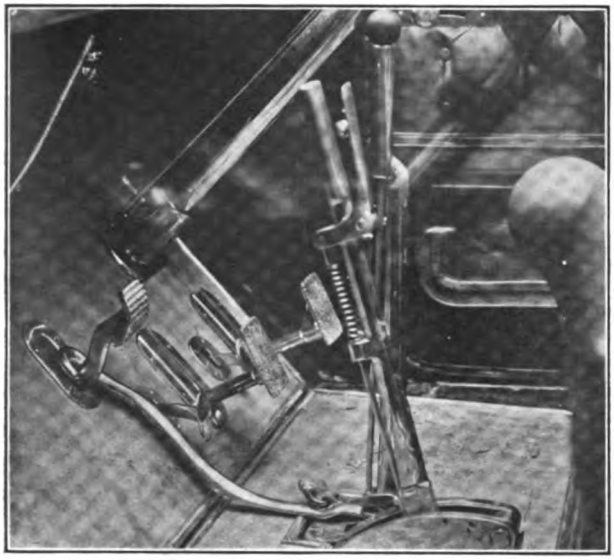
The Knox motors are the result of careful study and exhaustive road tests, and are noticeable for their simplicity, accessibility and economical operation. The same careful workmanship and high grade material are incorporated in each model, and as these differ only in the bore and stroke, and strengthening of those parts to care for the larger horsepower production, a general description of the power plant will suffice. Details of the motors are given in an accompanying table.

The valves are located in the cylinder heads without cages, and are thus assured thorough cooling by the circulation water. Machined and polished combustion chambers prevent carbon deposits. The valves are operated by rocker arms and tappet rods, rising from the camshaft. The cylinder head is detachable, four bolts serving to retain it firmly in position, while a copper-asbestos gasket makes the joint gas tight. The water jacket is cast integral with both parts, the cooling fluid entering at the lowest point and having its outlet near the top. The head joint is not for water at all, the latter being led into the upper portion by an external fitting. The pump is of the centrifugal type, having a safety coupling to prevent damage from freezing or clogging.

SPECIFICATION DETAILS OF KNOX 1914 MODELS.

	H. P.					Forward			Lighting and			Wheel-	
	Cyl.	S. A. E.	Bore	Stroke	Clutch	Trans.	Speeds	Drive	Ignition	Starting	Rear Axle	base	Tires
Model 44	4	40	5	5½	3 plate	Selec.	3	Bevel	2, Indpt.	Elec.	Full Floating	122	36x4½
Model 45	4	40	5	5½	3 plate	Selec.	3	Bevel	2, Indpt.	Elec.	Full Floating	126	37x5
Model 46	6	46	4⅜	5½	3 plate	Selec.	3	Bevel	2, Indpt.	Elec.	Full Floating	134	38x5
Model 66	6	66	5	5½	3 plate	Selec.	3	Bevel	2, Indpt.	Elec.	Full Floating	134	38x5½

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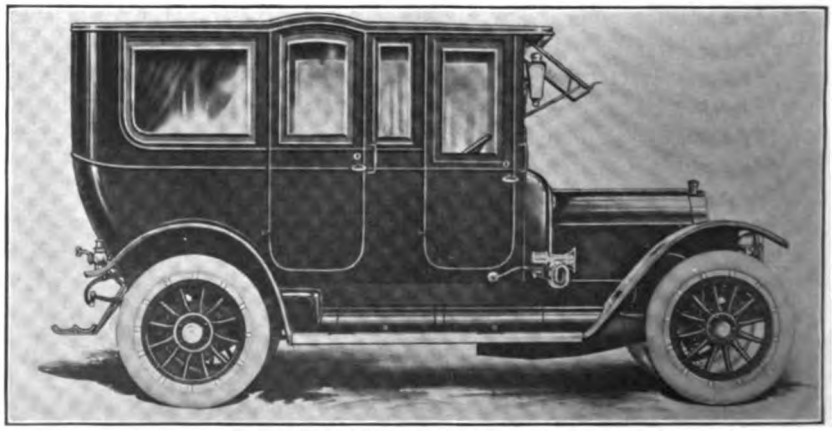
Knox Centre Control with Device for Locking Motor, Starting Pedal and Gearshift Lever—Note Sliding Grommets in Toeboard, Preventing Entrance of Heat into Fore Compartment.

Knox crankshafts are made from a high grade alloy steel, carefully heat treated and accurately ground to size. Both main and crank bearings are liberal in size, made of a special Fahrig metal, and are run in until a mirror like surface is obtained. The pistons are machined and ground and are fitted with three rings above the wristpin and an oil ring at the bottom. The connecting rods utilized on the four-cylinder models are of the round type, drilled out in the centre and fitted with a small oil tube, leading the lubricant to the wristpin from the main bearing. Those on the six-cylinder motors are of the I beam type, a forging and have an oil channel. The wristpins are hardened and ground and have bronze bearings.

The camshafts are cut from a solid bar of tough alloy steel with integral cams and two integrally cut spiral gears drive the water and oil pumps and timer. A silent chain drive is utilized on the Little Six. The chains are unusually wide and, of course, pitch, and are thoroughly stretched before assembling. They operate in a constant bath of lubricant. Timing of the camshaft is by a vernier coupling, while the magneto coupling has a notched connection, simplifying timing without removing the chains, as well as insuring accuracy of valve operation. The valves are made from a solid piece of nickel alloy steel and have large porportions, preventing undue warping, and insuring a good seat at all times. They are operated through tappet rods and rocker arms placed overhead. The upper ends of the former, as well as of the valve stems, being provided with a cup-shaped socket to receive the hardened tips of the rocker arms. In these cups oil is placed, making the action more nearly noiseless, as well as minimizing wear. In addition to the usual valve spring, an auxiliary is utilized for taking up lost motion, so as to render the whole efficient and quiet at all times.

The power group forms a unit with the clutch housing and transmission, this being supported in the frame from three points. Two supports are placed in the middle of the side arms and the single connection at the front. The latter comes at the centre of the crankcase, while the former are located just back of the flywheel. Not only are the advantages of the three point suspension obtained, but the situation of the supports is such that they come close to the units of the heaviest duty or weight. The Knox practise of having each unit removable by displacing a few bolts is continued, and each of the components may be taken out individually with an equally small amount of work.

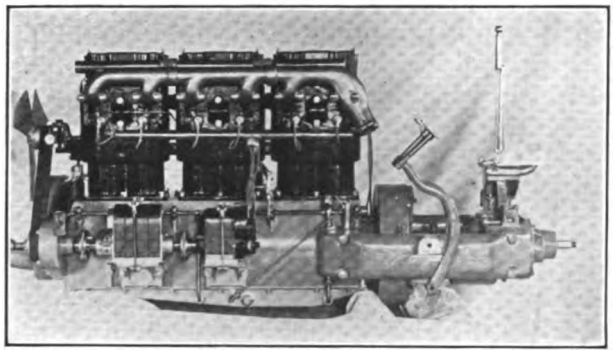
The clutch used on all Knox models is of the three-plate dry type with cork inserts, possessing the essential qualities of gradual and easy engagement, efficiency and durability. The clutch enclosure within the flywheel insures the exclusion of foreign elements. The transmission is simple and quiet operation is insured by the use of spiral gears in the main driving set. It is of the selective type, providing three forward speeds and one reverse, and the span between the bearings of the main shaft is such that maximum



Berline Enclosed Type of Body Fitted to Knox Model 45 Four-Cylinder Chassis.

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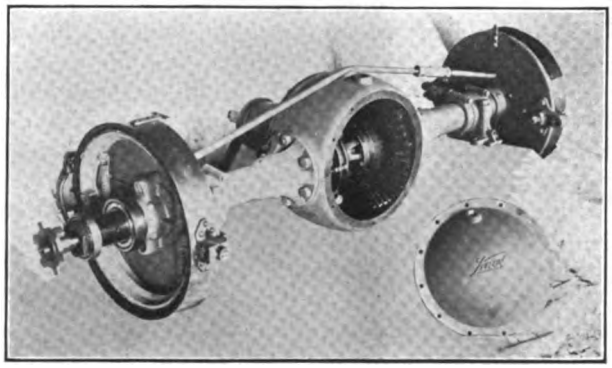
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Left Hand Side of Knox Little Six Power Plant, also Showing the Unit Construction and Accessibility of Components.

strength is assured. Shafts and gears are of alloy steel, the latter being hardened, while the former are made with integral flutes. Imported annular ball bearings are used throughout. The absence of nuts, bolts and cotter pins is noticeable within the case.

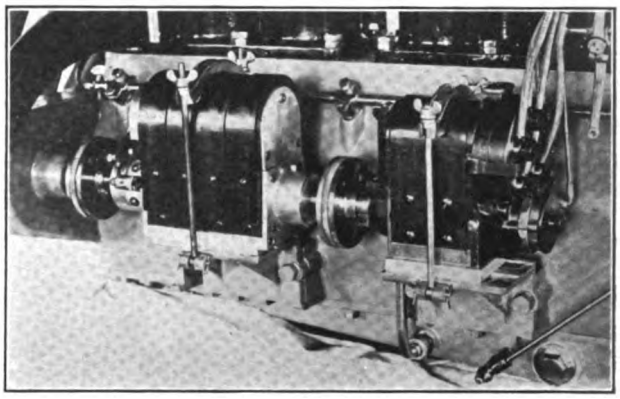
The Knox oiling system is of the circulating type and includes a simple gear pump driven from the camshaft. The lubricant is drawn from a crankcase supply, filtered, forced through a main pipe along the side of the case and separately lead to the crankshaft and camshaft bearings. From the latter, oil holes in the shaft and grooves in the connecting rod bearings, lead it to the rods, holes in which carry a supply up to the piston pins, bushings and cylinder interiors. In addition, the latter surfaces have the mist from the splash within the case. All oil is returned to the reservoir, filtered and used over again. This makes an efficient and economical oiling system with a minimum of parts. It is stated that an average of 800 miles to a gallon is obtained with the four-cylinder motors and 700 miles with the six-cylinder types. A gauge indicates the pressure at all times, and may be varied by a bypass valve. All screens are very accessible for cleaning and a petcock is provided for noting the height of the supply.



Side View of Rear End of Knox Little Six Chassis, Showing Arrangement of Brakes, Torsion Rod and Spring Suspension.

Two independent ignition systems are provided, these including a Bosch high-tension magneto and a four-unit coil, timer and battery, or distributor and motor vibrator on models 44 and 45. A Bosch magneto, distributor and battery are employed on the six-cylinder units.

Final drive is by shaft to a full floating rear axle, a universal joint being located at each end of the former to take care of any lack of alignment. The axle is of large proportions and the housing of the four-cylinder types is of pressed steel to which the tubular ends are acetylene welded, while that of the six-cylinder models has heavy gauge tubular axle ends, bolted to a central housing of cast steel by means of integral flanges. Both axles are trussed by a tierod underneath. The differential and bevel drive are



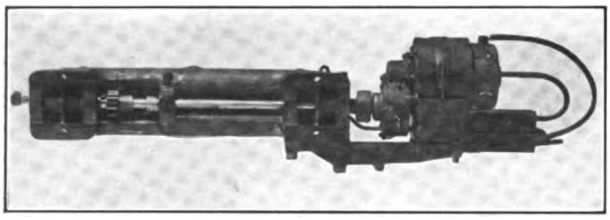
Showing Location of the Lighting Dynamo and Magneto and Method of Drive.

mounted on a steel casting, an integral unit, and a large inspection plate permits the withdrawal of the gears, while a micrometer adjustment is provided for setting the gears and bearings. The gears are of generous size, made from alloy steel, and the pinion bevel is made integral with its shaft, the material being an alloy steel drop forging. High grade imported ball bearings are employed and radial thrust bearings are provided on the bevel drive of the six-cylinder models, in addition to annular ball types.

The front axle is of the I beam section type, the material for the bed being an alloy steel, drop forged and heat treated, while the pivot levers are of the same material. The knuckles turn on Timken roller bearings, which are arranged to take all thrust, as well as provide means for making adjustments. The wheel bearings are of similar form.

The brakes of all models are located on the rear wheel hubs, the service members being of

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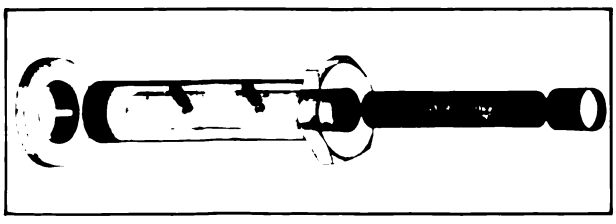


Showing Construction of Knox Electric Motor Starting Unit, Making for a Simple and Direct Application of Energy.

the contracting band type and the emergency of the internal expanding design. With the four-cylinder models the internal brake shoes act directly against the inside of the foot brake drum, adding considerably to its efficiency. The brake supporting brackets are securely anchored to the axle tubes, brake reaction being transmitted to a torque truss attached to the centre of the axle and spring supported on a cross member of the frame. The adjustment is simple. That of the service members is obtained by shortening a connecting link, while wear is compensated for with the emergency by turning the fulcrum cam slightly between the shoes.

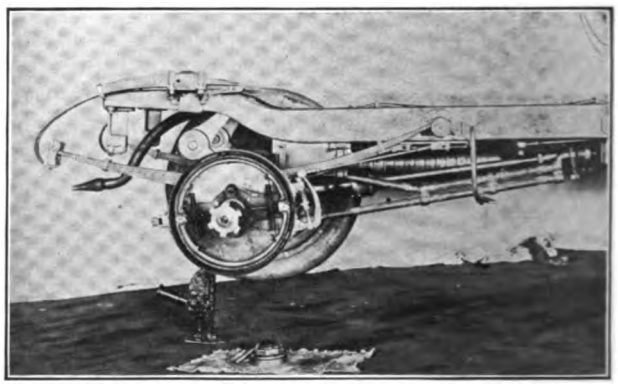
Semi-elliptic front and three-quarter scroll ended elliptic springs in the rear are used on all models, the front being 42 inches long. The rear members of models 44, 45 and 66 are 50 inches long, those of the Little Six 54. The lower members of each are rather flat, while the scrolls are comparatively long. They are of a tough, alloy steel with nickel components, and provide maximum comfort with stability and safety. All spring bolts are thoroughly lubricated by grease or oil. On the Little Six an ingenious method of lubricating the bolts is provided. It consists of a felt wick soaked in oil and forced into the spring bolt. The lubricant oozes through small wicks in the bushings, insuring efficient lubrication.

The Knox steering gear is continued. It is of the irreversible type operated by a double right and left hand threaded screw mechanism which reacts on a rocker located in the base of the housing. All road shocks are cushioned by a spring joint at the forward end of the fore and aft connecting rod, and throughout the best material and workmanship are incorporated. The stability of the Knox steering mechanism has been proven in service. Provision is made for compensation for wear. Both the spark and throttle levers are mounted on the top of the steering wheel on a stationary bracket.



Knox Method of Lubricating Spring Bolts of Little Six—Oil Soaked Wicks Insure Copious Lubrication.

The company points with pride to its frame, which is an unusual piece of workmanship and material. The flanges of the side parts widen rapidly from the attachment of the front spring shackle, and thence continue straight back with unusual width until past the point of power unit attachment. Thence the taper back to a usual section is gradual, being distributed over three feet or more. In side view, the frame is of full depth from the front axle back to the up-sweep at the rear. This design makes a unit which possesses great strength, without any unnecessary weight. There are three cross members, one at



Full Floating Type of Rear Axle Employed on Knox Little and Large Six, Having Large Inspection Plate and Micrometer Adjustment of Gears and Bearings.

the extreme front, just ahead of the crankcase end, another at the rear, where it unites the side members, and a third at the middle joint. The last named is just above the first universal joint in the driving shaft, and carries the forward extremity of the torque rod. The two motor supports also form cross members, in the sense of stiffening the frame.

The wheels are of the artillery type with spokes of second growth hickory, and Fisk demountable rims are standard equipment, although option is given of universal and clincher. The tire sizes are as follows: Model 44, 36 by 4.5 inches; model 45, 37 by five; model 46, 38 by five; model 66, 38 by 5.5.

Centre control is utilized on all models and option is given of right or left position of the steering column with the exception of the small four-cylinder models. Provision is made for locking the gear shift lever and motor starting pedal. The latter is located in the centre of the car. The

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order of the control members from left to right is as follows: Starter pedal, cut-out pedal, clutch, accelerator, service brake pedal on cars with right hand steer. Entrance of heat from the power plant through the toeboard is prevented by sliding groumets over the openings for the clutch and brake pedals.

The electric motor starter, which replaces the acetylene on all 1914 models, is the Berdon. The unit is mounted on one of the engine legs which extends from the motor to the transmission, and drives directly on the flywheel through a sliding pinion shown in an accompanying illustration. This provides a direct method without the employment of spiral or bevel gears. It is pointed out that it may be readily disassembled and assembled by displacing one of the engine legs. The lighting dynamo is a Berdon, which is located, as is the Bosch magneto, on the left hand side of the power plant.

The large number of bodies produced are manufactured in the Knox plants, and are of sheet aluminum and steel panels on a strong wood frame. The upholstering is of carefully selected hand buffed leather, either black or colors to match the painting or special cloth. Option is given of nickel or brass trimmings. The colors include battleship gray, brewster and thistle green, royal blue, wine, maroon, dark carmine, Knox red, tan and chocolate brown. Mahogany, French, Circassian walnut or mission natural wood finish is listed as extra. The finish is in keeping with the high standard maintained by the company, and the equipment is very complete, including every convenience for operation and comfort.

DETROIT'S ROAD CONGRESS.

Brief Outline of Programme Indicates Subjects of Decided Interest Will Be Discussed.

Road builders of all states will gather at Detroit, Sept. 29, for the third annual American road congress. The first congress was held at Richmond, Va., in November, 1911, the second at Atlantic City, N. J., October, 1912, the attendance at the former place being 1200, while that at the latter was 2000. Officials expect the largest assembly at Detroit that ever has been known.

The executive committee is preparing an elaborate programme and a number of distinguished road builders will speak upon leading topics. Col. E. A. Stevens, state highway commissioner of New Jersey, will describe the proper treatment of worn out or ravelled macadam road surfaces; Henry G. Shirley, state highway engineer of Maryland, will read a paper dealing with systematizing and simplifying the purchase of materials and equipment; State Highway Commissioner Wilson of Virginia will discuss the labor question as it affects road construction; State Highway Commissioner Hurst of Wisconsin will take up the structure of drains for highways, and State Highway Engineer Keller of Alabama will tell how to care for unsurfaced roads. John A. McIlhenny, president of the United States civil service commission, will speak on the merit system in road administration.

There will be model exhibits under the direction of the United States office of public roads of every style of street and road surfacing, approved types of highway bridges and culverts, from a reproduction of the Appian Way down to the present time.

MANY HANDS MAKE LIGHT WORK.

Five Thousand Michigan Men Rebuild 250 Miles of Road in One Day.

Five thousand Michigan men, from nearly every walk in life, recently set an example which might be followed by the whole United States, by building 250 miles of excellent automobile road in a single day. Mayors of cities and towns, state officials, millionaire lumbermen and mill men worked in the hot sun, hewing with picks and axes at the corduroy slabs, throwing stones, shovelling sand and gravel, leading plow horses or performing other of the innumerable duties which form part of the task of road building.

They effected what seemed an almost impossible feat in the big swamp in Pulaski township, Presque Isle county. Corduroy, which was laid a generation or more ago and which had long been the terror of motorists, was removed, or so completely covered with a foundation of stones and earth, gravelled on top, that it will never again jar those who ride over it. As a result of the day's work there is an unbroken line of gravelled highway from Bay City to Mackinaw City, a distance of 250 miles, the fulfillment of what had been a dream for months and in some cases, years.

With the success of its last two ventures fresh in mind, the Motor Dealers' Contest Association of New York City, has definitely decided to revive automobile racing on the Brighton Beach one-mile track, and the date for the coming meet has been set as Aug. 9.

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MOTORING LAWS AND THEIR ENFORCEMENT.

International Travel Club Adopts Resolution Respecting Uniform Traffic Regulations---New York Supreme Court Holds Accident Provision Constitutional.

IT WOULD appear that the subject of uniform motoring laws is soon to receive the attention that its importance deserves. Several of the eastern states have appointed commissions to meet in conference in an effort to draft a motor law which shall be possible of enactment in all these states. And in addition it is noted that the International Travel Club, composed of recognized touring organizations in this country and Europe, has taken the matter up in earnest.

At a recent meeting of the club in New York City, a resolution was adopted appointing a committee to proceed at once to the preparation of a set of uniform traffic regulations which will be advocated by the club in an effort to standardize the regulations in the various cities with a view to securing uniformity through their adoption by all the larger municipalities in this country and abroad. Frederick H. Elliott, well known in motoring circles, has the following to say in reference to the movement:

> At present nearly every city has a different set of traffic rules, which the police try to enforce; but many of them are so obsolete and unenforceable that it would be far easier to educate the public, as well as drivers and operators of vehicles, if each city had a standard set of regulations. Much force is given to this suggestion in view of the constantly increasing use of motor trucks, which are now used in delivering merchandise very generally, thousands of such vehicles covering a wide radius, often passing through a score or more of towns and villages in one day.
>
> It is reasonable to assume that if uniform rules for the regulation of traffic prevailed in all of the larger cities, and so far as necessary were adopted in all of the suburban points, pedestrians and all drivers and operators of vehicles would, within a short time, become thoroughly familiar with them, and the danger of accident be eliminated, while the traffic officers would be relieved of a great amount of trouble, which they complain they now experience.

CALLAN LAW CONSTITUTIONAL.

Provision Regarding Giving Name and Address So Held by Court of Appeals.

The court of appeals in New York State recently handed down a decision affirming the constitutionality of the provision in the so-called Callan automobile law requiring the operator to stop and give his name and address to the injured party or to the police in case of accident. The decision reverses that of the lower courts.

The case was that of the people against Edward T. Rosenheimer, who was indicted in 1910, and subsequently was arrested in Texas. His attorney demurred to the indictment on the ground that the provision was unconstitutional in that it compelled a man to give evidence which might tend to incriminate himself. In writing the decision Judge Cullen said in part:

> Physicians are required to report deaths and their causes, druggists the sale of poisons. The legislature might probably prohibit altogether the use of motor vehicles upon the highways or streets of the state. Then, why may it not equally be declared a crime to so use a vehicle as to injure any one in person or property? It is not declared a crime to operate an automobile on the highway even if it cause injury; but only failure of the operator causing the injury to identify himself. If the legislature can prohibit the use of automobiles it can certainly prescribe the conditions of such operation.
>
> I think it involves no violation of public policy or the principles of personal liberty to enact that as a condition of operating such a machine the operator must waive his constitutional privilege and tell who he is to the party who has been injured or to the police authorities—if, indeed, requiring him to give such information is an impairment of his constitutional privilege, which we do not decide.

WISCONSIN'S NEW LAW.

Section Providing Penalty for Reckless Driving Wins General Approval.

The new motoring law in Wisconsin has eliminated the maximum speed for automobile travel in the crowded business sections, and provides that machines shall be driven at a rate to be governed by the amount of traffic in the highway. This effort to regulate automobile speeding by a penalty for reckless driving is meeting with general approval from the public and authorities. In commenting upon the new law recently, Judge George E. Page of the district court in Milwaukee said:

> It is hard for a patrolman to judge of the speed of a car in a crowded street and a case brought on such grounds might be difficult to prove. But when he charges the driver with recklessness and calls four or five bystanders as witnesses that the car was being driven too fast for safety, the case ought to be easily won.

MANY SPEED TRAPS.

New York Resumes Ancient Practise but Legality Is Open to Question.

Within the past few weeks a large number of speed traps have been established in all sections of New York State. It is contended that the

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practise has been revived under the provisions of the new law recently enacted, which permits local speed regulations under certain conditions, among which is the following:

And on further condition that each city or village shall have placed conspicuously on each main public highway where the city or village line crosses the same and on every main highway where the rate of speed changes, signs of sufficient size to be easily readable by a person using the highway, bearing the words, "City of ———" or "Incorporated village of ———." Slow down to "——— miles," (the rate being inserted) and also an arrow pointing in the direction where the speed is to be reduced or changed.

In view of this provision, the legality of the present procedure is severely questioned, inasmuch as the speed traps are being operated without the posting of the signs mentioned. Obviously, motorists passing from town to town are not familiar with the various ordinances, and many claim to have been arrested without being aware that they were exceeding a legal speed limit.

LEGISLATIVE BRIEFS.

Alderman Paul Miller of Bridgeport, Conn., has introduced an ordinance prohibiting the use of headlights on automobiles in the centre of the city and on streets which are well lighted.

A new law in effect in Massachusetts carries a provision for a fine of $60 or imprisonment for not more than 30 days for willfully throwing or dropping glass in a public street or highway.

The state auditor in Mississippi has been flooded with requests for the return of money paid for automobile registration since the supreme court declared the law passed in 1911 was unconstitutional.

It is understood that the Massachusetts highway commission has promised to take up the matter of eliminating the red rear lights on automobiles, following the example set by the Vermont legislature, with the idea of recommending the passage of a similar law in that commonwealth at the next session of the legislature.

Governor Sulzer of New York has appointed Samuel Walter Taylor of New York City, Fay C. Parsons of Cortland and Arthur A. Deer of Hornell, as members of the commission to serve with commissioners of various nearby states with a view to drafting uniform automobile laws.

The first instance in which a Massachusetts motorist has served a sentence in jail for driving while under the influence of liquor was recorded in Plymouth county early in the month. It was the second case in which the defendant was sentenced to jail, but in the other instance an appeal was taken.

Although the supreme court of Mississippi has found that the law requiring automobile registrations in that state is unconstitutional, the supreme court in the neighboring state of Alabama holds that the law in that commonwealth is valid. The case was that of the state against R. H. Bozeman, and the decision was handed down July 1.

Basing their action upon the wording of the state motoring law, certain Iowa cities are contemplating the enactment of ordinances limiting the rate of speed to two miles in six minutes. The law reads as follows:

"Such speed limitations not to be in any case less than one mile in six minutes." It is contended that the word "less" refers to miles and not minutes.

J-M FYRO IN ACTION.

How Fires on Racing Cars Were Extinguished at Indianapolis Motor Speedway.

One of the most exciting incidents of the 500-mile sweepstake race at Indianapolis, Memorial Day, was the spectacular finish of Charles Merz in a Stutz car, in third place, which made practically the last two laps on fire. And almost as spectacular was the remarkable manner in which the blaze was extinguished by the prompt use of a number of small but highly efficient hand extinguishers of a comparatively new type. It was the work of a few seconds for the pitmen to put out the blaze.

In addition to its use in the Stutz machine this extinguisher saved a Mason special, which slowed up in front of one of the pits with the under part ablaze. And the same apparatus also put out a fire on Burman's car, the Keeton, on the back turn. This remarkable little fire fighter is known as the J-M Fyro extinguisher and is held to be entirely different from every other extinguisher on the market.

There are no screws or nuts to adjust and no pumping is necessary. A simple twist of the wrist turns a wheel and the J-M Fyro does the rest. The fluid used in the device is a liquid gas, which is said to possess extraordinary extinguishing powers, and to be one of the few fluids which can be successfully used on gasoline fires. It contains nothing to corrode metal and cannot injure the most delicate fabric. When carried as part of the equipment of a car the J-M Fyro is attached to the running board or any convenient place by means of metal straps, which release at a touch, making the extinguisher instantly available in any emergency. The maker, the H. W. Johns-Manville Company, New York City, has recently printed some interesting literature on this subject, which it will be pleased to forward to anyone interested.

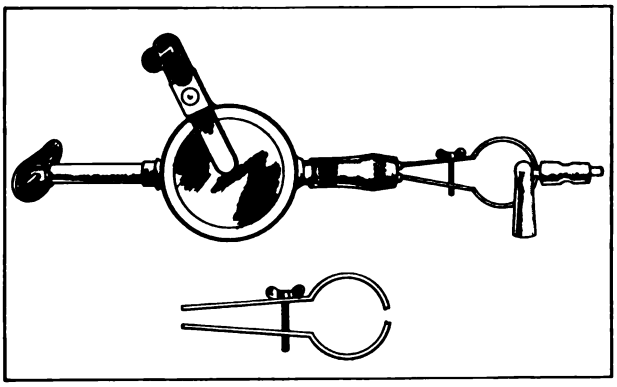
The Pierce-Arrow Motor Car Company, Buffalo, N. Y., maker of Pierce-Arrow cars, with characteristic progressiveness and enterprise, has adopted as standard equipment the Sager protection bumper, made by the J. H. Sager Company, 271 South avenue, Rochester, N. Y. To attach one of these bumpers to every Pierce-Arrow machine is a high tribute to Sager quality, but the bumper has merited distinction. Only the highest grade of material, including Shelby seamless tubing, is used in the Pierce-Arrow bumper, which is of the original and exclusive Sager bell crank type.

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THE REPAIR SHOP AND THE GARAGE.

Suggestions for Bending Large Steel and Brass Tubing Without Kinking--Grinding in Petcock Valves with Breast Drill.

IN THE overhaul of a car it is possible that a new exhaust pipe may be needed because of the old member having been damaged or rusted



Device for Grinding in Petcocks with a Breast Drill.

out. While copper or brass pipes, especially if annealed, are bent easily, the shaping of steel or larger tubes is more difficult. In fitting a new exhaust pipe it is desirable to eliminate kinks, which are not only unsightly, but obstruct the flow of the gases. Copper pipes up to 1.5 inches may be bent cold if suitable blocks and levers are utilized, but steel tubes generally require heating and are more troublesome to handle.

A method of bending is shown in an accompanying illustration, from which it will be seen that the pipe is passed through the hole in the block, while the copper loop forms a fulcrum for the lever. The leverage obtained enables short bends to be made without kinking, and is secured by gradually moving the block, so that the pressure is not exerted continually at any one particular point during the operation.

Before commencing to bend the pipe, a wire templet of the shape required should be made. If the tube be of copper it should be filled with resin, run in while hot and allowed to cool. Three articles are required, as will be noted in the drawing; first, a hard wood block with a hole slightly larger than the diameter of the pipe; second, a loop made from an old piece of copper pipe, and third, a stout pinchbar of convenient length.

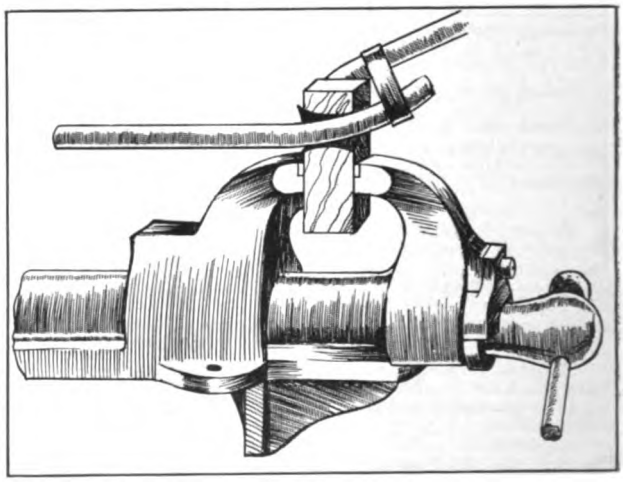
In bending steel tubing the same process is utilized, but the pipe is filled with sand, and the block should be of metal. The pipe is heated at the point at which the bend is desired, and is cooled off slightly on the side which forms an inner radius of the circle, to prevent kinking. A small hole should be drilled in the pipe in any convenient position to allow for the expansion of the sand when heated. Otherwise the contents are likely to be blown out during the bending process. Before fitting the pipe to the part it should be tested and inspected for flaws.

GRINDING IN PETCOCKS.

Sometimes petcocks in the fuel line leak unless the valve portion is driven in its seat. This will generally prevent leakage, but makes it difficult to utilize the petcock, which often becomes frozen, resulting in damage when moving the lever.

While grinding in the valve will usually cure the trouble, considerable time is required when the work is performed by hand. In an accompanying illustration is presented a suggestion for using a breast drill and facilitating the work.

The materials are not expensive and comprise two pieces of sheet steel about five inches by .75 by .125. The ends of these are shaped to fit the chuck of the drill as shown. When being ground in the valve plug of the petcock is retained in the auxiliary jaws by a thumb screw, which clamps the part securely. By rotating the



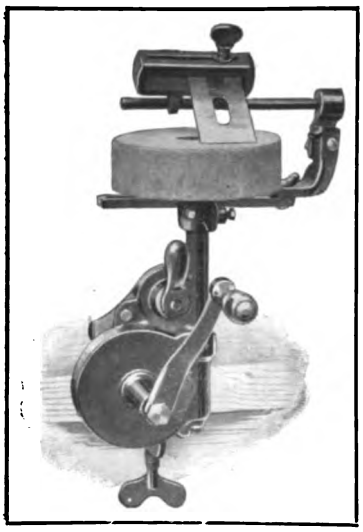
Suggestion for Bending Copper and Steel Pipes of Large Diameter Without Kinking.

handle of the breast drill the valve member may be ground in easily. The direction of rotation should be reversed from time to time.

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NEW TOOL EQUIPMENT AND MACHINERY.

ARBOR presses may be employed for a number of purposes in the repair shop, such as straightening rear axles, for example. Edwin E. Bartlett, 330 A street, Boston, manufactures a wide variety of Greenerd arbor presses and in an accompanying illustration is shown the No. 7, one of the largest types produced by the concern.



Luther Grinder Attachment.

It takes a diameter of 36 inches and has a leverage of 250:1, and a pressure of 25 tons is obtained easily. No change in principle or design has been made from the well known No. 5 Greenerd machine except in size and capacity. When the lever is in the position indicated in the illustration, the rack or ram may easily be moved up or down by means of the hand wheel.

The knee is operated by the crank shown, revolving a screw through a pair of miter gears. This screw runs in a nut in the base. The design is such that the knee can be lowered to its extreme position without the screw reaching the floor, making it possible to place the press in any position without cutting the floor for the screw. The knee is held to the frame by two studs and nuts, the nuts being adjusted and locked so that the knee can be moved easily. The pitch of the elevating screw is such that these nuts do not require tightening to hold the knee under the heaviest of pressure.

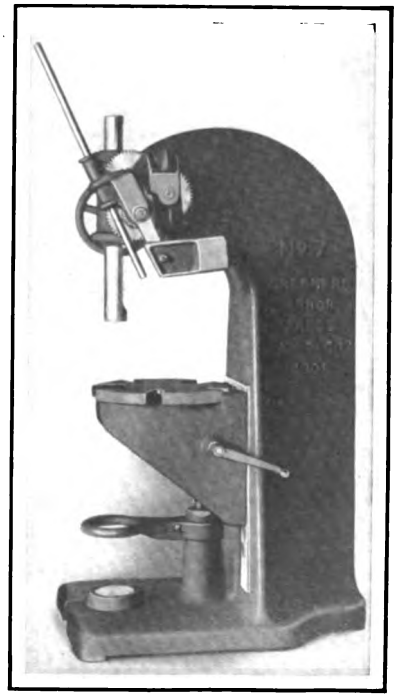
The No. 15 Greenerd is especially adaptable to automobile repair shops and has advantages over the No. 3.5, 4 and 5 sizes in that the capacity is 36 inches between the uprights and the opening under the revolving plate is 10 inches. One man can obtain seven tons, while two can secure 10 tons pressure. The maker is issuing a circular on arbor presses, which will be mailed upon request.

LUTHER HONING ATTACHMENT.

The Luther Grinding Manufacturing Company, Milwaukee, Wis., is marketing a new plane bit and chisel honing attachment for its machines of the Best Maide type. The parts to be sharpened, etc., are held rigidly in a clamp, which is moved back and forth across the face of the wheel, insuring a perfect angle and a smooth edge. The wheel is run in a horizontal plane. The Best Maide types of machines have a double grit wheel, the face side of the wheel on which the hone runs being extra fine for finishing purposes. This same attachment can be utilized on the round face of the wheel and the machine clamped into a horizontal position, as shown in the illustration.

ACKLIN BREATHER-OILER.

Some types of old motors are not fitted with breathers to relieve pressure in the crankcase, which results in a loss of lubricant. The Acklin Stamping Company, Toledo, O., is manufacturing a combination oiler and breather, the main body of which is of No. 16 gauge sheet steel. The metal is drawn to a depth of five inches and the bottom is necked so that there is one inch diameter at the lower half of the shell, while the upper part is 2.5 inches in diameter. A bead is thrown up around the bottom, and the flange is permanently secured in position by it and by the metal in the end of the shell being expanded back against it on the other side, making a rugged joint.



Bartlett Greenerd Arbor Press.

The cap is constructed of a lighter steel and is held on the breather by means of a bead which fits over a similar member on the main piece. There are openings in both the cap and the breather and these members may be adjusted as desired. The cap is easily removable.

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IN THE REALM OF THE MOTORCYCLISTS.

F. A. M. Convention Opens in Denver---Many Join Annual Tour of Kansas Short Grass Club---Plans for International Touring Contests---Other News.

MANY amendments to the constitution will come before the Denver convention of the Federation of American Motorcyclists, which opened July 23 for three days. President B. J. Patterson is a candidate for re-election, but is being opposed by Dr. J. P. Thornley, chairman of the competition committee, who would like to see the office abolished and a different form of government introduced. He will bring in a resolution embodying his ideas. Various reports of officials will be considered and most of the progressive legislation is expected to be introduced by J. Leo Sauer, chairman of the legal action committee, who recently completed a tour of the country in the interest of the organization and whose word will carry much weight.



Louis B. Scully, Pawtucket, R. I., and His Merkel.

R. S. Morton, New York state commissioner, proposes that the president be nominated and elected by a general mail vote, thus giving every member a direct voice in the organization's affairs. He has also brought forward an amendment to break up the exclusive board of directors system of government and asks for a change which will enable general members of the federation to sit upon various committees which at present are inside the national directorate.

The delegates will be informed by Secretary-Treasurer G. B. Gibson that the total receipts for the past year, ending June 30, were $28,613.85, with an actual balance in the treasury on that date of about $3000. It will be learned that the restrictive agreement sanction receipts for the year were $2925 and the receipts for general sanction fees were $6919. The total expenses of Chairman Thornley's competition committee were $3894; Estabrook's membership committee, $2835.61, while President Patterson's expenses were $1015.74. Secretary-Treasurer Gibson paid out $9386 during the year. The meetings of the board of directors cost $1041.34, and legal action expenses were $569.70. The tour of the United States made by J. Leo Sauer cost $787.85, and the state commissioners spent $515.66 during the year.

Aside from the business of the convention the recreation side will be well taken care of, the Colorado Motorcycle Club having arranged an elaborate programme. The club rooms are thrown open to the visitors and adjoining is a motorcycle garage, where members' machines will be taken care of for 15 cents a day.

An official programme outlining the various beautiful trips to be found in and around Denver is furnished the tourists upon their arrival and the scenery is unsurpassed. Among the places to be reached from Denver are Yankee Doodle lake, James' peak, Rollins' pass, where snow is deep in midsummer; Great Continental Divide, Frazer canyon, Sphinxhead rock, Mt. Morrison, famous Rock of Cries in the Park of Red Rocks, Thumb rock, Ladder cave, Cave of Saturn, Slabs of the Ages, Garden of Titans, Garden of the Gods, Manitou park, Pike's peak and the mining region.

Kansas Short Grass Tour.

About 500 motorcycle riders left Hutchinson, Kan., July 14, for the annual tour, held under the direction of the Kansas Short Grass Motorcycle Club. Among the riders were visitors from all parts of the country, the chief disappointment being the inability of Elbert Hubbard of Aurora, N. Y., to take part, it having previously been announced that he would be present. Riders who started were from Kansas, New England, Indiana, Nebraska and the South.

Another disappointment was the lack of women riders, arrangements having been made for a separate division of women motorcyclists in anticipation of a large delegation, which was to be led by Miss Inez Patterson as captain. She is the daughter of Dr. B. J. Patterson of Hutchinson, president of the F. A. M., who led the tour. But one woman rider appeared, save Miss Patterson herself, and these two made the tour with the main party.

Three divisions of the tour started on July 12

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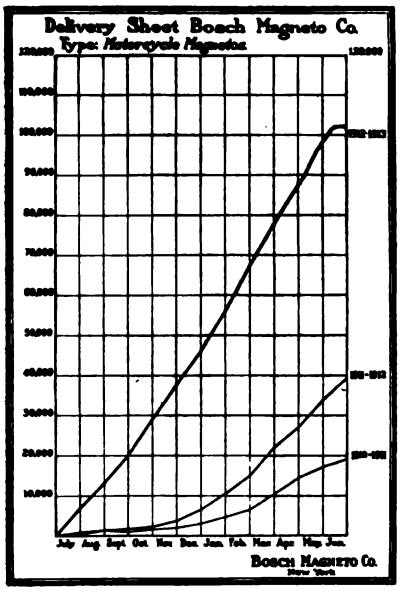


Chart Showing Increase in Shipment of Bosch Motorcycle Magnetos.

at Wichita, Emporia and Salina, Kan., converging at Hutchinson, where the entire party took up the journey to Denver, Col., the total distance being 572 miles. The itinerary included Hutchinson, Larned and Dodge City, Kan.; Holly, Las Animas, Pueblo, Canon City, Colorado Springs and Denver, Col. At Dodge City races were held and all along the route the principal points of interest were visited. Altogether it was the most successful tour in the history of the Kansas Short Grass Club. The party arrived at Denver, July 22, the day before the opening of the national convention of the F. A. M.

Bosch Production Record.

The fiscal year of the Bosch Magneto Company, New York City, maker of Bosch ignition equipment, ended July 1, and a record of its shipments of motorcycle magnetos is of interest as having a bearing upon the growth of the industry. An accompanying chart shows in a graphic manner the increase in this department of the company's business, which has been over 171 per cent. for the year of 1912-1913. During the period named approximately 103,000 motorcycle magnetos left the factory in Springfield, Mass., the facilities of which are such that it would have been able to take care of a much greater output had this been necessary.

On the Transcontinental Journey.

Mr. and Mrs. LeRoy Snodgrass of Los Angeles, Cal., have passed Albuquerque, N. M., on their overland journey to New York City on their Henderson motorcycle and sidecar. They left Long Beach, Cal., May 25, and expect to arrive in New York about Sept. 15. They crossed the Mojave desert over a terrible trail of 300 miles and after arriving at the Grand Canyon they proceeded by way of Flagstaff, Magdalena and Socorro, to Albuquerque. Mr. and Mrs. Snodgrass, the motorcycle, sidecar and total equipment weigh 1120 pounds. The outfit includes a tent, cooking outfit, shovels and other tools.

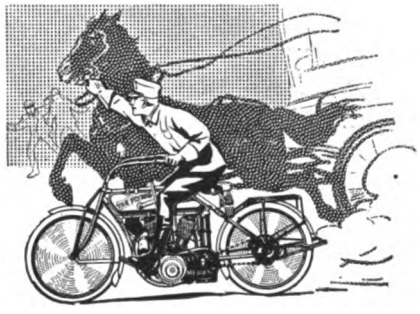
Merkel Restored His Health.

About a year ago Louis B. Scully of Pawtucket, R. I., found his health such that it was deemed advisable to visit the Southwest. Mr. Scully immediately decided to make the trip on his 1913 Merkel, made by the Miami Cycle & Manufacturing Company, Middletown, O. He covered a large portion of Oklahoma, Arizona, New Mexico and Texas, and returned to New England completely recovered. An accompanying illustration shows him riding the Merkel in Pawluska, Okla.

International Touring Trial.

The first international touring trial for teams of three motorcycles, nominated by any organization belonging to the Federation Internationale des Clubs Motocyclistes, to be run in conjunction with the 1913 six days' open reliability trial promoted by the Auto-Cycle Union, will be held at Carlisle, Cumberland, England, Aug. 18-23. The Manufacturers' Union of Great Britain has purchased a large cup, said to be worth $1000, as a perpetual trophy for the event.

Four countries, not including the United States, already have signified their intention of entering teams. The six days' trials will be for



ALWAYS READY FOR ANY EMERGENCY!

With its ability to pick up speed quickly—(60 miles an hour from a standing start within a city block)—the 1913 Flying Merkel Motorcycle is always ready for instantaneous use. These features and the fact that the Flying Merkel Motorcycle is the most economical in the world to operate has led to its universal adoption by Police Departments, Park Boards, Gas Companies, Telephone and Electric Light Companies and all other business concerns and individuals whose requirements demand a sturdy, reliable motorcycle at the minimum cost of upkeep. Remember, the Flying Merkel

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Free Art Catalog on Request.

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320 Hanover St. Middletown, Ohio, U. S. A.

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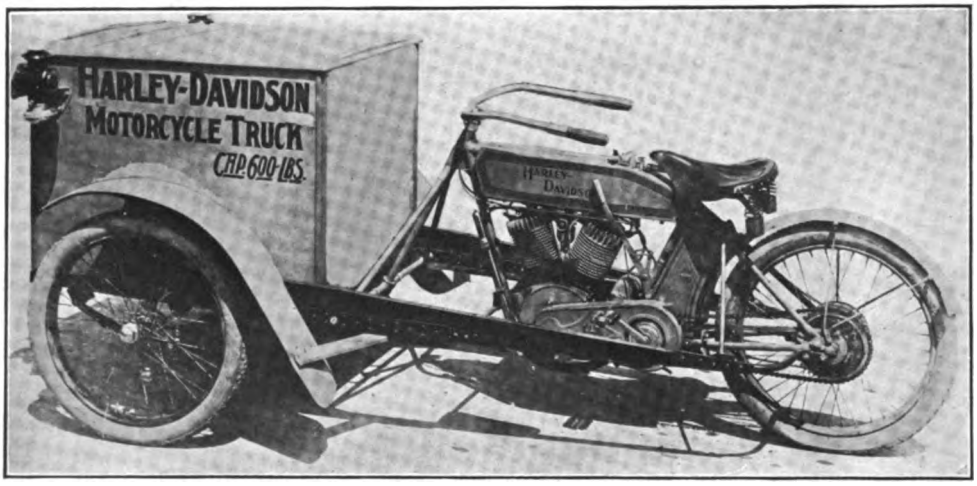
motorcycles, motorcycles with sidecars and cyclecars, the actual trials occupying five days and the sixth being given over to technical examination of competing machines.

Stolen Merkel Machine.

Charles E. Carter, chief of police in Columbus, O., announces that a Flying Merkel motorcycle, owned by Connie Yoest, was stolen from the shed in the rear of his residence at 1546 East Fourth avenue, in that city, on the night of July 7. The machine was a yellow frame, twin-cylinder 1913 model, No. 8895, rated at seven horsepower, chain driven, with tandem seat and large Solar lamp, and bearing a Columbus license tag No. 153.

French Grand Prix.

Big fields ruled in the second day's programme of motorcycle races at Amiens, France, in connection with the French Grand Prix automobile race. There were 13 contestants in the race for 350 cc machines over a course of 218 miles. A Clement-Bayard of France finished first in 4:00:27. A Rudge, an English make, won the race for 500 cc machines, in which there were 34 starters. The time was 4:22:00.



Harley-Davidson Parcel Post Car, Which Is Termed by the Maker a Motorcycle Truck of 600 Pounds Capacity.

An interesting event was that for sidecars, in which the racers carried passengers. In all but one instance mechanics accompanied the riders, the one exception being a woman passenger. Morgan was the winner over a field of 20 in 3:53:00.

New Affiliated Clubs.

New clubs that have affiliated with the F. A. M. are as follows: Wheeling, Wheeling, W. Va., 29 members; secretary, H. L. Cotton. Billings, Billings, Mont., 17 members; secretary, Gerald R. Simpson. Sioux Falls, Sioux Falls, S. D., 13 members; secretary, S. L. Strommerson. Monessen, Monessen, Penn., 18 members; secretary, M. Layman. Findlay, Findlay, O., 25 members; secretary, F. W. Day. Haverhill, Haverhill, Mass., 36 members; secretary, E. P. Tappan. Warpath, Springfield, Mass., 20 members; secretary, H. O. Rogers. Troy Indian, Troy, O., 20 members; secretary, C. H. Folker. New London, New London, Conn., 16 members; secretary, N. L. Cone.

Harley-Davidson Delivery Car.

The Harley-Davidson Motor Company, Milwaukee, Wis., is calling special attention to the Harley-Davidson delivery car, an illustration of which is presented herewith. The machine is the result of experimentation which was begun some three years ago, when Mr. Harley became convinced that the solution of the light delivery problem rested in a vehicle driving through a single rear wheel and propelling the load supported between two fore wheels.

The vehicle is designed to carry 600 pounds in addition to the driver. The tread is standard, 56 inches, and the wheelbase 76 inches. Several body types are produced, but the standard body shown is two feet 10 inches wide, three feet six inches long and two feet four inches high, with the doors opening in front. The machine is equipped with the Harley-Davidson two-speed gear, which gives a ratio of 5:1 on the high and 10:1 on low speeds.

Experience with these machines indicates that it is possible for one man to do the work of two horses and two wagons. They make from 40 to 45 miles to the gallon of gasoline. Their economy and efficiency have been called to the attention of the United States government, and at the request of the postoffice officials one has been sent to Washington for inspection by the postal department. That particular machine has a body built in accordance with the suggestions of postal authorities.

Seeking Space at Shows.

The first application for space at the Chicago motorcycle, bicycle and accessory show, to be held at the Chicago Coliseum and Annex, Nov.

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3-8, was received from Peter A. Frasse Company, New York City, importer of Renold chains and other accessories. The second application was from Van Cleef Bros., Chicago, cement maker and jobber of motorcycle and bicycle sundries. This firm also wants space at the New York show. Any manufacturer or jobber desiring to exhibit and who does not receive application blanks, which are now in the hands of the printer, can secure them by communicating with A. B. Coffman, 942 Nicholas building, Toledo, O.

An Indian Night Rider.

Willis Nelson of Waltham, Mass., believes the evening hours are the best time of the day in which to reap the greatest benefit from his Indian. Nelson is a baker by trade, and usually starts out at 5:45 in the afternoon for his rides. He thinks nothing of covering 70 or 80 miles during an evening, and the feature which most directly appeals to his friends is that he is at all times ready to help those who become stranded on the road for any reason.

Mr. and Mrs. Gale at Denver.

M. E. Gale, Angola, N. Y., connected with the Emblem Manufacturing Company, Angola, accompanied by Mrs. Gale, who occupied the Gale side seat attachment, attended the convention at Denver of the F. A. M., riding from Angola to the Colorado city. After the convention they intend to return home by the same method. Mr. and Mrs. Gale have made a notable reputation for long distance touring by motorcycle.

To Build Its Own Motors.

It is announced that the Davis Sewing Machine Company, Dayton, O., maker of Dayton motorcycles, will build its own motors for its 1914 machines. The patterns are already being made and the contract has been let for the cylinder castings.

Club Notes, Here and There.

The South Side Motorcycle Club and the St. Louis Motorcycle Club, St. Louis, Mo., have consolidated and the club will in future be known as the Motorcycle Club of St. Louis. The membership is at present about 200 and a campaign will be started to increase this number. The following officers have been elected: President, P. Kennett; vice president, Mr. Newman; secretary, R. E. Winkler; treasurer, Mr. Peach; captain, H. Steele; lieutenant, H. Collins.

The Fort Wayne Motorcycle Club, Fort Wayne, Ind., recently celebrated its first anniversary with over 100 active members. The club has incorporated under the Indiana laws and is equipped with every modern convenience.

Members of the Worcester Motorcycle Club, Worcester, Mass., enjoyed a recent outing to Nantasket beach. They rode to Boston, where they garaged their machines, going to Nantasket by boat. The club has another membership contest in progress and next month a banquet will end the contest.

The third quarterly endurance run of the Cleveland Motorcycle Club, Cleveland, O., was held under perfect weather conditions. Erie, Penn., was the turning point, making a trip of 203 miles. More than 20 machines started and ideal roads turned the affair into a pleasure jaunt which resulted in 17 perfect scores.

The Appleton Motorcycle Club, Appleton, Wis., recently held a tour of three days through Wisconsin, the event being promoted by Wettengell & Wettengell, local agent for Harley-Davidson machines. There were 45 riders in the tour, Harley-Davidson, Thor, Excelsior and Indian machines being represented. It is planned to hold another run the latter part of August.



Willis Nelson, Waltham, Mass., and His Indian Mount.

The Rockford Motorcycle Club, Rockford, Ill., has devised a new system of aiding members who are injured while riding, having established what is known as a Red Cross fund. The monthly dues are $1 and in future 25 cents of each member's dues will be set aside in the Red Cross fund. Any member injured while riding may draw on the fund to an amount not exceeding $25 for physician and hospital bills.

The Maryland Motorcycle Club, Baltimore, recently held its annual outing and crab feast on the shores of Middle river. Athletic events enlivened the outing.

JOIN THE F. A. M.

which is the National Organization fostering the interests of motorcyclists along legislative and other lines. Cut this out, mail it, and you will get the reasons.

E. M. ESTABROOK
Chairman Membership Committee Federation
American Motorcyclists,
BANGOR, MAINE.

Please send me the F. A. M. Booklet and all information interesting to prospective members.

Name .....

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1913 F. N. SHAFT-DRIVE MOTORCYCLES.

Lightweight Single, with Two-Speed Gear $275
Only Machine Built With Handle Bar Control of Clutch.
Four-Cylinder $300
With Handle Bar Control of Clutch $350
Two-Speed Gear, Extra $50
Equipment includes two brakes, footrests if desired, compound spring fork, combined luggage carrier and stand.

American F. N. Company, Boston, Mass.

Branch—415 Trumbull St., Hartford, Ct.

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NEWS OF THE MANUFACTURER AND DEALER.

The following concerns have been incorporated recently to manufacture or deal in automobiles, accessories, etc.:

Modern Motor Car Company, Bowling Green, O.; $1000; W. P. Albey, Dale I. Ladd, R. E. Ladd, J. A. Walker, T. E. Moore.

Huffman Manufacturing Company, Youngstown, O.; $10,000; tire protectors for motor trucks, E. S. Walton, W. B. Hall, H. H. Stambaugh, Richard Garlick, John T. Harrington.

Pneumatic Gear Shift Company, Chicago; $25,000; George W. Killalea, E. O. Leowen, D. Krinsky.

Overland-Garford Sales Company, Cleveland, O.; $10,000; Malcolm Bridgman, Royal R. Scott, George F. Russell, Herbert O. Fitch, Charles M. Ackerman.

Dayton-Buick Company, Dayton, O.; $10,000; L. J. Haughey, Charles Abel, Joseph A. McKenny, Earl Simon, A. J. Smith.

Auto Drive & Parts Company, Indianapolis, Ind.; $100,000; John J. Kennedy, John J. Kelly, L. D. Buenting.

Auto Maintenance Company, Newark, N. J.; $10,000; Bernard A. Kelly, Catherine Kelly, John E. Anderson.

Uhrlandt Gas Generator Manufacturing Company, Columbus, O.; $100,000; Daniel N. Hyman, Oswell C. Phillips, Harry D. Shepard, Arthur Uhrlandt, Samuel Esswein.



New Building of George A. Haws, Maker of Panhard Oils, at 142-144 Front Street, New York City.

Standard Purchasing Company, Inc., New York City; $10,000; Harry L. Cook, Harry F. Dexter, William H. Brooks.

Bremen Garage Company, Bremen, O.; $10,000; Albert E. Godfreyn, Edward A. Hufford, Arthur D. Hufford, Howard D. McCandlish, Milton L. Campfield.

Dallas Automobile Association, Dallas, Tex.; $5000; S. H. Breen, A. V. Lane, P. H. Keene.

Orleans Motor Company, Beaumont, Tex.; $7500; C. L. Smith, J. K. Smith, S. F. McMcConnico.

Eagle Manufacturing Company, Fort Wayne, Ind.; $50,000; automobile plows and machinery; H. F. Schnelker, W. J. Barth, Frederick Krejbaum, F. Green, Charles B. Orff.

Merchants Garage, Indianapolis, Ind.; $15,000; C. S. Shotwell, M. J. McGarr, H. H. Rice, W. A. Atkins, B. D. Christian, C. W. Dicks, C. B. Marshall.

G. B. Sales Corporation, New York City; $5000; Edward E. Reardon, Francis J. O'Grady, Irving C. W. Williams.

Consolidated Garage Company, San Jose, Cal.; $100,000; L. W. Bush and others.

D. & R. Storage Battery Company, Inc., Brooklyn, N. Y.; $100,000; A. F. Lucker, J. E. Reid, R. Drambourgh.

Findeisen & Kropf Manufacturing Company, New York City; $5000; F. Findeisen, O. F. Kropf, Charles A. Reigelman.

Demos Auto Repair & Garage Company, New York City; $3000; Demos Tsaconas, James E. Bradley, Gustave A. Gsell.

College Avenue Garage, Indianapolis, Ind.; $2000; F. H. Rupert, M. Rupert, H. A. Davis.

Murchison Garage & Machine Company, Benson, N. C.; $25,000; Alonzo Parrish and others.

Greensburg Transportation Company, Grensburg, S. C.; $10,000; George Rundle, C. R. Baker, T. D. Baldwin.

Williams Automobile Transmission Company, Nashville, Tenn.; $100,000; P. H. Cain, H. H. Campbell, Thomas L. Herbert, Benjamin S. Williams.

Turin Garage & Supply Company, New York City; $5000; Anna Grabschield, John F. O'Neil, Frank H. Coyne.

WITH THE MANUFACTURERS.

George A. Haws, New York City, founded the oil firm bearing his name in 1875, and since his death in 1888, the business has been conducted as a co-partnership without change of designation. From the first it has specialized in products of Pennsylvania crude, and when automobiles first began to be a factor of any real importance, this firm realized that thin, highly filtered oils of good viscosity would give better results than the very heavy steam cylinder stocks originally used. When Panhard oil first was placed in the market most automobile experts were skeptical, believing that it could not have sufficient body to lubricate. But as one after another was induced to try it, the conversions were speedy and permanent. Recently it was found necessary to erect a new building at 142-144 Front street, and this is the fifth or sixth which the firm has occupied, each succeeding one being larger than it predecessor; the result of the demands of a constantly growing business in the face of ever increasing competition. The latest structure, which is shown in an accompanying illustration, will be used for offices, packing, shipping and storing of stock. It is equipped with an up-to-date system of piping and pumps, which makes for an easier and speedier handling of the oil; can filling machinery and compounding vats. The managing partner of the firm is M. J. Martin, whose special care is for the mill and factory trade in general lubricating oils and greases of all kinds, while the automobile trade is in charge of Henry E. Haws.

The Keeton Motor Company, Detroit, maker of Keeton cars, has started work on the first of a series of additions to its plant. The first structure will be 100 feet in length, 60 feet in width and one story in height, of modern factory construction. It will be used for a testing plant. Others will be located on the present property of the company, while a still larger building than the present plant is contemplated on land lying between the Keeton factory and the Michigan Central railroad tracks.

The United States Tire Company has broken ground in Baum boulevard, Pittsburg, Penn., for a new service station for its solid motor tire department. A two-story and basement brick building will be erected. The company occupied its present building in October, 1911, and since then the business has grown to such volume that the new structure required will be the largest building devoted to the rubber tire trade in Pittsburg.

The Hexter Motor Truck Company of New York, which several months ago was acquired by John N. Willys, president of the Willys-Overland Company, Toledo, O., and several subsidiary concerns, has been legally authorized to change its name to the Willys Service Corporation. The change wil become effective Aug. 11.

The Willard Storage Battery Company, Cleveland, O., maker of Willard storage batteries, has established a new branch office at 438-439 Indiana Pythian building, Indianapolis, Ind.

E. J. Moon, president of the Moon Motor Car Company, St. Louis, Mo., maker of Moon cars, recently visited the principal Moon agencies in the West, his trip lasting five weeks. Among the cities visited were San Francisco, Los Angeles, Seattle, Ogden, Salt Lake City and Denver.

Fred J. Wagner, recently elected vice president of the

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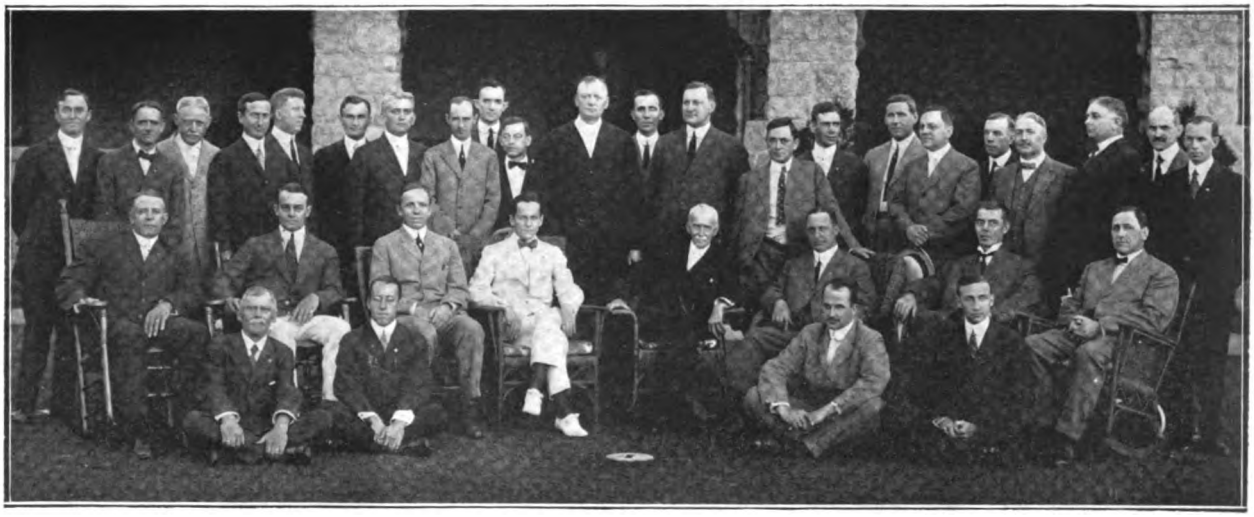
Ajax-Grieb Rubber Company, New York City, maker of Ajax tires, has completely recovered from an operation, following which he entered upon a western trip in the interests of his firm.

J. E. Kirchner has become chief engineer of the Mogul Motor Truck Company, St. Louis, Mo., maker of Mogul trucks. The company recently moved from Chicago and in securing Mr. Kirchner it obtained an automobile engineer of recognized ability.

L. A. Austin, 210 Medbury avenue, Detroit, has resigned as general manager of the Mais Motor Truck Company, Indianapolis, Ind., maker of Mais trucks. Mr. Austin is entertaining several offers, none of which he states he can accept until later in the year.

H. H. Robinson, southern travelling representative of sales department of the Keeton Motor Company, Detroit, recently visited the factory and shipped a Keeton touring car from Detroit to Newport News, Va., from which point he toured the South along the coast of Miami, Fla., visiting all the large cities. Mr. Robinson has covered much of his territory in a Keeton car this year.

The Republic Rubber Company, Youngstown, O., maker of Republic tires, recently held a convention of branch managers, officials and department heads at the factory, during which the present sales situation and future prospects were discussed at length. An accompanying illustration presents the members of the party, which included the following: President T. L. Robinson, Vice President L. T. Peterson, General Sales Manager J. H. Kelly, Superintendent A. H. Harris, Assistant Superintendent W. D. Harris, Secretary C. F. Garrison, Treasurer M. I. Arms, Second Assistant Sales Manager H. W. Bixler, Advertising Manager Web Brown, Purchasing Agent N. W. Sayles, Auditor G. L. Stansbury, Manager O. M. Norby of the credit department, Manager E. N. Frase of the hose department, Manager Thomas Matchett of the belting department, Engineer C. E. Rice, Paymaster W. Dunn, Shipping Clerk W. D. Norris, T. J. Mell, inventor of the Staggard tread, and the following branch representatives: H. K. Wick and John C. Wick, Youngstown, O.; M. E. Murray, San Francisco; C. W. Hardin, New York City; J. W. Maguire, Chicago; W. S. Carleton, Boston; B. C. Swinehart, Philadelphia; J. C. Kearne, Detroit; B. F. Morris, Buffalo; G. A. Sohl, Atlanta; J. Palmer, Chicago; F. G. Hill and H. W. Pratt, New York; F. W. Osmun, Minneapolis; G. M. Hoffman, St. Louis; G. N. Talcott, Cleveland.



Officials, Branch Managers and Department Heads at Recent Convention of the Republic Rubber Company's Factory in Youngstown, O.

GARAGE AND DEALER.

Harry M. Bronner, formerly manager of the Stoddard Dayton Company, and later of the Edwards Motor Car Company, New York City, who has been president of the Automobile Dealers' Association in that city since the first of the year, has resigned from the association on account of his going out of the automobile industry. The vice president, Arthur M. Day, of the Elliott Ranney Company, was elected to fill the vacancy. C. H. Larson of the Cutting-Larson Company, was chosen to the office of vice president. There being a vacancy on the board of directors caused by Mr. Bronner's resignation, R. H. Johnston of the White company was elected to that place.

The Chevrolet Motor Company has located salesrooms at 1651 Broadway, New York, and 1505 Bedford avenue, Brooklyn, N. Y. George H. Connor is in charge of the New York branch and Warren A. Suklon is manager of the Brooklyn office.

Edward Hayes and A. J. Diefenderfer, for a long time connected with the New York branch of the Lozier Motor Company, distributor of Lozier cars, have gone into the used car business. These men, who have been identified with the automobile business for the last 12 years, have opened headquarters at 19 West 62nd street.

John E. O'Neil, Lawrence, Mass., has incorporated his automobile business under the name of John E. O'Neil, Inc., with a capital stock of $1000.

R. F. Ketchum, formerly manager of the Mack Motor Truck Company of Boston, distributor of Mack trucks, made by the International Motor Company, New York City, has been appointed manager of the Boston branch of the R. & L. Company, distributor of Garford trucks, made by the Garford Company, Elyria, O. P. C. Chrysler, the former manager, has returned to the home office at New York City.

The Oakland Motor Company, New York City, has leased the third floor of the Postal Service Company's building, Broadway and 62nd street.

Cook, Williams & Wallace, Lakewood, N. J., is erecting an addition to its garage on Holly street.

The Peerless Motor Car Company, Philadelphia, Penn., has begun construction work on the erection of a new plant near Chestnut street.

The Standard Motor Car Company, Columbus, O., has been formed by H. J. Schwartz and Samuel J. Morris and salesrooms have been opened.

The Humes Auto Company, Tarentum, Penn., contemplates the erection of an addition to its building, which will be used as an office and accessory supply house.

L. R. Speare, formerly president of the American Automobile Association, has disposed of his interest in the W. L. Russell Company, Boston agent for Regal and Haynes cars, and Mr. Russell is now conducting the business alone.

A. C. Weaver, formerly manager of the Lozier Sales Company, Cleveland, O., has become general manager of the company. A. W. Woodruff, formerly manager, has become manager of the Lozier branch at Boston.

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COMING EVENTS.

July.

July 26—Tour, Orangeburg, N. J.
July 26-31—Tour, San Antonio, Tex.
July 27-28—Road races, Tacoma, Wash.
July 29-31—Beach races, Galveston, Tex.
July 29-31—Reliability run, Lincoln, Neb.

August.

Aug. 7—Track races, Amarillo, Tex.
Aug. 9—Track races, Brighton Beach, N. Y.
Aug. 9—Road race, Santa Monica, Cal.
Aug. 10—Track races, Pueblo, Tex.
Aug. 12—Reliability run, Kansas State Automobile Association.
Aug. 15-16—Track races, Denver, Col.
Aug. 18-22—Reliability run. Wisconsin State Automobile Association.
Aug. 25-28—Reliability run, Houston, Tex.
Aug. 29—Chicago Trophy race, Elgin, Ill.
Aug. 30—Elgin Trophy race, Elgin, Ill.
Aug. 30-Sept. 6—Reliability tour, Chicago, Ill.

September.

Sept. 1—Fire chiefs' convention, Madison Square Garden, New York.
Sept. 1—Track races, Columbus, O.
Sept. 8-15—Around Lake Michigan tour, Chicago, Ill.
Sept. 9—Speedway meet, Corona, Cal.
Sept. 12—Track races, Canfield, O.
Sept. 12—Track races, Youngstown, O.
Sept. 13—Track races, Grand Rapids, Mich.
Sept. 13—Track races, Covington, Ky.
Sept. 20-21—Track races, Detroit, Mich.

November.

Nov. 4-5—Road race, El Paso, Tex.-Phoenix, Ariz.
Nov. 4-5—Road race, Los Angeles, Cal.-Phoenix, Ariz.
Nov. 4-5—Road race, San Diego, Cal.-Phoenix, Ariz.
Nov. 6—Track races, Phoenix, Ariz.
Nov. 24—Vanderbilt Cup Race, Savannah, Ga.
Nov. 27—Grand Prize Race, Savannah, Ga.

MILLER'S SPECIAL CATALOGUE.

Supplemental List of New Accessories Carried by the Pioneer Dealer.

Chas. E. Miller, 97-103 Reade street, New York City, pioneer dealer in automobile accessories, supplies and fittings, has issued a special catalogue No. 26, which is in the nature of a supplemental list of new things produced since the annual catalogue was compiled. The motorist who desires to keep abreast of the times in this regard will desire a copy, which may be had free upon request.

Each of the 14 Miller branch stores in New York City, Brooklyn, Buffalo and Albany, N. Y.; Boston and Springfield, Mass.; Hartford, Conn.; Detroit, Mich.; Cleveland, O.; Philadelphia, Penn.; Atlanta, Ga.; New Orleans, La., and Newark, N. J., carries a line as complete, insofar as selection is concerned, as is that of the main store.

The adoption of parcel post policy in its delivery system places the Miller service at the disposal of every motorist in the country, no matter where located.

NATIONAL IN FUEL TEST.

Trials on Three Consecutive Days in Indianapolis Show Average of 16.7 Miles.

A regular stock National car, made by the National Motor Vehicle Company, Indianapolis, Ind., taken from the salesroom of the National company, has been used by the Prest-O-Lite Company at Indianapolis in a series of tests to determine the mileage a gallon of gasoline. A speed of 25 miles an hour was maintained in these tests, which were made by disconnecting the main gasoline line, and attaching direct to the carburetor a special line and testing can, into which a measured gallon of gasoline had been poured.

On one day the National car made 16.9 miles on a gallon, the following day, 16.5 miles, and the third day, 16.7 miles. The slight difference is thought to have been due to wind resistance. This is considered by automobile authorities to be a very creditable showing for a heavy touring car, such as the National, which was used in the test.

AMERICAN CARS ON FOREIGN ROADS.

General Manager Nash States His Impression upon Return from Trip Abroad.

Because American cars are built for American roads and the latter are so much worse than European ways is the reason that automobile exports have shown such a remarkable increase during the 1913 season, according to C. W. Nash, general manager of the Buick Motor Company, Flint, Mich., maker of Buick machines. Mr. Nash has just returned to Flint after spending a month abroad with his family. He visited Queenstown, Cork and Dublin, in Ireland; Hollyhead, Chester, Coventry, Stratford and London, in England; and Paris and surrounding places of interest in France, as well as some of the principal cities in the adjacent countries of Europe.

Mr. Nash states that American cars are built to withstand hard road shocks, while the European roads, which have been in the course of perfection for centuries before America was even discovered, are very smooth. The foreign builders do not make their machines for such hard road work as do American makers, so that a machine made here to stand up for 10,000 miles will run on European roads for 20,000 and even as much as 25,000 miles.

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EXPORTS AND IMPORTS.

Statistics Show Canada and Great Britain as America's Best Customers.

Although the exports of automobiles to Canada in May of this year were not so large as during the same month in 1912, that country continues to be the largest customer of American manufacturers. The British Kingdom is second and a gain is shown over the corresponding period last year. The total exports of motor cars shows a decided gain in foreign business over last year. Following are the detailed figures of imports and exports for the month, just made public by the bureau of foreign and domestic commerce of the Department of Commerce:

Imports.

	1912		1913	
Country	No.	Value	No.	Value
France	41	$95,965	17	$49,515
Germany	5	10,114	8	21,154
Italy	11	17,424	9	23,615
United Kingdom	11	28,324	3	6,300
Other countries	8	13,932	5	13,153
Totals	76	$165,759	42	$113,737

Exports.

France	63	$48,980	108	$72,149
Germany	49	36,719	192	145,799
Italy	30	35,605	5	12,500
United Kingdom	673	465,722	473	354,686
Other Europe	204	155,125	294	236,447
Canada	1109	1,352,856	862	1,255,771
Mexico	8	15,370	6	5,110
West Indies and Bermuda	29	36,237	45	47,591
South America	162	183,292	213	248,707
British Oceania	445	412,565	234	220,372
Asia and other Oceania	152	149,309	282	272,174
Other countries	85	72,038	322	283,883
Totals	3009	$2,963,818	3036	$3,155,189

ANNUAL SHAN KIVE.

Plans Maturing for Motorists' Carnival in the Garden of the Gods.

The Pike's Peak region in Colorado has been the mecca of a larger number of motorists this summer than ever before. It is estimated that over 500 outside machines went to Colorado Springs during the month of June, and nearly half the number took out permits to remain some time.

The Shan Kive, with bands of Ute Indians as the principal feature, is to be held this year Sept. 2-4. A thousand cars carried more than five times that number of people to the Garden of the Gods one day during the festival last fall to see the Utes dance amid the historic rocks. Oklahoma visitors have taken the prize two years in succession for the largest number of outside machines in the Shan Kive parade.

Among the plans this year is the staging of a pageant showing the history of the Pike's Peak region. No more picturesque spot for this can be found than the huge red rocks in the Garden of the Gods. A great camp will be organized, composed of Indians, cowboys, trappers and other representatives of early days. Here will be illustrated aboriginal life, the Spanish invasion, the early trappers, finding of gold and the attendant rush, Indian warfare, the cattle and sheep eras, agricultural progress and modern life.

MIDSUMMER MOTOR SHOW.

Cleveland to See New Fall Models Under Canvass in August.

The new fall models and latest improvements in automobiles will be displayed for the first time in Cleveland, O., at a midsummer motor show to be held the last week in August, simultaneously with the Forest City fair at North Randall. This is an entirely new plan and it is expected to meet with the approval of manufacturers and dealers.

Two of the largest tents in the country have been secured and pleasure cars, commercial vehicles, accessories, motor boats and motorcycles will be exhibited under canvass. Fred H. Caley, who has managed the annual automobile show in Cleveland for some years past, will be in charge.

Forrest M. Keeton, vice president and general manager of the Keeton Motor Company, Detroit, recently completed a run of 725 miles from Detroit to his old home in Southern Ohio and return, the trip being partially for pleasure and partially for experiment. During the long journey the six-cylinder Keeton car consumed 13.75 gallons of gasoline, or an average of 13.7 miles to the gallon. This is considered a remarkable feat for a six-cylinder car as large as the Keeton, which carried seven passengers. With the thermo-syphon system, which was given a thorough test, it was unneccesary at any point on the journey to replace water lost through evaporation or otherwise.

The Two Hundred Club, unique in the ranks of motoring bodies, has been formed by the contest committee of the Chicago Automobile Club. Any motorist who drives 200 miles in 10 hours without a motor stop and conforms to the rules of the test will be eligible to membership. Competition will be open to any motorist in the United States. As soon as 25 have qualified a permanent organization will be effected.

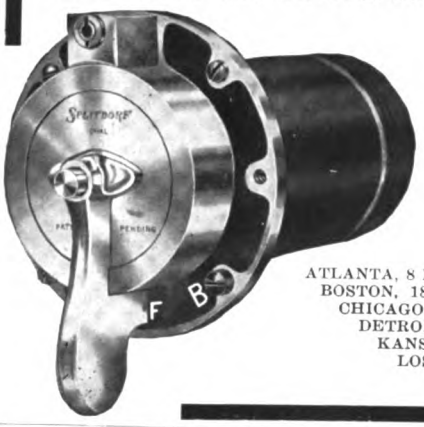
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The SPLITDORF "TS" COIL is new and the best and most effective coil on the market today. You can have your car equipped with this new style SPLITDORF COIL to work in connection with the SPLITDORF MAGNETO on your car.
The "TS" is interchangeable with any type tube or dash coil and can be attached to any car. We will make you a very liberal allowance on your old coil in exchange for one of the new style.

You can also have your entire ignition system exchanged for the latest type SPLITDORF MAGNETO and COIL at an exceptionally attractive price.



"New ignition for old" is our slogan—we intend to install SPLITDORF IGNITION throughout our territory and, to aid us in doing so, we have a SPECIAL EXCHANGE PROPOSITION of great interest to every owner of a gasoline motor. Write TODAY for particulars.

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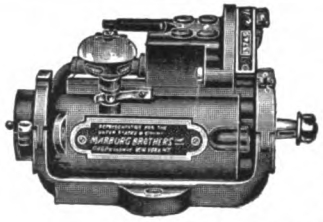
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BOSTON, 180-182 Mass. Ave.
CHICAGO, 64-72 E. 14th St.
DETROIT, 972 Woodward Ave.
KANSAS CITY, 1823 Grand Ave.
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NEWARK, 290 Halsey St.
NEW YORK, 18-20 West 63rd St.
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WORN OUT TIRES RENEWED AND Guaranteed for 3000 Miles BY THE INVINCIBLE PROCESS

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40 Gallons Less

New York to Albany Race

With a Planhard

June 30, 1913.

Planhard Mfg. Co.—My engine on Excelsior is a home-made 2 cycle 3 cylinder 4¼x5 inch. The very best I ever did with the S———— carburetor was 580 R. P. M., and I am now making 625 under the same conditions with a Planhard. Two years ago in the New York to Albany race I used **105 gallons** of gasoline in 27 hours 57 minutes. This year I only used a trifle over **65 gallons.** I had to sell surplus gasoline at Edgewater for 18 cents that I paid 22 for in Albany, as I had no place to store it, so you see how it worked.

The race just completed was splendid, and I should have done better time had I followed the New York M. B. C. courses better, but I disobeyed its instructions and ran on a mud flat above Coxsackie. Coming back my timer broke when I was off Fishkill Landing and I limped home, making wooden plugs as fast as they wore away. However, with all delays the Planhard enabled me to beat my previous record **1 hour 45 minutes.** Thomas Trolsen.

Best Croxton Could Find

The Planhard Mfg. Co. May 20, 1913.

Gentlemen—We have decided to adopt the Planhard as "Croxton" carburetor equipment because we find it excels all others in economy, power, speed and most important of all in a pleasure car—flexibility. * * *

We determined to make the "Croxton" superior to any automobile in its class in every way, and only the best accessory of its kind, regardless of price enters into its makeup.

Realizing the importance of the carburetor as the most vital single factor in the operation of a car—especially now with the low and variable grades of gasoline commercially available, we determined that the "Croxton" should be the most modern, dependable and faultless, in this all important respect.

With this end in view, we laid out a series of heart-breaking tests for carburetors that would leave no doubt whatever as to the results of our decision. Your carburetor left all others at the post. * * *

We congratulate you on your possession, and wish you every success.

Very truly yours, THE CROXTON MOTOR CAR CO.,
J. P. Stoltz, President.

25 Miles to Gallon on Ford

North Fairfield, O., May 16, 1913.

Gentlemen—After taking the old carburetor off my Ford car and putting on a Planhard, I increased my mileage from **18 to 25 miles per gallon,** and my engine, which was a notorious heater, runs as cool as desirable for the best results. I am using 60 to 62 gasoline, and as I have a hydromoter, I know what I am talking about. A. W. Grandon.



Eisner-Lenk Co.

1074 Boylston St.
Boston, Mass.

Want Dealers in New England Cities to Handle Planhards

Planhard

The Ultimate Carburetor

Other Distributers

Southern N. J. & Eastern Penn., Gustave Muller, Jr., Bourse Bldg., Philadelphia.
Hermann Engineering Company, Equitable Building, Detroit, Mich.
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J. G. Davis, 1224 Music St., New Orleans, La.

Planhard Mfg. Co., 1790 Broadway, N. Y.

Gentlemen:—Send at once your chart and book concerning Planhard Carburetor.

Name .....St.....
City .....State.....
Engine .....Carburetor....Size....in.

Threaded? Flanged? Horizontal? Vertical?

Pat. Europe. Pat. America



Showing M&M Attached with ½" Elbow.

Try the M&M Economizer For Speed, Power and Economy

HOW ABOUT THIS LETTER!

Lewistown, Pa., July 23, 1913.

Moller Bros., Philadelphia, Pa.

Gentlemen:—This is to advise you that the two M&M Economizers which I placed on my trucks, have met with my expectations, and I find them to do everything which you claim for them. They make a decided difference in the cars as to power, and economy on gasoline.

Yours very truly. ROBERT B. MONTGOMERY.

WHAT COULD BE MORE CONVINCING THAN THE ABOVE LETTER! ALSO, the M&M is guaranteed to do just what we claim, and if it proves unsatisfactory within thirty days, YOUR MONEY WILL BE REFUNDED. (Reference—Citizens National Bank, Lewistown, Pa.)

The M&M is guaranteed to save from 40 to 50% of gasoline, and increase the speed and power 20% with less gasoline, and less carbon. It is the only known carburetor adjuster on the market, and RANKS FIRST AS A CARBON ELIMINATOR. For priming the motor, you cannot find its equal. PLEASE BEAR IN MIND—THERE IS NO SCREEN, or any other obstacle placed in the manifold, as this will have a tendency to CLOG THE MANIFOLD, and make it more difficult for the motor to absorb the gas and air.

PRICE OF THE M&M—$3.50 and 17c extra for postage. We include either friction foot pedal, or steering post control, which consists of flexible shaft and wire. Requires ¾" pipe tap, which can be reduced to ½" by means of an elbow or a common reducer.

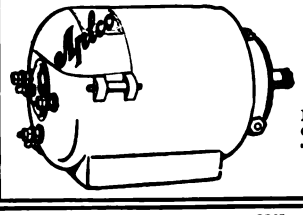
PRICE OF THE MOTORCYCLE SIZE—$1.25 Prepaid. Size ¼".

THE M&M ECONOMIZER IS "THE PATENTED ONE." Warning to users, makers and dealers, PATENT NO. 922,528—May 25, 1909.

WRITE US FOR FURTHER INFORMATION AND CATALOG.

Moller Brothers Controller & Economizer Company, Dept. A

Main Office and Factory, Lewistown, Pa.



Bring your car up-to-date with the

APLCO ELECTRIC LIGHTING SYSTEM

It can be done quickly and at little expense. Write us.

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The "Black Eagle" Spark Plug

PATENTED



50 Cents Is Enough

The "Black Eagle" Spark Plug has made good because it was designed and manufactured with this result in view.

A person in close touch with the supply and manufacturing ends of the trade was a visitor at our factory recently, and was shown the details of construction, including the machinery, testing, and assembling of the "BLACK EAGLE" Spark Plug. What he said we believe will be of interest to you, as it indicates the effort on our part to supply a high grade plug at a reasonable price. We therefore quote below his impressions.

"I am simply amazed at the workmanship, material, and construction of the 'BLACK EAGLE' Spark Plug. When I saw this plug advertised at a price of 50c to the consumer, I naturally supposed it was a cheap, common, plug such as you occasionally find in jobbing houses on the bargain counter. I am convinced, after seeing these plugs tested, and examining minutely the machine parts which enter into their construction, that **no better porcelain spark plug is offered by any one, regardless of the price they ask.**"

We are not **influenced** by what our competitors **charge for spark plugs!** We have **ignored price precedent,** for the reason that a **high grade spark plug** can be manufactured and sold at **50c each, and that is enough.**

Sent prepaid on receipt of price. Made in all standard threads.

THE STANDARD CO. **Torrington, Conn., U. S. A.**

MIGHTY MICHIGAN "40"

40-Horsepower Touring Car or Roadster, absolutely silent in operation. Oversize tires 35x4 1-2---cylinders 4 1-4x5 1-4 in.---118-in. wheel base---four-forward-speed transmission ---demountable rims---nickel mountings ---massive, straight-line body---big, roomy seats---electric lighting by generator---everything. Price $1555, includes full equipment. We also make a 33 H. P. model. Catalog on request.



(163) MICHIGAN MOTOR CAR CO., 185 Lay Blvd., Kalamazoo, Mich.

National

STOCK CHAMPION

FIVE MODELS - - $2750 to $3400

Electric Starter Electric Lights

National Motor Vehicle Co., Indianapolis

DON'T let rim rust destroy your tires; Paint them twice a season with

THOMAS' ANTI RIM RUST PAINT

One dollar a can at your dealers, or write us

The Anti-Rust Paint Co., Dept. 7, Akron, Ohio

How Largest Profits Are Made

We have some interesting facts in connection with increasing your car sales and *profits.*

Through merchandising strategy we have remedied these flaws. May we tell you about these things and about our kerosene-burning car, equipped with wire wheels, cowl dash, cowl gasoline tank? Left drive, center seat control, the most salable car offered today. *Write or wire for the facts.*

Henderson Motor Car Co., Indianapolis, Ind. 50

GYROSCOPE PRINCIPLE

The New Jones Speedometer Unaffected by Heat or Cold

Any motor car maker will equip with it if you state plainly you want nothing else, no matter what speedometer he may list in his catalog as equipment.

Write us for facts, test and experiments that show Jones supremacy beyond question.

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Subscribe to The Motor Truck

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KING MOTOR CARS

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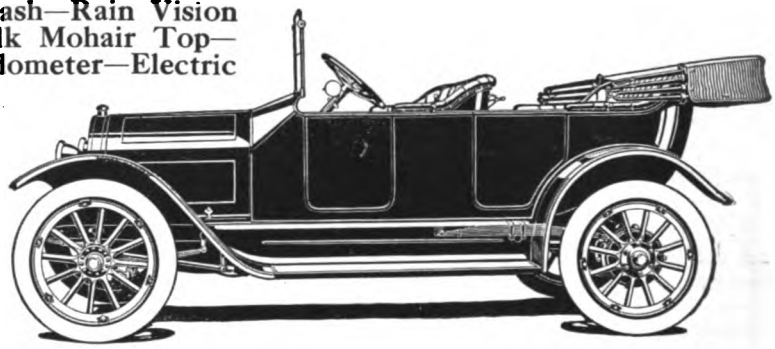
Because we are financially able to *wait* for profits, we are putting a quality in the *KING* which no other car can offer at the price. As our production increases our profits will come, but in the meantime you can possibly be the first in your field to secure a *KING* agency, and reap the "repeat" sales which every *KING* sold will inevitably make. Write or wire *today*.

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"Expensive Car" Features and Service for **$1095** *Complete.*

Handsome and Sturdy, They Daily Question the "Big Fellow's" Price.

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KING MOTOR CAR COMPANY 1300-1324 Jefferson Ave., DETROIT, MICH.

New York Agency and Showroom, Broadway at Fifty-Third Street. Write for Folder.

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The Thoroughbred Car.

Electric self-cranking, electrically lighted.
Four Forward Speeds.

"Six Thirty-Six" Touring Car and Roadster - $1850
Model 30 Touring Car - $1350
Model 30 Roadster - $1250

Live wire dealers, write for unallotted territory.

HERRESHOFF MOTOR COMPANY, Detroit, Mich.

KISSEL KAR Every Inch a Car

made complete in one factory, under a system of inspection that obtains a perfection of detail surpassed in no other car. Investigate.

KISSEL MOTOR CAR CO., 174 Kissel Ave. HARTFORD, WIS.

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Mechanically correct—easy to operate—perfect in material and workmanship. Used as standard equipment on the better cars.

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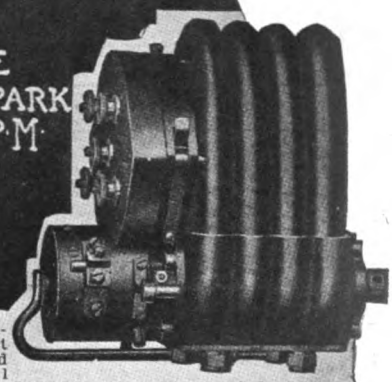
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Measured by Mileage, the Cheapest Shoes Ever Made. Clincher and Quick Detachable, Plain and Break-Skid Treads, Regular and Metric Sizes, for All Standard Rims.

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HECO MAGNETOS are the product of experts specialized in the electrical business. They embody all that the electrical industry knows about magnetos.

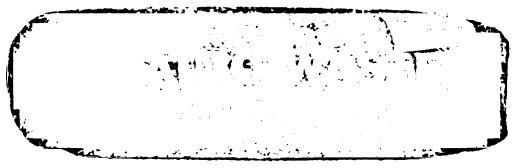
By our special method of winding the secondaries we are able to positively guarantee them against burning out or breaking down.

HECO MAGNETOS supply a spark of equal intensity for any number of revolutions per minute.

We also make the well-known HECO COILS, and HECO COMBINATION PRIMERS and SPARK PLUGS. Let us send you our complete catalog.

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Factories and Gen'l Office, Lowell, Mass.
Sales Office, Detroit, Mich.

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A Convenient and Attractive
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AUTOMOBILE AND MOTOR-BOAT USE

In rolls, opening on end, packed with 12 convenient handfuls, each one of which can be taken out without spoiling the rest of the package

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FOR THE GARAGE
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ASK YOUR SUPPLY HOUSE FOR THESE GOODS
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OILS

Increase Power and Efficiency.
Reduce Repairs and Expense.

HARRIS OILS are pure oils. They are free from carbonizing ingredients.

28 years experience—care in manufacture—the finest Pennsylvania Crude as a base—all combine to make HARRIS OILS "America's Leading Lubricants."



"A Little Goes a Long Way and Every Drop Counts"

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Room with bath, $2.00 up

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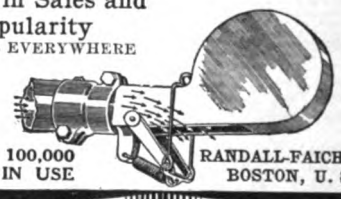
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Pyrene FIRE EXTINGUISHER

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Pyrene is a constant safeguard against fire.

Pyrene is small and compact and may be carried on the dashboard of your car.

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176 Federal Street, Boston, Mass.

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Classified Buyers' Guide

A Handy Reference for Purchasers

ACCESSORY MANUFACTURERS AND JOBBERS.

Auto Parts Co., Providence, R. I.
Hopewell Brothers, Newton, Mass.
Branch: 1974 Broadway at 67th St., New York.
Johns-Manville Co., H. W., Madison Ave. and 41st St., New York City.
Miller, Chas. E., 97-103 Reade St., New York.
Branches: 202-204 Columbus Ave., Boston; Bridge and Dwight streets, Springfield, Mass.; 274 Trumbull St., Hartford, Conn.; 924 Eighth Ave., and 2782 Broadway, New York; 1421 Bedford Ave., Brooklyn, N. Y.; 318 North Broad St., Philadelphia; 824 Main St., Buffalo, N. Y.; 1829 Euclid Ave., Cleveland; 227 Jefferson St., Detroit; 259 Peachtree St., Atlanta, Ga.; 601-603 Baronne St., New Orleans, La.; 135 Central Ave., Albany, N. Y.; 274 Halsey St., Newark, N. J.
Milwaukee Auto Specialty Co., 128 Second St., Milwaukee, Wis.
Shaler Co., C. A., Waupun, Wis.
Waite Auto Supply Co., 81 Exchange place, Providence.

ACETYLENE TANKS. (See Tanks.)

ADJUSTERS.

Vansickle, John A., Indianapolis. (Ford Ideal Ball and Socket Joint.)

AIR COMPRESSORS AND TANKS.

Williams Foundry & Machine Co., Akron, O.

AUTO LOCKS. (See Locks.)

AUTOMOBILES. (See Cars.)

AUTOMOBILE SPECIALTIES.

Sumner, George, Inc., 1926 Broadway, New York.

BALLS AND BALL BEARINGS.

Boyd, F. Shirley, 903 Boylston St., Boston. (R. I. V.)
Brets Co., J. S., 250 W. 54th St., New York. (F. & S.)
Marburg Bros., Inc., 1790 Broadway, New York. (S. R. O.)
New Departure Mfg. Co., Bristol, Conn. (New Departure.)
R. I. V. Co., 1771 Broadway, New York. (R. I. V.)

BATTERIES.

Electric Storage Battery Co., Philadelphia. (Exide.)
Geissler Bros. Storage Battery Co., 514 W. 57th St., New York.
Johns-Manville Co., H. W., Madison Ave. and 41st St., New York City. (J-M.)
Waite Auto Supply Co., 81 Exchange place, Providence. (Success.)
Willard Storage Battery Co., 5716 Euclid Ave., Cleveland. (LBA Lighting and Starting.)
Branches: 136 West 52nd St., New York; 1191 Woodward Ave., Detroit; 2241 Michigan Ave., Chicago; 243 Monadnock Bldg., San Francisco.

BATTERY EXTINGUISHERS.

Johns-Manville Co., H. W., Madison Ave. and 41st St., New York City.

BLOW-OUT PATCHES. (See Patches.)

BODIES, TRUCK.

Motor Truck Body Co., 320 Franklin St., Detroit.

BODIES—WOOD AND METAL.

Springfield Metal Body Co., 20 Medford Ave., Springfield, Mass.

(Continued on Next Page.)

Burn-Boston Battery



Occupies same space as dry cell and used the same way.

Has Cut Down Battery Cost For Owners The Country Over and Will Do the Same For You.

Read what the manufacturers of the Klaxon horn say—remember that the success of their own product depends on the efficiency of the battery:

"We are accustomed to recommend—— storage battery and *your liquid cell.*"
The reason is that while (we quote them again) "the ordinary dry cell lasts four to six weeks for ordinary touring purposes before the voltage runs too low"—Burn-Bostons on two test runs conducted by the Klaxon people sounded 35,980 and 50,000 calls respectively on six cells 36,000 is is equivalent to fifty calls per day for two years.

After testing Burn-Boston Batteries the U. S. Government found they set a totally new mark for efficiency and *future specifications were raised accordingly!*

The Boston agent of a well known car thus concludes a report of his experience with six Burn-Bostons on his 4 cylinder demonstrator without other ignition. (Atwater-Kent coil):—

"This makes a total distance to date of approximately 14,000 miles, distributed through a period of more than one year and two months, without attention to batteries and yet running strong."

On May 31st last we renewed a set of Burn-Bostons which had been in continuous use on Klaxon and Gauge Light since April, 1909.

Ask your dealer for Burn-Bostons. If he should not have them, send us his name and we will see that you are supplied.

Burn-Boston Battery

19 Doane Street, Boston, Mass.

Write today for booklet, "Service Performances," which further tells the story of economy and efficiency.

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STARTS—LIGHTS—IGNITES
SILENT—SIMPLIFIED—STURDY

Apparatus furnished in any combination, but the starting and lighting system is sold only to manufacturers.

Why bother with ignition troubles? Write for our magneto exchange proposition. Put new life into your old car.

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ANDERSON, INDIANA
Branches and Service Stations Everywhere.

Jackson
No Hill Too Steep
No Sand Too Deep

OLYMPIC - 4 cylinders - $1500
MAJESTIC - 4 cylinders - $1975
SULTANIC - 6 cylinders - $2500

JACKSON AUTOMOBILE CO., 1203 East Main St. Jackson, Mich.

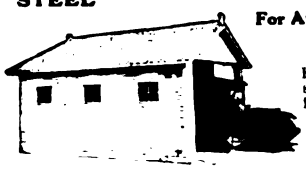
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THE HIGHWAY KING

MODEL 77
6 Cylinders, 4 1-2x7 - - - - $6,000
MODEL 66
6 Cylinders, 4 1-2x5 1-2 - - - - $5,000
MODEL 55
6 Cylinders, 4x5 - - - - - - $4,000
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AUSTIN AUTOMOBILE CO.
Grand Rapids, Mich.

AUTOMOBILE TURNTABLES

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ARE GOOD TIRES

(BUYERS' GUIDE—Continued.)

BRAKE BANDING OR LINING.

Johns-Manville Co., H. W., Madison Ave. and 41st St., New York City. (J-M Non-Burn.)
Royal Equipment Co., The, 422 Housatonic Ave., Bridgeport, Conn. (Raybestos.)
Standard Woven Fabric Co., Worcester, Mass. (Multibestos.)
Branches: 903 Boylston St., Boston; 276 Canal St., New York; 720 Main St., Buffalo; 422 River St., Troy, N. Y.; 1427 Vine St., Philadelphia; 1430 Michigan Blvd., Chicago; 1598 Woodward Ave., Detroit; St. Louis; San Francisco.

BRAKES.

Royal Equipment Co., The, 422 Housatonic Ave., Bridgeport, Conn. (Duplex.)

BRUSHES, WIRE.

Williams Foundry & Machine Co., Akron, O.

BUMPERS AND FENDERS.

Sager Co., J. H., 271 South Ave., Rochester, N. Y. (Diamond.)

CABLES. (See Wires.)

CARBURETORS.

Planhard Mfg. Co., 1790 Broadway, New York. (Planhard.)
Sumner, George, Inc., 1926 Broadway, New York. (S. U.)

CARS—ELECTRIC PLEASURE.

Anderson Electric Car Co., 458 Clay Ave., Detroit. (Detroit Electric.)
Baker Motor Vehicle Co., Cleveland. (Baker.)

CARS—GASOLINE PLEASURE.

Abbott Motor Co., 141 Waterloo St., Detroit. (Abbott-Detroit.)
Austin Automobile Co., Grand Rapids, Mich. (Austin.)
Cartercar Co., Pontiac, Mich. (Cartercar.)
Cole Motor Car Co., Indianapolis, Ind. (Cole.)
Empire Automobile Co., Indianapolis, Ind. (Empire, Little Aristocrat.)
Haynes Automobile Co., 166 Main St., Kokomo, Ind. (Haynes.)
Henderson Motor Car Co., Indianapolis. (Henderson.)
Herreshoff Motor Co., 620 Harper Ave., Detroit. (Herreshoff.)
Jackson Automobile Co., 1400 Main St., Jackson, Mich. (Jackson.)
Keeton Motor Car Co., Detroit (Keeton.)
Kissel Motor Car Co., 174 Kissel Ave., Hartford, Wis. (KisselKar.)
Knox Automobile Co., Springfield, Mass. (Knox.)
K-R-I-T Motor Car Co., Detroit. (K-R-I-T.)
Mercer Automobile Co., 1100 Whitehead Road, Trenton, N. J. (Mercer.)
Michigan Motor Car Co., 147 Lay St., Kalamazoo, Mich. (Michigan.)
National Motor Vehicle Co., 1033 22d St., Indianapolis. (National.)
Nordyke & Marmon Co., Indianapolis. (Marmon.)
Owen & Co., R. M., 19 W. 62d St., New York City. (Reo.)
Paige-Detroit Motor Car Co., Detroit. (Paige.)
Pierce-Arrow Motor Car Co., Buffalo, N. Y. (Pierce-Arrow.)
Reo Motor Car Co., Lansing, Mich. (Reo.)
Speedwell Motor Car Co., 80 Essex Ave., Dayton, O. (Speedwell.)
Studebaker Corporation, Detroit. (Studebaker.)
Stutz Motor Car Co., Indianapolis. (Stutz.)
White Co., The, 828 E. 79th St., Cleveland. (White.)
Branches: 320 Newbury St., Boston; Broadway and 62nd St., New York; 629-633 North Broad St., Philadelphia; 138-148 Beatty St., Pittsburg, Penn.; 610

(Continued on Next Page.)

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(BUYERS' GUIDE—Continued.)

S. Michigan Ave., Chicago; Market St. and Van Ness Ave., San Francisco; 120-122 Marietta St., Atlanta, Ga.; 74 Victoria St., Toronto, Can.
Willys-Overland Co., Toledo, O. (Overland.)

CARS—STEAM PLEASURE.

White Co., The, 828 E. 79th St., Cleveland. (White.)
Branches: See Cars—Gasoline Pleasure.

CARS—GASOLINE COMMERCIAL.

Adams Bros. Co., Findlay, O. (Adams.)
Available Truck Co., 2334 Hamilton Ct., Chicago. (Available.)
Bessemer Motor Truck Co., Grove City, Penn. (Bessemer.)
Blair Mfg. Co., Newark, O. (Blair.)
Brown Commercial Car Co., Peru, Ind. (Brown.)
Cartercar Co., Pontiac, Mich. (Cartercar.)
Clark, E. S., 242 Freeport St., Dorchester District, Boston. (Clark.)
Driggs-Seabury Ordnance Corp., Sharon, Penn. (Vulcan.)
Federal Motor Truck Co., Junction and Leavitt Sts., Detroit. (Federal.)
Garford Co., Elyria, O. (Garford.)
General Motors Truck Co., 26 Cadillac Ave., Pontiac, Mich. (G. M. C.)
Branches: New York, Chicago, Boston, Philadelphia, Kansas City.
Gramm-Bernstein Co., Lima, O. (B. A. Gramm's.)
Knox Automobile Co., Springfield, Mass. (Knox.)
Mais Motor Truck Co., Indianapolis. (Mais.)
Owen & Co., R. M., 19 W. 62d St., New York City. (Reo.)
Pierce-Arrow Motor Car Co., Buffalo, N. Y. (Pierce-Arrow.)
Reo Motor Car Co., Lansing, Mich. (Reo.)
Sullivan Motor Car Co., 611 East Ave., Rochester, N. Y. (Sullivan.)
Willys-Overland Co., Toledo, O. (Overland.)

CARS—ELECTRIC COMMERCIAL.

Anderson Electric Car Co., 458 Clay Ave., Detroit. (Detroit Electric.)
Atlantic Vehicle Co., Factory, Newark, N. J.; 1600 Broadway, New York City; 10 Postoffice Sq., Boston. (Atlantic.)
Baker Motor Vehicle Co., Cleveland. (Baker.)
Couple-Gear Freight-Wheel Co., 575 Buchanan St., Grand Rapids, Mich. (Couple-Gear.)
Branches: 30th floor, Singer Bldg., New York; 178 Devonshire St., Boston.
General Motors Truck Co., 26 Cadillac Ave., Pontiac, Mich. (G. M. C.)
Branches: See Cars—Gasoline Commercial.
General Vehicle Co., Long Island City, N. Y. (G. V.)

CARS—FIRE, POLICE AND MUNICIPAL SERVICE.

Cartercar Co., Pontiac, Mich. (Cartercar.)
Couple-Gear Freight-Wheel Co., 575 Buchanan St., Grand Rapids, Mich. (Couple-Gear.)
Branches: See Cars—Electric Commercial.
Knox Automobile Co., Springfield, Mass. (Knox.)
White Co., The, 828 E. 79th St., Cleveland. (White.)
Branches: See Cars—Gasoline Pleasure.
Willys-Overland Co., Toledo, O. (Overland.)

CATALOGUE SYSTEMS.

Catalogue Systems Co., Fisher Bldg., Chicago, Ill.

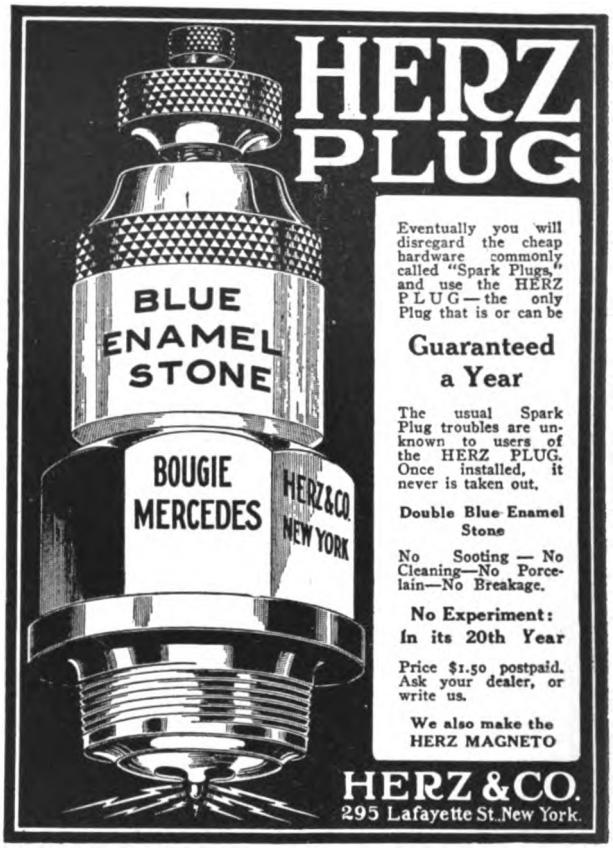
CEMENTS.

Johns-Manville Co., H. W., Madison Ave. and 41st St., New York City.

CHAINS, TIRE, AND ANTI-SKIDDING DEVICES.

Weed Chain Tire Grip Co., 28 Moore St., New York. (Weed.)

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J. M. Shock Absorber

Its efficiency is proved by scientific facts---not mere claims. Write for Ovington Data D. to 210 S. 17th Street, Philadelphia.

Branches in Boston, Hartford, Providence, and all leading cities

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Final and crowning achievement of R. E. Olds, pioneer designer of autos. A standard size 30 to 35 Horsepower four cylinder car of modern refinements priced at only $1,095.

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They Take The "Sting" Out of Rough Roads.
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Don't Wait for a "Smash-up" to Buy Protection.
DO IT NOW.

PRICES $6.00 to $27.50. Liberal Discounts.

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Protection



Used Almost Exclusively On High Grade Cars.

Channel



Rochester



Clamped on Bumpers of Distinction. 30 Models. Attached in 10 Minutes
FORD SPECIAL, CLAMPED ON, $10.

J. H. SAGER CO.
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Trade Mark
ELECTRICAL APPARATUS OF QUALITY
Tuto, Rexo and Tally-Ho Horns
Speedometers, Ignition, Starting and Lighting Systems
THE DEAN ELECTRIC COMPANY 506 Olive St., ELYRIA, O.

PAIGE "36"—$1275
"25"—$ 950

Leaders of popular-priced cars—thoroughly built, completely equipped, backed by a strong organization. Specifications and catalog on request.

PAIGE-DETROIT MOTOR CAR CO.
306 21st Street, Detroit, Michigan

(BUYERS' GUIDE—Continued.)

CHAINS—TRANSMISSION OR DRIVING.

Boyd, F. Shirley, 903 Boylston St., Boston. (Baldwin.)
Miller, Chas. E., 97-103 Reade St., New York. (Brampton.)
Branches: See Accessory Manufacturers and Jobbers.)

CLOCKS FOR DASHBOARDS, ETC.

Boston Clock Co., 16 State St., Boston.
Chelsea Clock Co., 16 State St., Boston.

CLUTCHES—AUTOMOBILE FRICTION.

Bretz Co., J. S., 250 W. 54th St., New York. (Hartford Cone.)

COILS.

Heinze Electric Co., Lowell, Mass.

CONTROLLERS AND ECONOMIZERS.

Moller Brothers Controller & Economizer Co., 700 Betz Bldg., Philadelphia. (M&M.)

CYLINDER CLEANING COMPOUND.

Milwaukee Auto Specialty Co., 128 Second St., Milwaukee.
Prest-O-Lite Company, 271 East South St., Indianapolis. (Prest-O-Carbon Remover.)
Branches: Atlanta, Baltimore, Boston, Buffalo, Chicago, Cincinnati, Cleveland, Dallas, Denver, Detroit, Indianapolis, Jacksonville, Kansas City, Los Angeles, Milwaukee, Minneapolis, New York, Omaha, Philadelphia, Pittsburg, Providence, San Francisco, Seattle, St. Louis and St. Paul.

FIRE EXTINGUISHERS.

Pyrene Co. of New England, 176 Federal St., Boston. (Pyrene.)

FUNNELS, AUTO.

Dover Stamping & Manufacturing Co., Cambridge, Mass. (Dover.)

GASKETS.

Brown Co., Inc., Chas. D., 49 Federal St., Boston. (Vellumoid.)

GAUGES.

National Motor Supply Co., 1911 Euclid Ave., Cleveland. (Tire Pressure and Gasoline Tank.)
Branches: In all principal cities.

GEARS, STEERING.

Ross Gear & Tool Co., 794 Heath St., Lafayette, Ind. (Ross.)

GUNS, GREASE. (See Oil Pumps.)

HEADLIGHTS.

Sumner, George, Inc., 1926 Broadway, New York City. (Diva.)

HORNS.

Dean Electric Co., Elyria, O. (Tuto.)
Randall-Faichney Co., Boston. (Jericho, Jubilee.)
Branch: 918 Eighth Ave., New York.

HOUSES, PORTABLE STEEL.

Kolb Sales Co., 1790 Broadway, New York. (Ruby.)

(Continued on Next Page.)

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(BUYERS' GUIDE—Continued.)

INSULATION.

Johns-Manville Co., H. W., Madison Ave. and 41st St., New York City.

LAMP COVERS.

Hopewell Brothers, Newton, Mass. (Hopewell.)
Branch: 1974 Broadway, New York.

LICENSE NUMBER BRACKETS.

National Motor Supply Co., 1911 Euclid Ave., Cleveland, O.
Branches: In all principal cities.

LIGHTING SYSTEMS, ELECTRIC.

Apple Electric Co., Dayton, O. (Aplco.)
Dean Electric Co., Elyria, O. (Dynalux.)
Remy Electric Co., Anderson, Ind. (Remy.)

LOCKS, AUTOMOBILE.

Bracelet Auto Lock Co., 32 No. Clark St., Chicago.

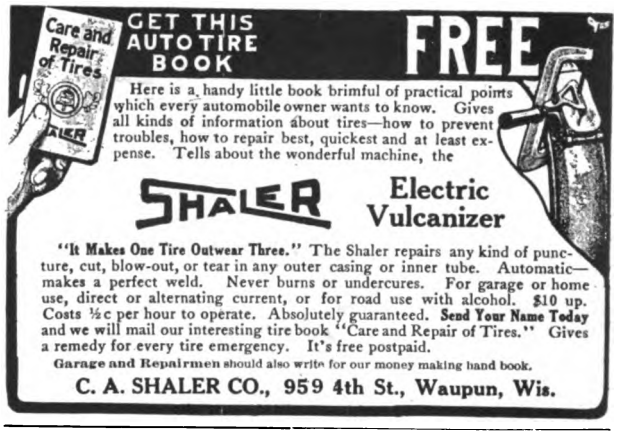
LUBRICANTS.

Borne, Scrymser Co., 80 South St., New York. (Colonial.)
Branches: Boston, Fall River, Philadelphia.
Dixon Crucible Co., Jos., Jersey City, N. J. (Graphite.)
Eagle Oil & Supply Co., 104 Broad St., Boston. (Eagleine No-Karbon.)
Harris Oil Co., A. W., 326 South Water St., Providence. (Harris.)
Branch: 143 No. Wabash Ave., Chicago.
Haws, Geo. A., 142-144 Front St., New York. (Panhard.)
Branch: 899 Boylston St., Boston.
Indian Refining Co., 17 Battery Place, New York. (Distributors of Havoline Oil.)
Branches: Pacific Coast—Kohl Bldg., San Francisco; Western—People's Gas Building, Chicago; Southern—Title Guarantee & Trust Bldg., Birmingham, Ala.; First National Bank Bldg., Cincinnati, O.; Lynchburg, Va.; St. Paul.
Refineries: Georgetown, Ky.; Lawrenceville, Ill.
Invader Oil Co., 80 Broad St., New York. (Invader.)
Branches: 284 Columbus Ave., Boston; 113 Arch St., Philadelphia; 3556 11th St., N. W., Washington, D. C.
Miller, Chas. E., 97-103 Reade St., New York. (Pan-American.)
Branches: See Accessory Manufacturers.
New York & New Jersey Lubricant Co., 165 Broadway, New York. (MoToRol, Non-Fluid, Kejex.)
Standard Oil Co., New York. (Polarine.)
Branches: In all cities.
Texas Company, The, 7 West St., New York.
Branches: Boston, Philadelphia, Chicago, St. Louis, Norfolk, Atlanta, New Orleans, Dallas, El Paso, Pueblo, Tulsa, Houston.
Vacuum Oil Co., Rochester, N. Y. (Mobiloil.)
Branches: 49 Federal St., Boston; 29 Broadway, New York; Fourth and Chestnut Sts., Philadelphia; 154 Exchange St., Bangor, Me.; 406 Hitchcock Bldg., Springfield, Mass.; 117 Commercial St., Portland, Me.; Fisher Bldg., Chicago; Ford Bldg., Detroit; Indiana Pythian Bldg., Indianapolis.
Valvoline Oil Co., 27 State St., Boston. (Valvoline.)

MAGNETOS AND SUPPLIES.

Bosch Magneto Co., 223-225 W. 46th St., New York.
Branches: 119-121 E. 24th St., Chicago; 1250 Woodward Ave., Detroit; 357 Van Ness Ave., San Francisco.
Bretz Co., J. S., 250 W. 54th St., New York. (U. & H.)
Heinze Electric Co., Lowell, Mass. (Heco.)
Marburg Bros., 1790 Broadway, New York. (Mea.)
Remy Electric Co., Anderson, Ind. (Remy.)
Splitdorf Electrical Co., 98 Warren St., Newark, N. J.
Branches: 10-20 W. 63rd St., New York; 1110 S. Michigan Ave., Chicago; 180-182 Massachusetts Ave., Boston; 1028 Geary St., San Francisco; 972

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Woodward Ave., Detroit; 1228 S. Olive St., Los Angeles, Cal.; S. W. Corner Cherry and Juniper Sts., Philadelphia; 1823 Grand Ave., Kansas City; 1628 Broadway, Seattle, Wash.; London, Eng.; Buenos Aires.

MEASURES.

Dover Stamping & Manufacturing Co., Cambridge, Mass. (Auto and Savol.)

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Royal Equipment Co., 422 Housatonic Ave., Bridgeport, Conn. (Gyrex.)

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American F. N. Co., Boston. (F. N.)
Branches: 49 Union St., Providence; 415 Trumbull St., Hartford, Conn.
Miami Cycle & Manufacturing Co., 320 Hanover St., Middletown, O. (Flying Merkel.)

MOTORING ORGANIZATIONS.

Federation American Motorcyclists, E. M. Estabrook, Bangor, Me.

MOTORS AND POWER PLANTS.

Continental Motor Mfg. Co., Detroit. (Continental.)
Rutenber Motor Co., Marion, Ind. (Rutenber.)

MOTOR STARTERS.

Apple Electric Co., Dayton, O. (Apple.)
Remy Electric Co., Anderson, Ind. (Remy.)

PACKING, FIRE.

Johns-Manville Co., H. W., Madison Ave. and 41st St., New York City.

PAINT, ANTI-RUST.

Anti-Rust Paint Co., Dept. 7, Akron, O. (Thomas.)

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Invincible Puncture Proof Tire Co., 53 Sabin St., Providence. (Invincible.)
National Motor Supply Co., 1911 Euclid Ave., Cleveland.

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International Metal Polish Co., Quill St. and Belt R. R., Indianapolis, Ind. (Blue Ribbon.)
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Randall-Faichney Co., Boston. (B-Line.)
Branches: See Horns.

PUMPS, TIRE.

Brown Co., Syracuse, N. Y. (Brown Impulse.)
Dewey-Anderson Co., Toledo, O. (Dewey Power.)

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Johns-Manville Co., H. W., Madison Ave. and 41st St., New York City.

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Boyd, F. Shirley, 903 Boylston St., Boston. (Dorian.)
Firestone Tire & Rubber Co., Akron, O.
Branches: In all principal cities.
Standard Welding Co., Cleveland. (Stanweld.)
United States Tire Co., Broadway and 58th St., New York. (Continental and Whittlesey Demountable.)
Branches: New York, Chicago, San Francisco.

ROAD BUILDING MATERIALS.

Barrett Manufacturing Co., New York. (Tarvia.)
Branches: Chicago, Philadelphia, Boston, St. Louis, Cleveland, Pittsburg, Cincinnati, Kansas City, Minneapolis, New Orleans, Seattle, London, Eng.; Montreal, Toronto, Winnipeg, Vancouver, Can.; St. John, N. B.; Halifax, N. S.

SHIELDS, MOTOR.

Johns-Manville Co., H. W., Madison Ave. and 41st St., New York City. (Asbestos.)

SHOCK ABSORBERS AND SUPPLEMENTARY SPRINGS.

Boyd, F. Shirley, 903 Boylston St., Boston.
J. M. Shock Absorber Co., 210 So. 17th St., Philadelphia. (J. M.)
Sager Co., J. H., 271 South Ave., Rochester, N. Y. (Peerless.)
Sumner, George, Inc., 1926 Broadway, New York. (Velvet Auxiliary, Acme.)

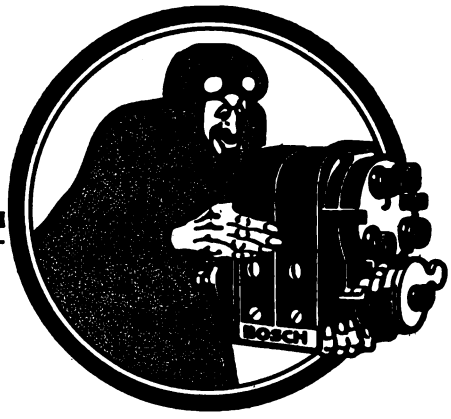
SOAPS.

Hopewell Bros., Newton, Mass. (Paos.)
Branch: 1974 Broadway, New York.

SPARK PLUGS AND IGNITERS.

American Ignition Co., 319 Adams St., Dorchester, Mass. (Amico.)
Bosch Magneto Co., 223-225 W. 46th St., New York.
Branches: See Magnetos and Magneto Supplies.
Heinse Electric Co., Lowell, Mass. (H. E. Co. Priming.)
Johns-Manville Co., H. W., Madison Ave. and 41st St., New York City.
Mosler, A. R., & Co., P. O. Box M, Mt. Vernon, N. Y. (Spit Fire.)
Randall-Faichney Co., Boston. (MacKae.)
Branches: See Horns.

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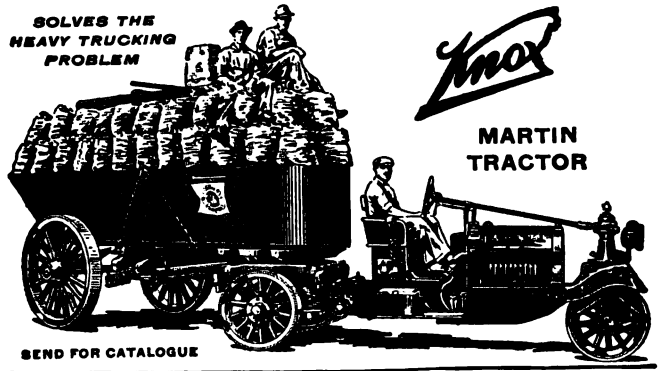
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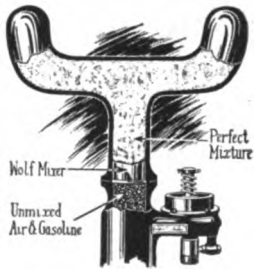
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Randall-Faichney Co., Boston. (Mac-Kae Blitz.)
Branches: See Horns.

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Hoffecker Co., The, Motor Mart, Boston. (Hoffecker.)
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Service Recorder Co., 2245 East 105th St., Cleveland. (Servis.)
Stewart-Warner Speedometer Corp., Chicago. (Auto-Meter.)
Branches: 116 Edgewood Ave., Atlanta, Ga.; 925 Boylston St., Boston; 720 Main St., Buffalo; 2420 Michigan Ave., Chicago; 807 Main St., Cincinnati; 2062 Euclid Ave., Cleveland; 1518 Broadway, Denver; 870 Woodward Ave., Detroit; 330½ North Illinois St., Indianapolis; 1613 Grand Ave., Kansas City; 748 S. Olive St., Los Angeles, Cal.; 1902 Broadway, New York; 302 N. Broad St., Philadelphia; 5940 Kirkwood Ave., Pittsburg; 14 N. Seventh St., Portland, Ore.; 36-38 Van Ness Ave., San Francisco; 611 E. Pike St., Seattle, Wash.; 3923 Olive St., St. Louis; 559 Yonge St., Toronto, Can.

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Boyd, F. Shirley, 903 Boylston St., Boston. (Baldwin.)

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Standard Welding Co., Cleveland.

STORAGE SYSTEMS—GASOLINE AND OIL.

Scaife & Sons Co., Wm. B., Pittsburg, Penn.
Branch: New York City.

TANKS, ACETYLENE GAS.

Prest-O-Lite Company, 271 East South St., Indianapolis. (Prest-O-Lite.)
Branches: See Cylinder Cleaning Compound.

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Scaife & Sons, Wm. B., Pittsburg, Penn.
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TANKS, TIRE INFLATING.

Prest-O-Lite Co., 271 East South St., Indianapolis. (Baby Tire Filler, The Emancipator.)
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Johns-Manville Co., H. W., Madison Ave. and 41st St., New York City.

THERMOS CASES.

Dover Stamping & Mfg. Co., Cambridge, Mass.

TIRE ACCESSORIES.

Firestone Tire & Rubber Co., Akron, O.
Branches: See Rims—Removable and Detachable.
Shaler Co., C. A., Waupun. Wis.

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Hopewell Brothers, Newton, Mass. (Hopewell.)
Branch: 1974 Broadway, New York.

TIRE CHAIN GRIPS. (See Chains.)

TIRE PRESERVATIVES AND PROTECTORS.

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TIRES—CASINGS AND INNER TUBES.

Braender Rubber & Tire Co., Rutherford, N. J. (Braender.)
Dayton Rubber Mfg. Co., Dayton, O. (Dayton Airless.)
Diamond Rubber Co., Akron, O. (Diamond.)
Firestone Tire & Rubber Co., Akron, O. (Firestone.)
Branches: See Rims—Removable and Detachable.
Fisk Rubber Co., Chicopee Falls, Mass. (Fisk.)
Branches: 811-813 Boylston St., Boston; 17½ Dorrance St., Providence.
Gaulois Tire Co., 1926 Broadway, New York. (Gaulois.)
Goodyear Tire & Rubber Co., Madison St., Akron, O. (No-Rim-Cut.)
Branches: In all principal cities.
United States Tire Co., Broadway and 58th St., New York. (Continental, G & J, Hartford, Morgan & Wright.)
Branches: See Rims—Removable and Detachable.
Walpole Tire & Rubber Co., Walpole, Mass. (Walpole.)

TIRES—CUSHION.

Cataract Rubber Co., Wooster, O. (Cataract.)
Branches: Boston, New York, Providence.
Firestone Tire & Rubber Co., Akron, O. (Firestone.)
Branches: See Rims—Removable and Detachable.
Motz Tire & Rubber Co., The, Akron, O. (Electric Special Motz Cushion.)
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TIRES—MOTORCYCLE.

United States Tire Co., Broadway and 58th St., New York. (Morgan & Wright, G & J.)
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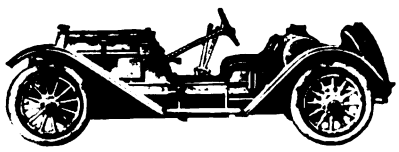
TIRES—SOLID AND COMMERCIAL.

Diamond Rubber Co., Akron, O. (Diamond.)
Firestone Tire & Rubber Co., Akron, O.
Branches: See Rims—Removable and Detachable.
Fisk Rubber Co., Chicopee Falls, Mass.
Branches: See Tires—Casings and Inner Tubes.
Motz Tire & Rubber Co., The, Akron, O. (Motz.)
Branches: See Tires—Cushion.
Polack Tyre and Rubber Co., 246 W. 59th St., New York City. (Polack.)
Republic Rubber Co., Youngstown, O. (Republic.)
United States Tire Co., Broadway and 58th St., New York.
Branches: See Rims—Removable and Detachable.

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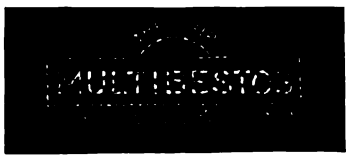
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Connecticut Steel & Wire Co., Hartford, Conn.

TUBING, GAS.

Johns-Manville Co., H. W., Madison Ave. and 41st St., New York City.

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Beach Co., T. C., 108 Ottawa St., St. Johns, Mich. (Beach.)

UNIVERSAL JOINTS.

Bretz Co., J. S., 520 W. 54th St., New York. (Hartford.)

VALVE GRINDERS.

Wall, J. H., 290 Hope St., Bristol, R. I. (Ford.)

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Vanderpool Co., Springfield, O.
Williams Foundry & Machine Co., Akron, O.

WELDING OUTFITS.

Prest-O-Lite Co., 309 W. South St., Indianapolis. (Prest-O-Welder.)
Branches: See Cylinder Cleaning Compound.

WELDING STEEL.

Standard Welding Co., Cleveland.

WHEELS.

McCue Co., The, Buffalo, N. Y. (Wire.)

WIRES AND CABLES.

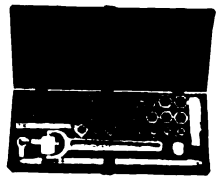
Diamond Rubber Co., Akron, O. (Diamond.)

WIRE MECHANISM.

Bretz Co., J. S., 250 W. 54th St., New York. (Bowden.)

WRENCHES AND COMBINATION OUTFITS.

Allen Wrench and Tool Co., Providence, R. I. (Allen Friction Socket Sets.)
Coes Wrench Co., Worcester, Mass.
Cutter, George A., Taunton, Mass.
Walworth Manufacturing Co., Boston. (Stillson.)



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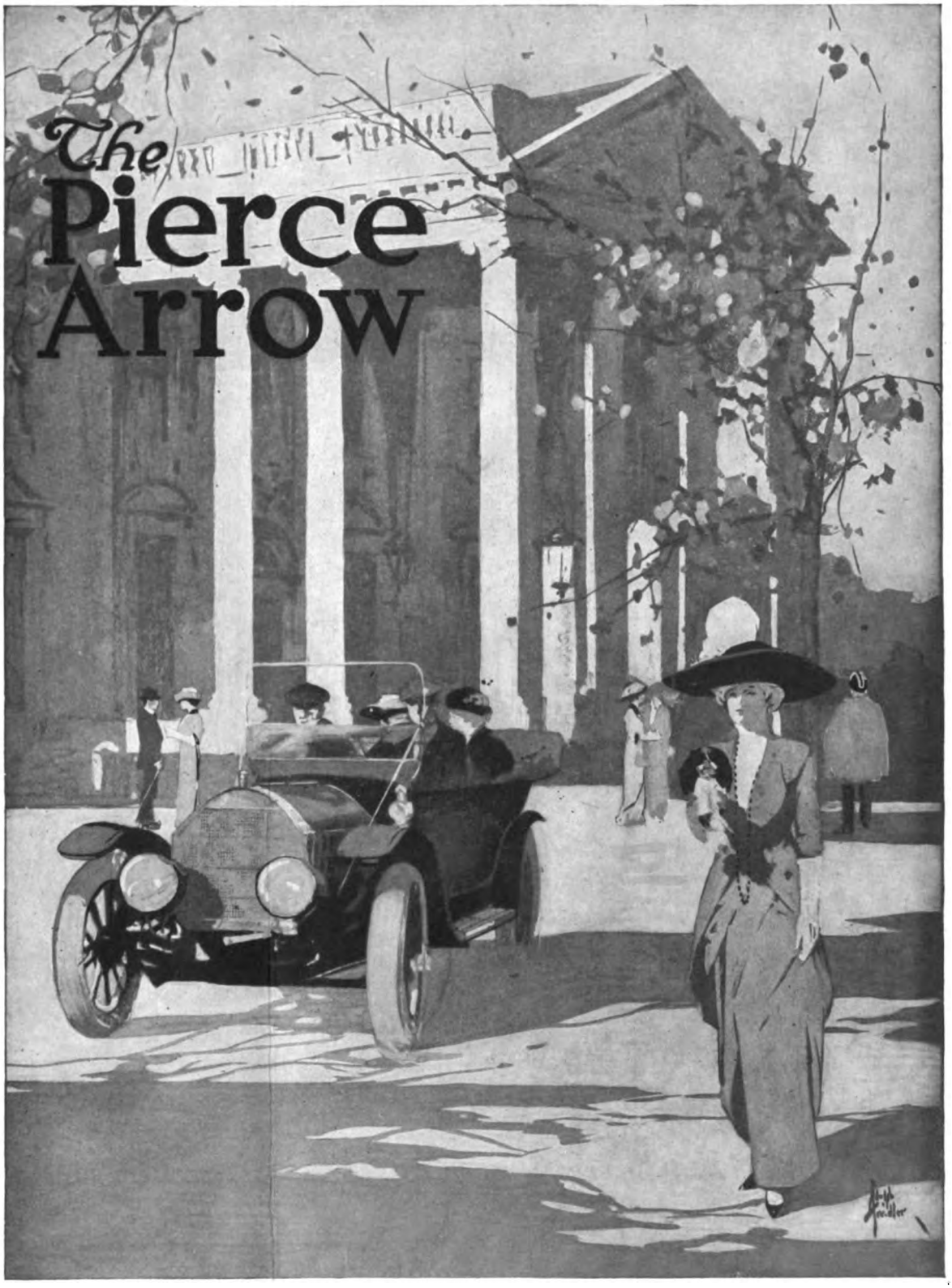
Bay State Autokit, No. 2, $7.50

Bay State Stickit, $3

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